



SCHOOL OF
ECONOMICS AND
MANAGEMENT

Innovation Strategies in a VUCA World

A Systematic Literature Review

by

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ABSTRACT

Purpose: The purpose of this study is to provide an overview and understanding of what innovation strategies to thrive in a VUCA world are presented by research published from 2015-2024. As the characteristics and consequences of the VUCA world become increasingly evident and in today's corporate environment, utilizing innovation strategies are one forwarded way in order for corporations to maintain prosperity in volatile, uncertain, complex and ambiguous environments. Thus, by reviewing, describing, analyzing and synthesizing what 54 published theoretical and empirical research articles suggest as suitable innovation strategies to thrive in a VUCA world, we aim to present main themes, commonalities, differences and inconsistencies in the selected research.

Methodology: A systematic literature review was conducted to produce an objective data collection and analysis process and thus provide objective findings.

Findings: The main finding of this systematic literature review consists of the distinguished representation of suggestions of innovation strategies to thrive in a VUCA world that focuses on agility, adaptability and flexibility of organizations, managers and leaders. Another finding revealed that innovation was an outcome of the implementation of strategies focusing on organizational, managerial and leadership agility and flexibility. A third finding is the minor contribution of technologically oriented innovation strategies that was found among the 54 research articles that were reviewed. Another finding suggests that technologically oriented research tended to design strategies where innovation was a component of the strategy instead of an outcome.

Contribution: This study is valuable for scholars in academic fields of strategic management and or technological innovation management for managerial positions and organizations and for individuals with an interest in the field of VUCA, strategic management and innovation. Due to the description, analysis and synthesizing of 54 research articles, an overview of a part of the academic field of innovation strategies and VUCA contributes to understandings of what academia perceives to be challenges related to VUCA and suggestions for strategies to solve these challenges. This provides suggestions for scholars on how to further this research and valuable insights for practitioners.

Keywords: VUCA, VUCA world, Volatility, Uncertainty, Complexity, Ambiguity, Innovation, Strategy, Innovation strategies, Agility, Organizational Development Leadership Agility, Organizational Ambidexterity

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Table of Contents

1. Introduction	5
1.2 Relevance of Research	6
1.3 Purpose and Research Question	7
1.4 Delimitations	7
1.5 Outline of Thesis	8
2. Theoretical Frame of Reference	9
2.1 VUCA Definition	9
2.2 A VUCA world	10
2.3 Understanding Innovation	12
2.4 Defining Strategy	13
2.5 Innovation Strategies in a VUCA world	15
3. Methodology	19
3.1 Motivation of Choosing the Systematic Literature Review Approach	19
3.2 Conducting the Systematic Literature Review	21
3.2.1 Data Collection	21
3.2.2 Data Analysis	27
3.3 Methodological reflection	28
3.3.1 Data Quality	28
3.3.2 Reliability and Validity	31
4. Findings	33
4.1 Organizational Adaptations	34
4.1.1 Leadership	37
4.1.2 Dynamic Capabilities & Ambidexterity	44
4.1.3 Organizational Culture	46
4.1.4 Agility and Resilience Teams	48
4.1.5 Design Thinking	50
4.2 Technological Innovation Adaptations	51
4.2.1 Technological Innovation Management	51
4.2.2 Product Innovation Management	52
5. Analysis and Discussion	54
5.1 Analysis	54
5.1.1 Innovation as an outcome	54
5.1.2 Innovation as a Process	67
5.2 Discussion	70
5.2.1 Interpretation of analysis	71
5.2.2 Defining Innovation	73
5.2.3 Defining Strategy	75
5.2.4 Defining VUCA and a VUCA world	77
5.3 Critical Perspectives	82
6. Conclusion	84
6.1 Suggestions for Future Research	86
7. List of References	89

List of Tables & Illustration

Figure 1. The Innovation Landscape Map	17
Figure 2. Data Collection Search Results	22
Figure 3. Data Collection Process	22
Figure 4. Relevance rating and their motivation in relation to research question	25
Figure 5. Relevance Rankings and corresponding amount of research	25
Figure 6. Range of publication years in selected research	26
Illustration 1. Themes in the VUCA-literature	33
Figure 7. Scenario planning application model	44
Figure 8. Conceptual Framework	49

1. Introduction

Today, organizations are facing challenges as the world is becoming increasingly complex, unstable with unpredictable changes (Garvey Berger & Johnston, 2015). As a result, the acronym VUCA, representing a volatile, uncertain, complex and ambiguous world has gained immense relevance (Bennet and Lemoine, 2014a). These characteristics of the business environment are factors that according to Bennet and Lemoine (2014a) describes that: “*We now live in a VUCA world*” (pp. 311). Living in a VUCA world by Bennet and Lemoine (2014a) assumes to alter the nature of what is regarded to be competitive in corporate environments. In a similar fashion, Julia Sloan (2020) describes how increased complexities of markets prohibits managerial ability to plan ahead due to a nonlinear nature of how markets operate. As an alternative response to changing and complex characteristics of the business environment, Crossan and Apaydin (2010) and Damanpour (1991) argue for innovation as a broadly acknowledged source of competitive advantages in changing and complex markets (Crossan & Apadyn, 2010; Dampanour, 1991). Emphasizing innovation as a suitable response to a VUCA world inevitably presents speculation regarding what innovation entails in the context of VUCA and how innovation can be utilized as a suitable response to a VUCA world.

Formulating suitable responses of innovation in a VUCA world can evidently be executed in a multitude of ways. Strategic responses to a VUCA world focused on innovation have been forwarded as suitable to a business environment riddled by automation, outsourcing, deregulation, globalization and internet (Deloitte, 2015). Innovation can produce possibilities to respond to external and internal changing environments of organizations (Damanpour, 1991). Rita Gunther McGrath (2013) describes the demand for transient competitive advantage in business strategy formulation as market turbulence has increased as a result of globalization. Bonn (2001) describes that innovation is furthered by the creativity fostered in a corporate culture where employees are invested in the innovative practices. To achieve creativity and innovation, managers are encouraged to fortify motivation in their team. At the same time, in motivating employees to foster innovation, Schilling (2020) articulates various types of innovation, examples being radical, incremental, disruptive and technological innovation (Schilling, 2020). On the other hand, McGrath (2013) describes the demand for transient competitive advantage in business strategy formulation as market turbulence has increased as a result of globalization.

The above section provides an overview of the abundance of sorts of innovation and how scholars perceive how innovation is optimally utilized in order for organizations to thrive in a VUCA world. Despite the importance placed on innovation as a suitable response to a VUCA world, navigating what sort of innovation is suitable in a certain context can become difficult. This is due to the extensive assortment of innovation sources and suggestions of applicable strategic methods presented by various scholars. We therefore argue in line with Tulder et.al (2019) that there needs to be a closer look at how to overcome challenges presented by a VUCA world. Conducting research that aims to detangle what challenges VUCA presents and what different approaches and strategies involving innovation is therefore useful to bring increased clarity. This is further elaborated on in the section below.

1.2 Relevance of Research

As presented above, the field of VUCA and innovation as a suitable mechanism in which challenges of a VUCA world can be solved is complex in various ways. VUCA presents four different dimensions of challenges corporations can face (Bennet and Lemoine, 2014a) and there are different types of innovations that require efficient management to be forwarded (Bonn, 2001). In order to be able to utilize innovation as a suitable response, detangling what type of innovation is successful in a specific context is highly relevant to combat the VUCA world. In addition, due to the multitude of innovation sources and suggested strategies on how to utilize the innovation, amounts of unique innovation strategies grow as a result.

In light of this, we have decided to conduct a systematic literature review that aims to provide an overview of what published research argues to be suggestions of how to utilize innovation in a VUCA world. This systematic overview aims to detect what innovation research believes presents challenges related to a VUCA world and what innovation strategies are suitable in solving these challenges. Performing this study therefore aims to bring clarity and understanding of the field of VUCA, innovation and strategic management. This becomes relevant for scholars in these fields, practitioners and individuals interested in what challenges a VUCA world as an overview of the field reveals what challenges and strategies other scholars deem to be the greatest of relevance.

1.3 Purpose and Research Question

The purpose of this research was to investigate what strategic responses published empirical and theoretical research suggest in order for organizations to thrive in a VUCA world. The purpose was reached through performing a systematic literature review that described, analyzed, synthesized and scrutinized a chosen part of the academic realm. Through this method, we have achieved valuable insights on the topic of what research suggests are suitable innovation strategies in order for organizations to thrive in a VUCA world.

The contributions produced in this study are of direct relevance for scholars, managerial positions of organizations and individuals with a general interest in the academic field of VUCA, innovation and strategic management. The systematic literature review approach allowed for a comprehensive overview of different suggestions of innovation strategies put forward by research which revealed a strong focus on managerial and leadership responsibilities and capabilities of assisting organizations in a VUCA world. Moreover, the review provided insights to the fragmentation and dispersion of management and technological focused innovation that allowed for identification of inconsistencies and possible research gaps and thus future recommendations valuable to scholars in the academic field. Finally, the systematic review format provides an overview and summary of 54 research articles that provides a simplistic manner in which individuals with an interest in the field can get an understanding of what suggestions of innovation strategies in a VUCA world research provides.

In order to provide this purpose and guide this research, the following research question is as follows:

What suggestions does research provide as innovation strategies to thrive in a VUCA world?

1.4 Delimitations

One limitation for this study is that it does not seek to evaluate what of the presented innovation strategies that can be deemed to be the “key strategies to thrive in a VUCA world”. Instead, this study aims to develop an understanding and overview of what innovation strategies research presents and account for their similarities and differences and potential inconsistencies.

1.5 Outline of Thesis

In section 1, we introduce the research topic and motivate the relevance of pursuing the systematic literature review. In addition, we describe the purpose of conducting the research and the research question that will guide the research. We will also account for relevant delimitations for this research project and what approaches that have been decided on instead.

In section 2. Theoretical Frame of Reference, we elaborate on definitions of key terms in relation to the topic and research question of this study. Here, definitions of VUCA and the VUCA world along with definitions of innovation and strategy are provided to bring an understanding of the terms. Finally in this section, we present a critical understanding of innovation strategies in a VUCA world and what it entails for this study.

In section 3. Methodology, we motivate and describe the chosen research method and design which is the systematic literature review. Here we also elaborate on the data collection process and analysis and provide a motivation and critical explanation of the data quality. Then we proceed to discuss limitations through a methodological reflection where we account for factors that might have impacted the quality and understanding of the study.

In section 4. Findings, we in detail describe the 54 research articles chosen for this study and what they entail. To enhance clarity of this elaborate section, we initiate the section by explaining a general categorization that simplifies the interpretation of the findings.

In section 5. Analysis and Discussion, we will provide a more in depth categorization of the findings and include external scholars opinions and knowledge to the analysis. In the discussion, we apply a critical dimension and reflect on the usage and definitions of the key terms VUCA and the VUCA world, innovation and strategies. We also elaborate and provide discussion around the word thrive in the research question. This together with the analysis provides extended findings and answers to our research question.

In section 6. Conclusion we will present the main findings and provide answers to the research question. We will also based on the finding and discussion produce suggestions for future research.

2. Theoretical Frame of Reference

This section aims to describe key terms related to the research question of this study. The clarifications and explanations of these terms will be used in the discussion section of the study and simplify understanding of the subsequent sections.

2.1 VUCA Definition

Today, the VUCA term is a widely used concept in the corporate world and academic realm. VUCA is characterized by four components; Volatility, Uncertainty, Complexity and Ambiguity and they describe an environment where change is rapid and unpredictable, making it challenging to anticipate and respond effectively to emerging situations (Bennett & Lemoine, 2014a). In order to gain a comprehensive understanding of the many dimensions and meaning of a VUCA world, it is essential to understand that each component has its own specific significance that needs to be understood individually and addressed as a separate phenomenon (Bennett & Lemoine, 2014a).

2.1.1 Volatility

Volatility is characterized by instability and unpredictability (Bennett & Lemoine, 2014a). A situation can be volatile without having complex or ambiguous elements, such as lack of knowledge of the cause and why it is happening. In a VUCA world, events and conditions can shift suddenly, creating instability and turbulence. Agility is essential for managing volatility (Bennett & Lemoine, 2014a). The key to avoiding becoming a victim of a volatile situation is to stock up on both material resources, talent, and skills to be ready to act when needed (Bennett & Lemoine, 2014b).

2.1.2 Uncertainty

Uncertainty refers to situations marked by lack of knowledge and information that causes it to be unpredictable (Bennett & Lemoine, 2014b). In uncertain situations, cause and effect are known, but because of the lack of predictability and additional information, uncertainty remains. While volatility suggests likely but varying changes, uncertainty may not involve any inherent change at all. In a VUCA world, there may be limited information or conflicting signals, making it hard to make informed decisions (Bennet & Lemoine, 2014a).

2.1.3 Complexity

Bennett and Lemoine (2014a;2014b) and Kurtz and Snowden (2003) describe a complex situation as one with interconnectedness of different factors and variables affecting each other. In a VUCA world, issues and problems are often multifaceted, involving numerous stakeholders and overlapping systems (Bennet & Lemoine, 2014a). Hence, processing the information available can be challenging and overwhelming (Bennett & Lemoine, 2014b). Complex situations demand considerable effort to gather, assimilate, and comprehend the relevant information comprehensively (Bennet & Lemoine, 2014a).

In complex environments, foreseeable situations do not exist because of the lack of predictable outcomes (Kurtz & Snowden, 2003). As a result, it is hard to predict the relationship between cause and effect until after the situation has happened where the results can be observed. Although the cause-and-effect pattern may seem logical retrospectively, there is no guarantee that these patterns will repeat in a complex world (Kurtz & Snowden, 2003).

2.1.4 Ambiguity

Bennet & Lemoine, (2014a) describes that in an ambiguous situation, the relationship between cause and effect is unclear. It does not become more clear with additional information (Bennett & Lemoine, 2014b), An ambiguous situation often centers around a completely novel product, market, innovation or opportunity. Dealing with ambiguity presents greater difficulty due to its novelty: there is minimal historical precedent to guide predictions about the consequences of specific causes or actions (Bennet & Lemoine, 2014a). This describes the presence of multiple interpretations or unclear meanings. In a VUCA world, situations may be open to different interpretations, leading to confusion and lack of clarity about what actions to take (Bennet & Lemoine, 2014a).

2.2 A VUCA world

The VUCA world describes the complex, rapidly changing, and unpredictable nature of the world we live in, encompassing various sectors such as business, politics, economics, technology and society at large (Bennet & Lemoine, 2014a). While the concept of VUCA refers to the framework itself, the VUCA world refers to the reality or context in which the framework is applied to understand and navigate complex challenges and uncertainties. When dealing with a VUCA world, situations and outcomes are unpredictable (Kurtz & Snowden, 2003).

Due to the complex nature of the VUCA world, managerial and strategic approaches are necessary in order to navigate it. Bennet and Lemoine (2014a) argue that in order to navigate the complexity of the world, organizations must be able to mirror the environment. It is essential to recognize and analyze external shifts in the environment to facilitate internal changes within organizations. Kurtz and Snowden (2003) suggest that relying solely on experts' opinions is insufficient when addressing complexity. They caution that depending only on expertise may hinder individuals' ability to recognize unexpected patterns and respond effectively to unforeseen situations in a complex world. Kurtz and Snowden (2003) propose that other traits and skills beyond expertise are desirable in employees for navigating such an environment. For instance, a VUCA world presents challenges that require adaptability, resilience, and innovative thinking to navigate successfully (Kurtz & Snowden, 2014).

But what does this statement mean in practice? Why would capabilities to be adaptive and resilient and attempt to think innovatively only benefit a VUCA world and not a non-VUCA world? Garvey Berger and Johnston (2015) write how in a predictable world, it is sufficient to consider what is most likely based on past events. However, in a complex world, one must contemplate all possibilities. That a VUCA world requires organizations to consider all possible outcomes naturally raises speculation that this would not be necessary in a non-VUCA world. Considering all possibilities to mitigate risks in business related decisions is likely the recommendation of strategists in a VUCA or non-VUCA world as means to make the most informed strategic decisions to overcome risks and problems.

Garvey Berger and Johnston (2015) emphasize that assumptions based on previous knowledge and experiences that work well in predictable environments will need reevaluation in a complex world. The authors highlight that this contributes to the importance of people's mindsets and behaviors in navigating a VUCA world. However, shifting from focusing on probabilities to considering possibilities can be challenging because human brains tend to simplify things. The authors also address that by creating new habits and thinking patterns, the human can develop the ability to handle complexity better (Garvey Berger & Johnston, 2015).

From this section, it is evident that scholars believe that action and mindsets must be changed in a VUCA world compared to a non-VUCA world. Due to the complex and inevitable impossible ability to predict future outcomes in a VUCA-world, capabilities of adaptability, agility, and resilience are required. Garvey Berger & Johnston (2015) also indicates that organizations and individuals must challenge preconceived notions of how to handle complex situations in a non-VUCA world in order to manage complexity in a VUCA world.

2.3 Understanding Innovation

“Innovation is everywhere today” (Kahn, 2018, p.453). Innovation can arise from many different sources (Schilling, 2020). Innovation is “*the practical implementation of an idea into a new device or process*” (Schilling, 2020, p.18). It can originate with individuals such as an inventor, the individual who designs solutions for their own needs, from research efforts of universities, government laboratories, incubators or private nonprofit organizations. Regardless, the primary driver are firms and linkages between sources, called networks of innovators. Networks of innovators that use knowledge and other resources from multiple sources are one of the most powerful drivers of technological advance (Schilling, 2020). Innovation begins with the thought process of ideas and the ability to generate new and useful ideas and is referred to as creativity. It is the ability to produce work that is useful and novel.

Schilling (2020) continues by describing that novel work must be different from work that has been previously produced, but it also means that it can not simply be the next logical step in a series of known solutions. Innovation can be reinvented, thus innovation does not have to be something completely new and radical, it can also be minor incremental innovation. Radical innovation is an innovation that is very new and different from prior solutions. Incremental innovation is an innovation that makes a relatively minor change from or adjustments to existing practices (Schilling, 2020).

Innovation is both the introduction of something new, meaning that it is an outcome, but it is also a new idea, method or device. These definitions capture the essence of innovation as the process or result of introducing novelty or creating something new, whether it's a product, service, process or concept (Kahn, 2018). Organizations that confine innovation to just one aspect, that is either an outcome or a process, will inevitably miss the mark in their endeavors. Those fixated solely on outcomes risk neglecting the importance of the process, resulting in inefficiencies such as duplicated efforts and excessive resource consumption.

Conversely, organizations overly focused on the process can inadvertently foster bureaucratic obstacles that hinder the realization of outcomes. With this in mind, achieving a balanced view and perspective that integrates both outcomes and processes is crucial (Kahn, 2018).

2.4 Defining Strategy

Although the term “strategy” is widely used, its exact meaning is far from being shared (Grant, 2018). Despite extensive academic research, there is little consensus on its definition (Sloan, 2020). Essentially, the interpretation of strategy depends on whether one focuses on past achievements or future goals. To some, strategy represents a recurring pattern of success, while to others, it signifies a comprehensive plan of action aimed at achieving victory. Grant (2018) intentionally states in his book that strategy in the end is the process in which organizations or individuals can reach their set goals. Strategy involves setting goals, allocating resources but also establishing consistency and coherence among decisions and actions (Grant, 2018). Regardless of the specific definition used, all interpretations of strategy imply a desire to succeed, a competitive element, a structured approach to success, a long-term outlook, the identification of overarching goals, a cohesive intent, and decisions regarding resource allocation (Sloan, 2020).

Despite the comfort in concluding that there might be as many definitions of strategy as there are stars in the sky, a more limited definition is more optimal as a general definition could get so unspecific that another term could be inserted instead of strategy and still provide the same meaning to the discussion. If the definition of strategy could insert skill instead and still provide a very similar definition, this would decrease the relevance of defining the term overall. With this in mind, the following paragraphs include definitions of strategy made by prominent researchers in the field of strategic management. These definitions are therefore not the entirety of strategy as a concept and term and should not be regarded as the correct way to define it. Despite this, by utilizing their definitions, how it can be perceived and applied is aimed to bring clarity to understanding the findings of this study.

Michael Porter (1996) in his article “What is Strategy?” describes that essentially, strategy in recent times is about organizations creating uniqueness and the set of products and activities that competitors will have difficulties trying to imitate. The consideration Porter takes to fast changing markets and products and thus elements to a VUCA world in this article is evident. This is shown in his discussion of the decreasing relevance of positioning products and

services due to the increasing importance of technological innovation and that strategic positioning of an organization will not produce a competitive advantage as imitation of products and services decreases unique selling points. Porter (1996) continues to embark on defining strategy by separating strategy with operational efficiency. The author discusses that both terms concern achieving organizational success although operational efficiency regards the speed and effectiveness of utilizing resources in a more successful manner than competitors. Strategy is on the other hand about constructing activities that are unique in relation to competitors and thus bring a competitive and unique value in the products or services the organization is offering.

Henry Mintzberg (2009) describes that formulating and managing strategies is more about the continuous development when conditions are altered and initially proposed strategies are no longer functioning as thought. Mintzberg directs critical thoughts to Porter's view on analysis to formulate competitive strategy and instead directs attention to the fact that strategy in comparison to analysis requires to be synthesized in order to be successful. Defining and formulating strategy is, according to Mintzberg, less about the analytical tools utilized to develop strategy and more about how they are managed in order to stay successful. Mintzberg also articulates that strategy can be formulated without a deliberate strategy formulation process and instead through informal learning.

Rita Gunther McGrath (2013) challenges what she argues to be 'textbook examples' of how to formulate competitive strategies. The author addresses that although developing unique activities difficult to imitate as core components of corporate strategy has a negative impact on company performance, maintaining a sustainable competitive advantage in the current business world is more difficult. Due to factors of globalization and decreased barriers to enter markets, McGrath (2013) introduces the *Transient Competitive Advantage* as a useful complement in order for companies in turbulent markets to sustain their competitive advantage. The core of transient competitive advantage include re-imaging goal setting of what stability, innovation and evaluation competition looks like. Instead of attempting to hold on to a unique edge to a product or service that creates a competitive advantage, the transitory nature instead urges organizations to view competitive strategy in phases and be able to adapt as the process continues. This means that depending on the success rate in which a company can effectively allocate resources to upscaling a project, the ability to embark on a disengagement process when the competitive advantage is no longer reasonable to reach

contributes to the companies ability to sustain a transient competitive advantage. The continuous adaptability to relevant circumstances and the coordination of an organization in relation to these alterations becomes the core strength of sustaining competitive advantages in fast moving, turbulent markets.

2.5 Innovation Strategies in a VUCA world

The above sections have clarified an assortment of definitions of terms that is of high relevance in this study. The concepts of VUCA, innovation and strategy are terms that have many commonalities and one characteristic that is especially interesting for this study is that there is no exact and correct definition of either of the terms. What is to be considered a VUCA world? What is an innovative product or service? What is a (good) strategy? In these questions, there are various speculative components and questions that are highly subjective in nature. Strategy is said to be about value creation, competitive advantage and uniqueness (Kraaijenbrink, 2019). Just like what is considered to be innovative and what can be considered a VUCA world, there is no clear and unison. In light of this, precaution is required when reviewing research that addresses these topics. In order to provide a theoretical backbone of factors to consider when reviewing innovation strategies in a VUCA world is presented below. These descriptions correspond to different types of innovation in different contexts, variations that are likely to stumble upon when reviewing research.

Schilling (2020) presents important aspects to protecting technological innovations. She argues that an important part of formulating a firm's technological innovation strategy is determining whether and how to protect its technological innovation. Traditionally, experts in economics and strategy have emphasized the importance of protecting new ideas strongly so that the firm gets the most benefit. However, deciding how much to protect an innovation can be complex (Schilling, 2020). Schilling (2020) proceeds to present that the effectiveness of protection methods for innovations differs greatly, both within industries and across them. In pharmaceuticals, legal protection like patents are highly effective. However, in sectors like electronics, patents and copyright offer limited protection since competitors can often develop similar technologies without violating patents. In certain competitive scenarios, it might be more advantageous to freely share a technology rather than safeguarding it. In industries marked by increasing returns, companies may opt to liberally diffuse their technologies to increase the chances of rising to the position of dominant design (Schilling,

2020). To resolve these trade-offs, firms often adopt a strategy of partial protection for their innovation. Many technologies are partially open, meaning that they utilize varying degrees of control mechanism to protect their technologies.

In order to implement technology strategies in a firm, innovation needs to be aligned with the overall business strategy. There is not one innovation system that fits all firms equally well or works under all circumstances. Grant (2018) describes that chosen innovation strategies for companies could possibly be a predefined set of structures and technologies that are moved together to form a strategy. However, Grant emphasizes the importance of implementing innovation systems. The system should direct attention to the procedures carried out by organizations to produce novel ideas and products and more importantly, how these ideas are formulated into effective business designs to ensure prosperity.

A company lacking an innovation strategy will struggle to make decisions regarding trade-offs and the selection of components within the innovation system. An explicit innovation strategy helps the creation of a system tailored to meet the particular competitive demands. Managers should be the ones articulating an innovation strategy that states how their firm's innovation efforts will support the overall business strategy. As the environment changes, innovation strategies must evolve to stay competitive. Creating an innovation strategy involves deciding how innovation will create value for potential customers, how the company will capture it and what type of innovation to pursue (Pisano, 2015).

The choice regarding how to capitalize on an innovation hinges critically on the resources and capabilities that the innovation offers (Grant, 2018). For instance, start-up firms typically lack the requisite complementary resources and capabilities necessary for the commercialization of their innovations. Consequently, they are often inclined towards options such as licensing or leveraging the resources of larger firms through outsourcing, alliances, or joint ventures. Innovation increasingly necessitates coordinated responses by multiple companies. Hence, firms striving to innovate must first recognize and map their innovation ecosystem, subsequently overseeing and managing the interconnections within it (Grant, 2018).

The optimal timing for market entry depends on the resources and capabilities accessible to a firm. The advantage of early entry is contingent upon factors such as;

1. “The extent to which innovation can be protected by property rights or lead-time advantages” (Grant, 2018, p.229).
2. “The importance of complementary resources” (Grant, 2018, p.230).
3. “The potential to establish a standard” (Grant, 2018, p.230).

Various firms operate within distinct strategic windows when their resources and capabilities align with the opportunities available in the market (Grant, 2018). Regarding innovation opportunities, companies have a choice about how much of their efforts to focus on technological innovation and how much to invest in business model innovation. Based on Pisano (2015), innovation can be characterized in two dimensions: the degree to which it involves a change in technology and the degree to which it involves a change in business model. The map, so called “The Innovation Landscape Map” shows how four quadrants, or categories, of innovation exist on a continuum. Grant (2018) uses this map to describe how to implement technology strategies in an organization and how to organize for innovation. He writes that in assessing the implementation challenges of innovation, it is important to recognize the implication of innovation for a firm's capabilities and its business model (Grant, 2018, p. 242).

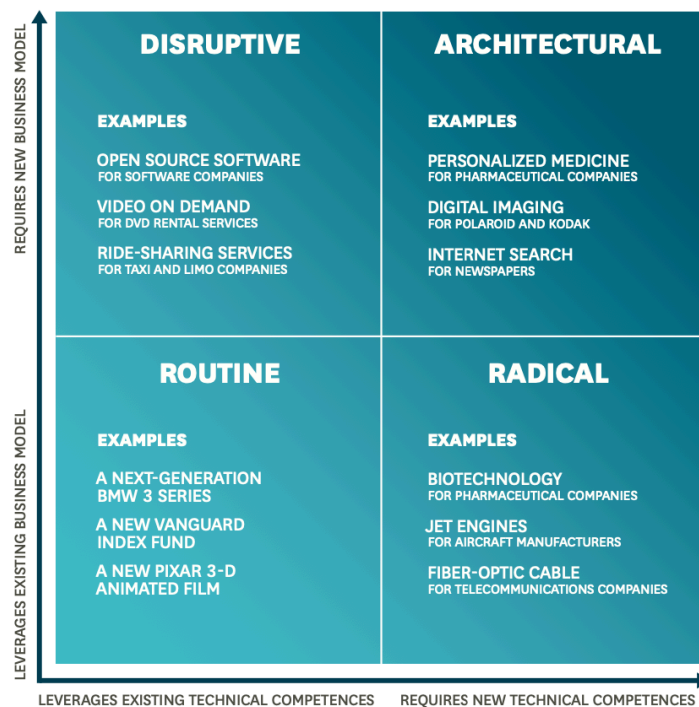


Figure 1. Innovation Landscape Map Gary (Pisano, 2015, pp.44-54)

Grant (2018) provides key lessons about strategies to successfully manage innovation and technological change. The first lesson includes learning how value through innovation can be created and shared among different stakeholders in a market. Value creation includes property right, tacitness and the level of complexity of an innovative product or service. The second key lesson regards tactical introduction of innovation and what strategic incentives that exist to become a leader of innovation or a strategic runner up. Tactical positioning also includes whether to join innovative alliances and how to manage risks following innovative activities. The final lesson is how to structure suitable strategies to manage innovation and how to organize creative activities in an organization (Grant, 2018).

To implement and design strategies in industries where innovation is a key success factor, strategy needs to be closely tailored to the characteristics of technology, market demand and industry structure. For instance, Apple, Amazon, Toyota and Facebook have all been highly successful in using innovation to build competitive advantage and they have all developed strategies that are tailored to their individual circumstances (Grant, 2018). Ingrid Bonn (2001) presents challenges for senior managers in creating a work environment conducive to exploration of new ideas and fostering innovation. She argues that senior managers play a pivotal role in embedding a culture of creativity throughout the organization, making it an integral part of its identity and the cornerstone of how it operates (Bonn, 2001).

Bonn (2001) further elaborates on the different factors that stimulate innovation and creativity. Creativity thrives when people are driven by the interest, satisfaction, and by the challenge inherent in their work, rather than external pressures. Managers can cultivate creativity by nurturing the intrinsic motivation of employees. Therefore, it is essential to unlock the potential of the organization's employees, and to do that, one needs to have an understanding of the factors that stimulate innovation and creativity. Furthermore, effective communication is paramount. Managers must consistently convey the message that creativity is highly valued within the organization. This involves elevating the overall creative capacity and promoting a culture that encourages creative thinking and innovation (Bonn, 2001).

3. Methodology

This section is meant to thoroughly explain and motivate choices of methodology, data collection and data analysis as well as account for the research quality and limitations of chosen research method.

3.1 Motivation of Choosing the Systematic Literature Review Approach

To provide insights and understanding of what existing research suggests to be suitable innovation strategies to thrive in a VUCA world and to systematically synthesize key themes, the chosen methodology for this study is the systematic literature review.

This choice of method is suitable for this study as it allows us to thoroughly investigate, scrutinize and synthesize a selected part of the academic realm of innovation strategies and the concept of VUCA. The systematic literature review entails an in depth review of systematically chosen empirical and theoretical literature where findings encapsulate key themes and differences in the literature (Booth et.al, 2022).

In choosing an appropriate research method and design for this study, our initial choice of research design and methodology was to conduct semi-structured interviews and investigate what managers involved in innovation related practices did to strategically brave the VUCA times. In line with Sekaran and Bougie's (2016) discussion of appropriate research design, there is never a perfect research design and limitations and disadvantages are natural to any choice. On the other hand, the authors discuss various criteria a researcher must take into consideration when choosing appropriate research designs. Some of these include availability of resources, time, research objectives and research questions (Sekaran and Bougie, 2016).

With this in mind, we performed initial, intentionally broad searches on credible databases as EBSCOhost to create a general understanding of the state of the academic field of innovation strategies and VUCA. This was done to build understanding of how much research already has been performed on the topic and hence if there were any research gaps that demanded more empirical research.

The intentionally general and broad searches included search terms of "VUCA" or "Volatil*, Uncertain*, Complex*, Ambig*" and combination with "Innovation" on EBSCOhost. This

search generated 1 251 search results in current writing (May 2024). The plentiful results on this search provided an initial indication that the field of the VUCA world and innovation have been thoroughly investigated. As is shown in 3.2.1 Data collection, the search results utilized in the systematic selection of research revealed that research on innovation strategies and the VUCA world have been conducted many times before. In this way, a clear research gap was not identified and therefore, the choice to conduct a review of already published research was found to provide more contributions to the academic realm than conducting additional empirical research.

The choice to conduct a systematic literature review is further motivated by section 2. Theoretical Frame of Reference and more specifically the transparent discussion of the inherent limitations in consolidating “correct” definitions to dynamic concepts as strategy, innovation and to some extent, a VUCA world. The dynamic nature of these concepts bring about motivation to contribute to the academic realm by a research review instead of empirical research. With this research approach, we are providing clarification of what innovation strategies research suggests are suitable for thriving in a VUCA world and account for the dispersion of empirical and theoretical research, differences and similarities in the academic field. By doing this, we believe we can contribute with more insights to what future research should focus on according to our discussion and conclusion and therefore contribute in a more meaningful way than producing empirical research. This is further elaborated on in 3.2.2 Data analysis and 3.3 Methodological reflection.

In order to ensure that the literature review remains systematic, Booth et.al (2022) describes features of the literature review that enhances the systematic nature and the research quality. According to Booth et.al (2022) & Easterby-Smith; Thorpe and Jackson (2015), conducting a review of literature systematically entails adhering to consistent choices of search terms, databases and criterias on which research is selected. Not only does a systematic approach allow for increased objectivity as choosing research on pre-selected criterias and search terms decreases personal bias influencing what is deemed relevant. A detailed explanation of chosen methodology and included steps in selecting and analyzing research provides transparency to the study and allows fellow researchers and practitioners to easily investigate what efforts produced a certain outcome and motivation of chosen efforts (Booth et.al, 2022) & (Easterby-Smith; Thorpe and Jackson, 2015).

To adhere to the systematic approach, a specific process was created in order to bring clarity into what databases, search terms and keywords, limitations and filterings were utilized in the data collection process in order to ensure transparency and replicability. This process also aims at visually displaying the chosen systematic method in a simplistic manner, allowing for practitioners and researchers to clearly examine what and what was not done in this study, features business methodology literature argues to increase the quality of the method, (Booth et.al, 2022).

This systematic literature review was conducted in two main steps, data collection and data analysis. The data of this study is the previous research in the academic field of innovation strategies and the VUCA concept and regards how the collection of this research was carried out. The data analysis describes how and what tools were utilized to analyze and discuss the findings and contribute to answering the research question and produce conclusions for this study.

3.2 Conducting the Systematic Literature Review

This section consists of two parts which together create the process in which this systematic literature review was conducted.

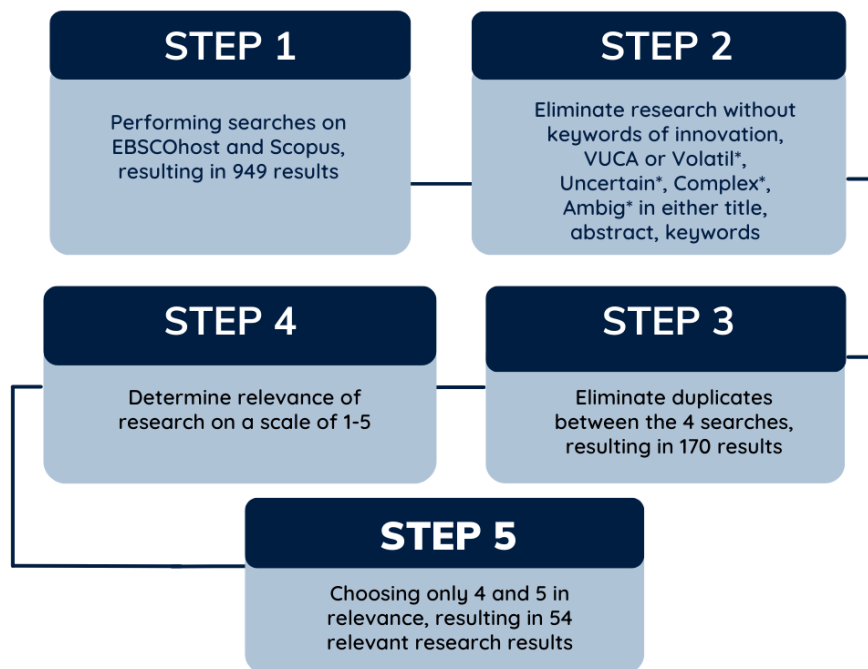
3.2.1 Data Collection

This section aims to describe and present the collection of empirical and theoretical research and choices made in the data collection process.

Figure 2 - Data Collection Search Results

Search terms	Database	Filters:	Number of results
VUCA OR Volatil*, Uncertain*, Complex*, Ambig* AND Innovation Strateg*	EBSCOhost, Business source complete & Academic search complete	Peer-reviewed, Academic Journals, English	410
VUCA OR Volatil*, Uncertain*, Complex*, Ambig* AND Strateg*	Scopus	Journals, Articles, Conference papers, English	56
VUCA OR Volatil*, Uncertain*, Complex*, Ambig* AND Innovation Management	EBSCOhost, Business source complete & Academic search complete	Peer-reviewed, Academic Journal, English	411
VUCA OR Volatil*, Uncertain*, Complex*, Ambig* AND Innovation Management	Scopus	Journals, Articles, Conference papers, English	72
Total number of results			54

Figure 3 - Data Collection Process



In accordance with the figures above, initial searches on EBSCOhost were performed to investigate the extent of the academic field of Innovation in a VUCA world. The first choice was to decide where the research was going to be derived from and ensure the credibility and quality of these databases.

We chose to utilize EBSCOhost and Scopus as databases for browsing research. The databases were suitable choices due to their credibility, trustworthiness and possibility to filter and distinguish search terms. From business research academia, the importance of high quality research has been highlighted (Easterby-Smith; Thorpe and Jackson, 2015) and therefore we chose to limit the search results to 'peer-reviewed' research. To avoid any language translation bias, only research published in English was chosen for this study.

When deciding on appropriate search terms in EBSCOhost and Scopus, we took the aim, scope and research question of this study into consideration. Therefore, we concluded that to remain systematic, the search terms should be identical or very similar depending on restrictions of filtering of each database. To find relevant research that provided answers to the research question and thus suggestions of innovation strategies in a VUCA world, two main searches were performed at each database.

As seen in Figure 2, the combination of search terms: VUCA OR Volatil*, Uncertain*, Complex*, Ambig* AND with Innovation Strateg* was performed along with the second combination: VUCA OR Volatil*, Uncertain*, Complex*, Ambig* AND Innovation Management was performed at both databases.

The choice to instruct the databases to browse for research combining search words of VUCA with innovation strategies or management and also browse for combinations of one or more of the components of the VUCA concept is motivated by section 2.1 VUCA definition. As stated there, the individual components being Volatility, Uncertainty, Complexity and Ambiguity have a joint importance when together forming VUCA but they also have separate importances. Scenarios can be classified as VUCA despite the situation only being characterized as uncertain or volatile, or complex, or ambiguous. Hence, instructing databases to include search results that does not explicitly mention VUCA as a term does not eliminate possibilities for the research to provide innovation strategies in a VUCA world.

The choice to combine search terms targeting VUCA with innovation strategies and innovation management was made on a similar basis. Innovation strateg* as a search term is chosen to target all possible endings to the word, meaning research containing strategic, strategy or strategies will be targeted. Innovation management was utilized as an attempt to target research with themes relevant for the research topic of this study but not explicitly use strategy as a search term.

As shown in Figure 2, having carried out these searches, a total of 949 search results were achieved. To systematically narrow down the quantity of research to make it more comprehensible for the time constraint and resources available for this research project, we examined the title, abstract, keywords and subject terms. The elimination criteria was that the research should include a combination of either VUCA, Volatil*, Uncertain*, Complex*, Ambig* and innovation strategy or management in either of these titles. This first elimination of research non-relevant to the study altered the search results from 949 to 277.

This elimination of research allowed us to narrow the amount and quality of research to those that actually included a combination of topics that is in line with the research question for this study. After this systematic elimination, we further eliminated duplicates by first comparing the results from the databases with each other and then the two different searches on respective databases. This provided 165 original articles that fulfilled criterias of inclusion of keywords and research quality.

To determine the relevance of these 165 articles in relation to the research question of this study, more in depth reading of abstracts was performed. This was done to determine to what extent the research discussed or provided suggestions for innovation strategies in a VUCA world or could contribute to the discussion of the topic. To perform this determination of relevance, the abstracts were investigated and given a number of 5-1. The relevance ratings were divided as follows:

Figure 4 - Relevance rating and their motivation in relation to research question:



The dispersion of results from utilizing this systematic way of assigning relevance in relation to topic and research question was as follows:

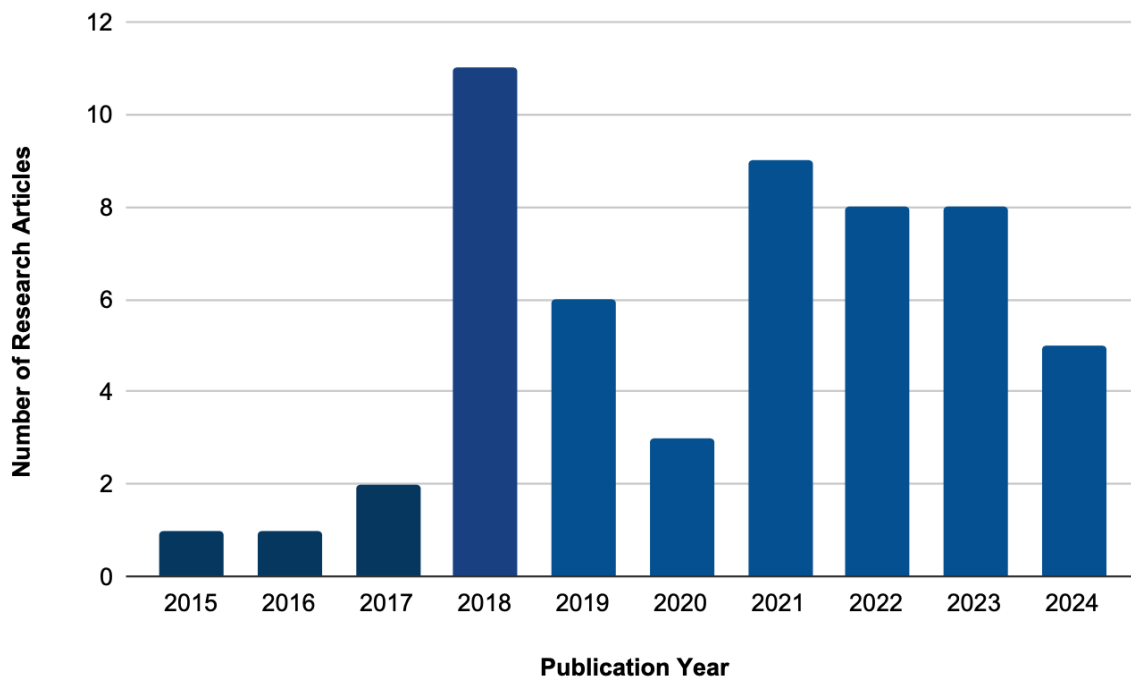
Figure 5. Relevance Rankings and corresponding amount of research

Relevans Ranking	Corresponding amount of research
5	21
4	36
3	33
2	14
1	61

From having performed the distribution of relevance rankings, the next step was to determine what research should take part in the final selection of articles that were going to become the basis of the findings. This decision-making process was built mainly on the ability of the chosen research to contribute to answering the research question and fulfill the purpose of this study. That meant, how and to what extent did the research provide independent

suggestions of innovation strategies in a VUCA world? This choice was balanced by selecting a quantity large enough to provide these answers and a meaningful discussion and simultaneously choosing quantities of research that the resource constraints could manage in an effective way.

Figure 6. Range of publication years in selected research



This analogy provided a decision that research given a relevance rank of either 4 or 5 would be part of the final selection of research. When attempting to access the research given a relevance rank of 4 or 5 however, we lacked access to three of these, which resulted in a final number of 54 research articles. These consisted of a combination of peer-reviewed research articles and conference papers with publishing years from 2015-2024. The relevance ranks of 4 and 5 consisted of research that had high topic relevance in relation to both innovation and a VUCA world, all with high relevance to the research question and the 5s in relevance contained explicit suggestions of innovation strategies in a VUCA world. These preconditions promoted the choice of choosing research with these rankings. This was both due to the quantitative amount of 54 articles and their ability to contribute to answering the research question and ability to fulfill the purpose and thus provide a fruitful discussion.

In light of the above, transparency should be promoted in the discussion of choosing a quantity of research to systematically review. In qualitative research, deciding the sufficient amount of research needed is difficult before having performed the analysis and thus how well the qualitative validity and reliability can be addressed through the obtained data (Sekaran and Bougie, 2016). A reflective discussion of the choices within this research design will be conducted in section 3.3 Methodological reflection.

3.2.2 Data Analysis

The 54 research articles that were selected in the data collection of this study were later thoroughly synthesized by the authors to extract findings that subsequently were used to answer the research question and fulfill the aim and purpose of this study.

The selected research was divided between the two co-authors and an inductive analysis approach was performed. This approach was chosen based on Sekaran and Bougie (2016) and content analysis in qualitative research analysis and Booth et.al (2020) approach to thematic synthesis. Content analysis refers to synthesizing research and looking for commonalities, differences and general trends (Sekaran and Bougie, 2016) and thematic synthesis aims to collect and scrutinize commonalities and factors that contributes to understanding the data and it also allows for separating and highlighting the most common and most unique factors among the data (Booth et.al, 2020).

Therefore, an inductive approach meant allowing for categories and themes within the findings to emerge naturally. The research question of this study aims at answering what suggestions research makes for innovation strategies to thrive in a VUCA world. This question is in line with an inductive analysis approach that does not seek to answer what the key innovation strategies to thrive in a VUCA world are or certain attributes that must be considered in the suggested strategies. Thus, all suggested strategies presented in the findings of the study were allowed attention to be analyzed and discussed due to the inductive analysis approach.

In the data analysis and discussion section of this study, the findings presented in section 4 were discussed in relation to definitions of key terms from section 2 and other relevant sources and scholars. The discussion's purpose was to critically analyze and discuss the findings of this study in relation to the theoretical frame of reference where key terms the

research question is composed of were highlighted. Differences of how terms were defined and discussed in the research and theoretical frame of reference along with additional relevant sources brought a more detailed, critical reflection of the findings that enriched the discussion and the contribution of this study.

3.3 Methodological reflection

Because this study is of qualitative nature, to address the data quality properly, Sekaran and Bougie's (2016) interpretation of qualitative reliability and validity is accounted for. This section aims at reflecting and bringing possible factors that might impact the quality of the work forward in order to increase clarity and transparency. Data quality and qualitative reliability, validity and limitations will be discussed.

3.3.1 Data Quality

To ensure the highest level of quality on the chosen data for this study, the databases Scopus and EBSCOhost were decided on due to their credible bank of peer-reviewed research, (Lubsearch, n.d) and with an extensive assortment of filters and complex abstract and keyword searches. As shown in 3.2.1 Data collection, the selected research was all published in English to decrease possible language translation errors and biases.

The dispersion of conference papers in relation to independent research articles for Scopus was considerably higher than for this dispersion on EBSCOhost. This high concentration of conference papers derived from Scopus does not ultimately negatively affect the data quality, although as a variety of conference papers tended to be shorter than research articles, we want to acknowledge that it might have yielded decreased data quality due to the article type. In addition, the choice to limit the research on EBSCOhost to databases of Business Source Complete and Academic Source Complete was made due to the resource constraints of this study. Therefore, we direct attention to the possible skew in research towards business and management related research as this is the focus mainly for Business source complete.

The choices made to narrow down the quantity of research in the systematic process and the possible impacts this had on data quality should be addressed in order to increase transparency of the conclusions drawn in this study. These choices concern what Sekaran and

Bougie (2016) refers to qualitative external and internal validity of the data which means the extent the research can be generalized and how well it reflects the chosen data of the study.

The systematic reduction of research that might have had an impact on the data quality regards both the relevance ranking and systematic reduction of literature. Firstly, utilizing a relevance ranking system to eliminate research is adequate in relation to a systematic fashion of choosing research as the levels of ranking are predetermined ensuring that research given the same ranking fits under the same category. By constructing the levels of relevance in relation to the research question, the contribution of the relevance ranking systems becomes clearer for the purpose and aim of the study. On the other hand, in hindsight, we have detected factors that might have impacted the quality of the research we aim to bring forward to increase transparency.

This concerns how the differences between the different rankings were decided on and what was made to ensure that the differences between the levels are equally distributed. In practice, how did we know that the difference between rankings of 2 and 3 were the same difference as between 4 and 5? This dispersion of rankings also affects the added stopping criteria which means how we are determined to only include relevance rankings of 4 and 5s. The construction and differences of the ranking levels attempted to create an even dispersion with clear differences in order to simplify determining where to rank the research. However after having performed the relevance rankings, we acknowledge the fact that the difference between a topic being somewhat relevant and relevant as is displayed in the difference between ranking 2 and 3 is highly subjective on what these differences entail in practice.

In determining the stopping criteria and what research depending on their ranking would contribute to the final selection of research also have some inherent limitations important to discuss. As stated in the data collection, the choice to include 4 and 5 in relevance ranking were because these had the most relevance and ability to contribute to answering the research question and fulfill purpose. Despite this, the whole construction of the relevance ranking system provides possibilities that research was eliminated when it could have provided value to the research question and aim. We do want to highlight that the relevance ranking was made with intentions of ensuring a systematic approach to decrease personal bias of what was deemed relevant if predetermined criteria existed. Nonetheless, having performed the systematic literature review we acknowledge that such predetermined criteria are more suited

to be less biased if they are not constructed by the authors themselves. To this, we would base the criteria on methodology literature of systematic literature reviews to ensure that the construction of them was a peer-reviewed way of performing that task.

This also contributes to the choice of assuming that 54 was a sufficient quantity of research to answer the research question and fulfill the purpose of the study. This was partly due to the time and resource constraints that characterized this project and an attempt to keep a narrow frame of research that kept the discussion within the frame of the research question. This choice was made on grounds of what was realistic considering the nature of writing this study and does not have to correspond to what a sufficient number of systematic literature reviews is considered optimal. In one way, we could argue in hindsight that it might be a too large number considering the resource constraints and to allow for all research to be thoroughly investigated and presented. On the other hand, a few examples from the review present other systematic reviews that have chosen numbers of 88 (Castro and Moreira, 2024). Hence, a subjective eye could determine this study to have chosen sufficient amounts, too little or too many.

Lastly, to accurately and transparently present the findings and answer the research question for this study we want to direct attention to some inevitable limitations of this study. Due to the nature of this systematic literature review, there is inevitably research of relevance that has not been captured in this study. There is undoubtedly additional research available that would contribute to the findings of this study, but due to time and resource constraints of this research project, these are not possible to utilize.

The main reasons for not being able to capture all relevant research for this study is due to resource constraints of the study, lack of access to research and the elimination process of the data collection. Firstly, as indicated above, the possibilities that additional relevant research has not been captured in this study is evident. Choosing two databases regardless of their credibility limits abilities to capture all relevant and accessible research. Secondly, university and other accessing tools allow and decline access to various research which further eliminates possibilities to capture all relevant research. Thirdly, the elimination process in the data collection included the two co-authors and our abilities to make informed decisions and not eliminate data based on careless reading and interpreting. Although the elimination and

data collection was conducted to the best of the co-authors' abilities, there are unfortunately no guarantees that relevant research was filtered out due to any of the reasons stated above.

3.3.2 Reliability and Validity

Discussing metrics of credibility and trustworthiness means a slightly different thing in qualitative research and Sekaran and Bougie (2016) describe the important components in assessing qualitative reliability and validity in detail. One method applied to increase reliability for this study was done in line with Sekaran and Bougie' *category reliability*. This meant that categorization and coding of the research in 4. Findings were performed to increase clarity of the interconnections between the research and therefore more general categorizations were created that contained more specialized sub-categories to provide meaning and usefulness for the discussion.

Sekaran and Bougie (2016) also discuss qualitative validity where internal and external validity represents two important aspects to how the authors choose to present the findings. Internal validity refers to the accuracy of how the data is represented in the original article compared to this study. This was ensured through putting emphasis on empirical and theoretical suggestions made especially for case studies or generalizable suggestions and thus ensuring that research was not subjectively interpreted to fit proposed research questions. This means that case studies or research that provided insights difficult to generalize were accounted for in order to make sure that non-generalizable sources were utilized in a general context to provide convincing arguments analysis.

External validity therefore becomes an extension of the ability to accurately transfer insights from research to this systematic literature review Sekaran and Bougie (2016). The systematic approach of this study increased the external validity as the review format allows for in depth reviewing of the chosen research and a discussion based on detailed and transparent review of the data. External validity forwarded by Sekaran and Bougie (2016) was another argument for pursuing an inductive analysis approach of the research. By allowing for themes, commonalities and differences to emerge naturally and not deductively disregarding research based on predetermined criteria, we ensured increased possibilities to display the research accurately in this study.

The inductive approach was also decided based on the phrasing of the research question. Because we opted to investigate what innovation strategies proposed to thrive in a VUCA world, the research question did not require any justification or limitations on what the innovation strategies were or were not including. The one component of the research question that determines the characteristic of the strategy is the word “thrive” as this assumes that the strategy should produce an outcome where a company can be successful.

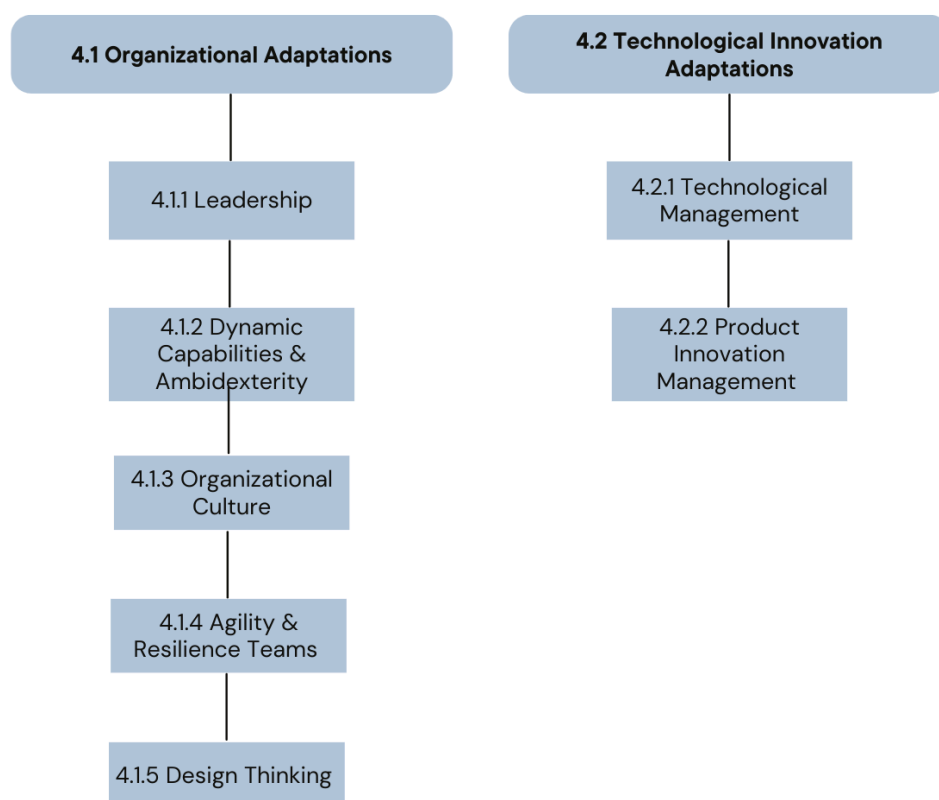
The inclusion of “thrive” in the research question allowed for an interesting discussion of what the term entails in practice for innovation strategies and companies in a VUCA world. We acknowledge the direction and evaluation of what thriving meant for this study and that despite the meaningfulness it brought to the study, we remain humble to the fact that other components could have provided a better outlook considering the aim and purpose of the study.

4. Findings

The aim of this section is to provide a comprehensive description of the 54 selected research articles in relation to the research question of this study. The main categories, divided into ‘Organizational Adaptations’ and ‘Technological Innovation Adaptations’ were created for the general themes of the research and correspond to which order the findings will be presented. The findings are both at a general level but also in a specific context or industry. In the findings, there are both case studies from different authors that conduct a more in-depth analysis by exploring the problem in a specific context and/or industry, and different frameworks and suggestions based on literature reviews. The findings will start by the category 4.1 Organizational Adaptations where five subcategories will be presented. It will end by the category 4.2 Technological Innovation Adaptations and the subcategories shown below.

Illustration 1: Themes in the VUCA-literature

(Source: Author's own illustration)



4.1 Organizational Adaptations

In the chosen research, different themes have emerged, one of which was Organizational Adaptations. Pasmore, 2018; Thakhathi, 2018; Jakhar & Bharadwaj, 2018; Shukla & Singh, 2015; Shintaini, 2023, Shintaini 2023 and more authors, are suggesting the demand for change in organizations to adapt in the VUCA world.

Pasmore (2018) reviews the trajectory of the sector Organization Development (OD) and suggests what can be done to enliven OD during times of new competition and new possibilities. The author writes that “*Despite the pace of change we are experiencing, we are only at the dawn of the digital revolution*” (Pasmore, 2018, p.16). Thakhathi (2018) also addresses change - in the last 40 years, organizations have entered a new stage where information, technology, markets and people are changing radically and unpredictably. Traditional approaches to innovation may no longer be enough in addressing the complexities of a VUCA world. Instead, organizations need to embrace new ways of working and create strategies that make it possible to adapt quickly, collaborate effectively and anticipate emerging trends and changes (McCausland, 2022).

Pasmore (2018) continues by stating that before the future was argued to be complicated yet predictable. Now, it has become chaotic and unpredictable. However, it is not the end for OD, to survive, they need to adapt. Three suggestions are made, “1. Offer a better product, 2. Team up and 3. Get out in front” (Pasmore, 2018, pp. 17-18). The first step is about leveraging design thinking and providing customized services, whereas the second step is to firm alliances to get access to larger resources. The third step, get out in front, suggests that ODs need to invest in and prioritize innovation, and be proactive in identifying and adopting new trends and technologies. On that note, the author writes that OD needs to innovate in ways they did not think of before and present five possibilities in how that can be done, namely by “Aligning ecosystems, Accelerating execution, Designing for VUCA, Culture sculpting and Hyper-learning” (Pasmore, 2018, pp. 18-20). Shukla and Singh (2015) agree that the customer is important for innovation, but they present their findings in another way. However, Pasmore (2018, p.20) also adds that “*These examples are the tip of the iceberg*”.

Shukla and Singh (2015) present 10 factors in their empirical study conducted in an Indian context among managers from different organizations. These factors have an impact on and

influence an organization's ability to manage innovation. These are, Attitude to Innovation, Incremental Innovation, Flexibility & Open Communication, Employee Adaptability, Idea Generation, Traditional Approach, Result Oriented, Skill Enhancement, Motivation to innovate and Organizational Support. (Shukla & Singh, 2015, p. 58). Pells (2019) suggests six innovative concepts that may help the high rate of project failures in terms of planning, organizing and managing projects in volatile, uncertain, complex and ambiguous environments. Shukla and Singh (2015), Pells (2019) suggests that the customer's needs have to be understood, but also that teamwork and diversity are important. The other five concepts are, Go small, migrate to program management, Reverse EIA (environmental impact assessment), Stakeholder intelligence, Benefits engineering, Strategic agility (Pells, 2019). Sun (2022) continues with recommendations of what organizations can do to foster innovative behavior and practice, based on a causal analysis and a literature review. The author states that by stimulating emotional and professional support that has a positive stance towards employees' ideas and suggestions, innovation can be increased.

In line with Pasmore (2018), Thakhathi (2018) discusses OD and change management. The author draws on the work of Donal Schön. The main focus is to re-examine Schön's concepts and from that, develop a typology that can be applied to contemporary organizational change practices. Two issues are addressed, the problem for practitioners of sustaining high performance in turbulent environments and the problem for researchers with the incoherence of existing champion scholarship. Organizations should identify and develop actors who can drive and advance change, known as "Champion of Organizational Change and Development". 10 meta-champions from the empirical research are presented so that, in particular, organizations can in a more efficient way navigate the challenges presented in today's business environment. Since the fourth industrial revolution it has been characterized as volatile, uncertain, complex, ambiguous, but also in order for organizations to leverage the champions and their strength (Thakhathi, 2018). The 10 meta-champions being Collaboration, Human Rights, Innovation, Product, Project, Service, Strategic, Sustainability, Technology, and Venture Champions" (Thakhathi, 2018, p.281).

The focus in Shintaini (2023) article is on redefining the organization of research and development (R&D) for technology based companies. It does not take the same approach as Pasmore (2018); Thakhathi (2018), instead it discusses change from anticipation. In the VUCA era, it is required to anticipate environmental changes in the target market segments,

as accurately as possible (Shintaini, 2023). Additionally, R&D strategies need to be aligned with the overall corporate strategy as well as be responsive to both emerging and latent market trends and customer needs (Shintaini, 2023). Schmidt and von der Oelsnitz (2020) suggest implementing a foresight phase to anticipate future trends and prepare for changes in combating the challenges companies face in VUCA environments, thus also making scenario analysis relevant in identifying potential disruption and opportunities.

Al Bushairi et al. (2024) presents a extensive data analysis to investigate the relationship among strategic flexibility, agility, ambidexterity, sustainable competitive advantage, and innovation within the marketing tourism sector. The study found that strategic flexibility and a corporate culture that foster innovation have an important role in extending innovative activities in corporations. In addition, strategic flexibility also contributes to the competitiveness of the marketing tourism industry.

Alternative ways an organization can adapt is by smart working and by digital transformation. Bucea-Manea-Tonis et al. (2021) discusses that in times of crisis, organizations must be flexible and integrate smart working. They investigate the effect that smart working has on production of eco-innovation in corporations. Smart working refers to the agreements between employees and companies to work more comfortably in which constellation this might be. In this paper, working from home was an example of smart working arrangements that contributed to increasing eco-innovation (Bucea-Manea-Tonis et al., 2021). Robu and Lazar (2021) uses Alberta Health Services (AHS) as a case study of digital transformation in practice led by Knowledge Management. The authors refer to APQO's report in 2019 where it was found that 75% of organizations are undergoing digital transformation, and continuous with “ *Digital transformation has become a necessity in our volatile, uncertain, complex and ambiguous (VUCA) world*” (Robu & Lazar, 2021, p.133). In order for digital transformation to be successful, it requires a strong foundation of people, process technology and the ability to select the right strategies. The study showed that to ensure successful implementation and post-implementation, it was required that a preview of technological and workforce trends to anticipate the future of work and workers. The overarching strategies in AHS case, namely fitting the change into overall business strategy, developing the knowledge of how the change would affect the workers and setting up a clear way of informing leaders about adoption and user engagement, were essential to align with the vision of digital transformation (Robu & Lazar, 2021).

4.1.1 Leadership

Schoemaker et al. (2018) explore the interactions among innovation, strategic leadership and dynamic capabilities together with business model innovation, helping organizations to navigate and excel in VUCA environments. VUCA and its destabilizing effects, frequently necessitates existing business models to adjust. Shukla and Singh (2015, p.56) agrees and writes *“It is widely acknowledged that managers will have to innovate as well as transform their business continuously to keep pace with the ever changing and evolving business landscape in the VUCA world”*

Business model innovation can assist organizations to use VUCA as a way to either adjust the current model (s), or, which is more likely - creating new ones (Shoemaker et al., 2018). The cause of failure when facing VUCA conditions is often when managers and entrepreneurs do not proactively innovate both organizationally and in their business model, they need to learn to react, adjust and respond - then they are more likely to succeed (Schoemaker et al., 2018). The authors propose six characteristics of strategic leadership to success in the VUCA world; (1) Anticipate, (2) Challenge, (3) Interpret, (4) Decide, (5) Align, (6) Learn (Shoemaker et al., 2018, p.30). Millar et al. (2018) refer to the work of Schoemaer et al. (2018) and present 15 challenges as well as explicit recommendations to manage successfully in the current unpredictable and challenging business environment. Both Schoemaker et al 2018; Millar et al 2018, emphasize the need for adaptability and resilience in dealing with VUCA and its challenges. They both stress the importance of never-ending learning, the importance of understanding and responding to changing customer needs and market environment and lastly, they both acknowledge the need for strategic foresight and flexibility in organizational planning and decision making. However, the articles also differ from each other. While Schoemaker et al. (2018) emphasizes individual leadership qualities and how they should act to enhance their effectiveness in VUCA environments, Millar et al. (2018) focuses and provides a wider perspective on organizational strategies and approaches. The authors target organizational leaders and managers who shape strategies, and give suggestions on how to address VUCA challenges.

McCausland (2022) highlight another dimension of leadership, namely authentic leadership. According to the author, it is important that leaders do not remain scared and confused by the VUCA world, instead, leaders should develop the ability to show vulnerability in VUCA

times and see it as a strength. The authentic leadership opens up for an honest and vulnerable side of leaders, something that also strengthens the organization and innovative practices. Mohammed and Viswanathan (2019) is also emphasizing authentic leadership, but from an Indian pharmaceutical context. In order to survive and succeed in the competitive world, organizations depend on their ability to innovate sustainably - something that relies on the human capital within the organization. It is crucial for organizations to harness the creative potential of innovation if it is done successfully by new ideas or knowledge. To enhance authentic leadership, companies should develop programs among employees in the research-intensive R&D divisions.

In line with Shoemaker et al. (2018), Kaivo-oja and Lauraeus (2018) argue for what managers, leaders and organizations need to do when facing turbulent VUCA conditions. The authors present a new corporate foresight framework with seven practical solutions and tools, anticipation tools, interpreting tools, challenging tools, decision-making tools, aligning tools, learning tools and combination tools (Kaivo-oja & Lauraeus, 2018). Corporate leaders and managers need a new understanding of these tools, thus, making the authors advocate the need of a global mindset, a virtual mindset, an innovative mindset and a collaborative mindset. All mindsets are key issues in the VUCA environment, however the innovative mindset is more emphasized as being more effective in navigating a VUCA environment (Kaivo-oja & Lauraeus, 2018).

Moccia et al. (2020) states that innovation is a success factor in the highly competitive and globalized economy, and therefore, organizations have to recognize that innovation is not a tool, but rather a strategic option and it is essential for survival. *“The world's innovation landscape is changing quickly”* (Moccia et al., 2020, p.119). García et al. (2017) agrees that leaders need to develop new skills and behaviors to adapt to a VUCA reality. In their empirical research, they found that throughout gamification, one can become more resilient to VUCA times. Schoemaker et al (2018) and Moccia et al (2020) also discuss the importance of human resource management. They both agree on the importance of human capital that forms the foundation of an organization where growth can yield more significant results. Moccia et al. (2020) also states that leaders still need to address different organizational factors, however, yet placing emphasis on a primary concern on human resource management that can guarantee organizational vibrancy, personal fulfillment and sustainable success.

Purcell and Chahine (2019) are drawing on the UK's Plymouth University in a case study as an example of change in higher education institutions (HEIs). They use a conceptual framework of leadership and governance to analyze the critical steps in managing change. The study focuses on the interplay between senior management hierarchy (SMH) and the adaptive community social networks (CSN) within the university as well as external stakeholders. In order for transformation in HEIs to be successful, leaders are required to engage with adaptive social networks and use social forces to inspire collective actions among employees and external stakeholders. This is to share a joint vision of the future (Purcell & Chahine, 2019). Key findings such as a fuse between SMH and social networks creates a balanced governance model that supports the free flow of ideas and efficient decision-making - both necessary for innovation. Additionally, due to a shared vision, the university was able to innovate and create value in uncertain, complex and ambiguous environments. The free flow of ideas is done by mapping how ideas are shaped, shared and implemented across the university and overall in organizations. If done efficiently, it helps with refining decision-making strategies, enhances productivity and creative outputs (Purcell & Chahine, 2019).

Cook (2016) focuses on ecological innovations CEOs and how more than half of them are not prepared for circumstances related to a VUCA world in their practices. His empirical research by interviews and case studies proposes that a sound balance between management and leadership can foster ecological innovations. As Cook (2016), Piel and Fischer (2019) also discuss the role of the CEO. With time, the quality of innovation produced has been a popular topic. The authors measured the relation between CEO personal motivation for conducting innovative practices with quality and quantity of output on innovation in a company. The tests indicated that CEO's with personal characteristics of prioritizing qualitative over quantitative output actually contributed to an increase in innovation output (Piel & Fischer, 2019).

Robu and Lazar (2021) revealed eight aspects, divided under people and processes, that require continuous attention when learning about change. Those are;

People (Robu & Lazar, 2021, p. 147):

1. “End User adoption – clearly explain the reason for the change and engage them through the entire change process and WIIFM (What’s In It For Me) and business value.”
2. “Dynamic stakeholder engagement – stakeholders continue to be actively involved and responsive in the post- implementation phase, continuing to model adoption and business rules.”
3. “Create new working relationships – recognize the need to act and build competencies in users, as well as modeling the change with mentoring and coaching to make it work.”
4. “Workers’ role changes – machine/technologies replace repetitive tasks in the flow; however, a set of skills remain the domain of people. Science, technology, engineering, and math are valuable for programming and decision making; Creativity - thinking outside the box to handle exceptions; Social skills – empathy, motivation, and interpersonal skills are crucial for managing information, decision making, and collaborative efforts. Physical dexterity – machines can dominate in the world of robots, but many jobs require dexterity that only human touch can achieve.”
5. “Managers’ role changes – enable experimentation and data-driven decision making and help teams design good experiments and make fair and objective analyses that lead to the “best” answer; develop coach-like approaches for team members, developing them towards high performance and helping them build on their strengths and mitigate their weaknesses; set a context and vision for the team, and constantly work to align the workers to that vision.”

Processes (Robu & Lazar, 2021, p. 147);

1. “Enhanced support model – be available to provide training; respond to questions; support learning at all levels (beginner, intermediate, advanced); make resources available to build and maintain trust and performance.”
2. “Value of feedback to optimize – be responsive to user feedback before, during and after implementation; demonstrate through follow-up updates and improvements that their input counts.”
3. “Continuously evaluate – evaluate what you do; capture gaps and opportunities.”

Billington and Ellersgaard (2017) highlights that companies need to constantly evolve and innovate, which might become challenging for companies that rely on past knowledge and

experience. These established processes may not be sufficient. Instead, the authors suggest that leaders throughout the organization need to be adaptive, agile and encourage employees to embody innovative and adaptive practices. In line with Billington and Ellersgaard (2017, Peschl (2021) also discusses how relying on past knowledge and experience is inadequate for organizational development to learn in a VUCA world. To address this, the authors propose a conceptual model that is meant to integrate organizational learning as an innovation practice based on the future. Organizational learning should be an innovative activity within a company and be future-oriented. Peschl (2021) highlights that organizational learning as innovation practices both rely on the ability to generate and implement novel ideas. It is crucial for innovation practices to acquire new knowledge, something that organizational learning positively has an impact on.

To assist leaders in creating strategies for innovation and growth, Billington and Ellegaard (2017) presents a framework, “Competence Gauge” with 24 competencies for leaders and a complementary development plan. It can be applied to various types of companies at different leadership levels. Billington and Ellegaard (2017) also discusses key competencies for leaders in various aspects of their work in order to become more responsive to unpredictability. These competencies are at three levels: Workforce, organizing work and strategic aspects. The following competencies are put forward:

In relation to workforce (Billington & Ellegaard, 2017, p. 137);

1. “Involvement: inclusion of input and competence of others in decisions”
2. “Emotional Intelligence: consideration of culture and emotional impact on others
3. Talent capture: recruitment of creative and resilient employees”
4. “Change management: guidance for successful adoption of changes by employees”

In relation to organizing work (Billington & Ellegaard, 2017, p. 137);

1. “Creativity: development of systems to encourage creativity in all functions”
2. “Systems: design for efficient ways of organizing work”
3. “Digitalization: implementation of digital processes and models”
4. “Change management: instillment of a mindset that change is a constant occurrence”

In relation to strategy (Billington & Ellegaard, 2017, p. 137);

1. “Agility: cultivation of mood, psyche, and tools to shift strategy fast”

2. “Intuition: trust of intuition and as well as facts and data”
3. “Assimilation: capture and analysis of input from sources to certain direction”
4. “Change management: inclusion of time and change management practices in the strategy”

Peschl (2019) emphasizes the importance of how innovation in a VUCA world demands that the leader shift its way of thinking of solutions to solve a problem, and not only base these solutions on past knowledge. In complex and uncertain futures, setting a clear goal and trying to achieve it, is often difficult. Rather, it has turned out that co-creation can help. Peschl (2019) therefore stresses the significance of collaboration and working together to brave VUCA times. As a result, the author describes three strategies based on being and working together in different formats. These are (Peschl, 2019, p.11);

1. “Working together with others on a mission”
2. “Cooperating and working together with what is currently going on in the world and hence - attempt to work with what material you currently have “
3. “Working with the future as a friend and constantly attempt to emerge in one’s practices with the future in mind”

Parmar and Provodnikova (2022) argued for another aspect of leadership and innovation. Their empirical study - expert interviews and workshops, demonstrated the importance of visual aids and tool assistance in agile leadership. As leadership teams control the allocation of resources to projects, doing it effectively becomes key. Effective resource allocation is directly influencing the quality of innovation outcomes, something that underscores the critical role of sound leadership (Parmar & Provodnikova, 2022). Like all departments in innovative companies, operating in a VUCA world, leaders have limited time to make well-informed decisions. Thus, the authors suggest that visual approaches and supportive tools can help leaders streamline their decision-making processes. By enhancing and streamline this process, leaders can increase the speed of decision-making for innovation projects, ultimately boosting innovation outcomes.

Brooks and Curnin 2021; Mortlock and Osiyevskyy 2023 agree on the importance of scenario planning in a VUCA world. Shintaini (2023) also suggests scenario planning when anticipating environmental changes, thus making scenario planning helpful to forge corporate strategies. Brooks and Curcin (2021, p.113) writes “*Scenarios are vivid descriptions of*

plausible futures". Strategic planners need to imagine future environments to help with developing long-term strategy, even in uncertain conditions. It is a useful tool in strategic thinking and therefore, the authors have combined research on creativity, divergent thinking and creative constraints to design a method they call 'Stretch-Thinking Loops'. Brooks and Curnin (2021) study focus on crisis management and specifically for crisis recovery post-COVID-19, but also state that the model offered may be applicable to the strategic management and scenario planning for any type of organization. The Stretch-Thinking loops are built on six interconnected stages, and those are (Brooks & Curcin, 2021, p.115).

1. "Establish the Continuum"
2. "Identify the variable"
3. "Imagine Consequences"
4. "Identify Constraints"
5. "Unusual Opportunities"
6. "Continuation"

The first step is to establish a continuum of scenarios by starting imagining the best-case and worst-case scenarios, which serve as the anchors to the continuum (Brooks & Curnin, 2021). The next step is to imagine, based on current information, what scenarios could happen between the best and worst-case scenarios. Stage 2, is to identify the variable that will be used in the Stretch Thinking Loops. What type of variable is dependent on the context in which the model will be used. Stage 3, requires those involved to imagine the specific, more obvious consequences and also the possible wider consequences for each of the loops (Brooks & Curnin, 2021). Stage 4, is about identifying the constraints that align with the already identified consequences. Stage 5, is about identifying opportunities from the potential consequences and constraints. Stage 6, is a continuous and repeating of stages 2, 3, and four for other scenarios.

In line with Brooks and Curcin (2021), Mortlock and Osiyevskyy (2023) agrees that scenario planning is a tool for strategic thinking and for executives to explore new ways of working, however they present a other model for scenario planning. The authors create a novel typology for scenario purposes that involves eight different practical applications and associated benefits. These include risk identification, assessing uncertainty, organizational

learning, options analysis, strategy validation and testing, complex decision-making, strategic nimbleness and innovation.

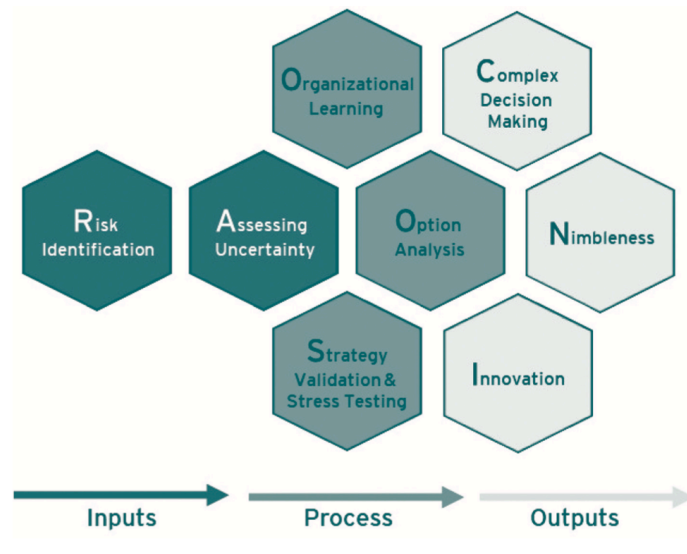


Figure 7. *Scenario planning application model* (Mortlock and Osiyevskyy, 2023, pp. 27)

4.1.2 Dynamic Capabilities & Ambidexterity

Pandit et al. (2018) explores in their case study of the Indian automobile sector how dynamic capabilities can drive disruptive innovation. They state that disruptive innovations are not well-studied in emerging economies thus, their study. In emerging economies, market segmentation seems to be key to allow for disruptive innovation manifestation. From their case study, the authors conclude that dynamic capabilities such as sensemaking and organizational learning are essential for the ability to leverage disruptive innovation technologies but also that it increases production of disruptive innovation. Dynamic capabilities can lead to specific types of innovations. Tabaklar et al. (2021) focuses on dynamic capabilities to achieve social innovation. Their study is based on the organization Logistics Cluster and their activities in a humanitarian aid context. Social innovation aims at creating innovation practices to reach a social need or goal and the authors propose a framework based on their findings for social innovation in highly dynamic settings.

Tabaklar et al. (2021) emphasize that in unstable environments of high levels of dynamism, uncertainty, ambiguity and complexity, it is important to establish a supply network of partners with complementary skills and local knowledge to quickly identify problems and

solutions to them. Despite a focus on social innovation in a humanitarian aid context, the authors argue that managers of organizations operating in a more stable environment can benefit from the study's findings in periods of turbulence, for instance caused by global crises. Shoemaker et al. (2018) brings up that when crafting competitive business models it is a critical micro-foundation for an organization's ability to seize capabilities. The authors use companies such as Apple, UBER, Airbnb and pharmaceutical firms like Pfizer and Sanfio to highlight that dynamic capabilities are central for an organization's business model and innovation process.

In line with Shoemaker et al. (2018), Millar et al. (2018) indicates that in order to be able create dynamic capabilities, organizations have to integrate functions and processes that allow dynamic capabilities to be made. Castro and Moreira (2024) conducted a systematic literature review of 88 published articles and found three main ways in which small and medium enterprises (SMEs) respond to resist complex changes. One of them being organizational dynamics. When SMEs face a VUCA world, it is crucial for their organizational dynamics and focus to ensure that rapid changes and complex challenges are addressed with fitting organizational responses (Castro & Moreira, 2024).

Araújo et al., 2019; Du and Chen 2018; Brandl et al. 2020; Schmidt and von der Oelsnitz 2022 discusses organizational ambidexterity in order to achieve prosperity and innovative activities in a VUCA world. Du and Chen (2018) examine the conflicting situation where highly technological companies face when deciding between market exploration or exploitation VUCA environments. The authors emphasize the important relationship between organizational ambidexterity, namely balancing exploration and exploitation - and overall performance. The authors conducted case studies on two high tech companies and a model of how cognitive patterns of top management affect the ability of organizational ambidexterity. In contrast with what previous research had focused on, radical and incremental innovations driven by ambidexterity, Du and Chen (2018) suggest that innovation also can be driven by consumer perspectives, thus not only technological advancements. To combat a highly competitive and constantly evolving business environment, the authors address dynamic capabilities in order to become more flexible throughout the whole organization. Especially in a VUCA world, ambidexterity is important to stay competitive.

Brandl et al. (2020) describe the Toyota Kata as a holistic management philosophy and its advantages to solving complex problems in the manufacturing industry. This market is fragmented with challenges of the VUCA world and challenges of ambidexterity and thus remaining competitive in complex markets calls for attention. The Toyota Kata is generally a tool for organizational learning and through the Improvement Kata and the Coaching Kata, ways of thinking and acting to redesign business processes is achieved (Brandl et al. (2020). Companies are facing challenges in today's VUCA environment, the companies have to adapt to different scenarios and they need to develop radical innovation and move away from previous successes (Schmidt and von der Oelsnitz, 2020). Through interviews with five experts from German companies, the authors aimed to provide practical guidelines for established companies to achieve ambidexterity and VUCA-foresight. Their guidelines focus on building VUCA-resilience and promote radical innovations in different ways. The authors suggest balancing evolutionary and revolutionary innovation to stay competitive in the VUCA world, thus having an ambidextrous management approach is necessary. Also collaborating with radical innovators and incorporating a foresight phase to anticipate future trends and prepare for changes (Schmidt and von der Oelsnitz, 2020).

Araújo et al (2021) directs attention to start-ups and how innovation becomes a key element, allowing them to respond quickly but also making them perform better in the market. The COVID-19 pandemic is lifted as an example that highlighted how unprepared many organizations are for sudden changes. Even with the focus of the study being on fintechs companies, the authors findings provide insight into strategies that support decision-making and organizational performance in a competitive market. Strategies such as restructuring, experimentation, information sharing and agile methods proved to be effective for the selected fintechs in navigating the VUCA world. Araújo et al (2021) suggest two decision-making logics, effectuation and causation and how they can help navigate the VUCA environments. Effectuation analysis being the available means to achieve the effects, where the causation process focuses on selecting the means to achieve a certain goal or solve complex issues. These logics contribute to organizational ambidexterity.

4.1.3 Organizational Culture

Mohammed and Viswanathan (2019) findings indicate that organizational innovation and a culture of innovation are interconnected and affect each other. Sukla and Singh (2015) writes

that the attitude of innovation the manager has, is crucial for fostering a culture of innovation. Pells (2019) brings up diversity and that needs to be promoted among project teams to foster a culture of innovation. Dey et al. (2021) from a sample of 96 travel agencies in the Czech Republic, they found that process and technological innovation have had an important role in establishing innovation as part of the organizational culture. Establishing innovation as a cultural norm within is essential for staying competitive in the industry. Having a mindset that values creativity, experimentation and continuously improving at both a corporate and unit levels, was shown to be essential. Thus, amplifying innovation practices as part of organizational culture is suggested (Dey et al., 2021).

Ida and Tumelero (2021) explores a Brazilian bank's use of an idea generation program (IGP) and their study found that IGP had noticeably enhanced the bank's culture of incremental technological innovation, which enhanced products, services and processes. The program helped create an environment at the bank where its employees felt comfortable sharing their innovative ideas. To implement a culture of innovation can be a wise strategic decision. The authors found that how successful the IGP is depends on how well the ideas were implemented and followed up (Ida and Tumelero, 2021) Instead of trying to change a culture, organizations can adopt culture 'sculpting' and focusing on the values and beliefs employees already hold and use these to sculpt desired cultures from the start (Pasmore, 2018).

Pahurkar et al. (2023) present that the world economy is being transformed and disrupted by factors like globalization, intense competitions, market dynamics and the COVID-19 pandemic. They focus on Indian businesses and examine best practices for fostering a culture of innovation in the workplace. Focusing on offering customized and affordable products and services to customers as well as how digital marketing has an important impact on a culture of innovation, was found. Digital marketing helps with animation, customization and automation, and in a VUCA world, digital marketing is essential (Pahurkar et al., 2023).

Florek-Paskowska et al. (2021) utilizes a narrative literature review to present findings of strategies for business innovation for unknown times. They concluded that human based factors and non-human based factors to consider to brave the VUCA times. The human related part focuses on the importance of leaders that attract the skills needed and an open mind to be able to soundly handle human resource management. The non-human related factors consist of beneficial business culture and model, strategies, and disruptive

technologies to foster innovation. Florek-Paskowska et al. (2021) highlights that the synergy between human and non-human factors is crucial for fostering innovation in a VUCA world. Thus, a leader's ability to produce a culture that encourages motivation and resilience is important. In line with Florek-Paskowska, Cook (2016) emphasizes the importance of leadership when creating a corporate climate and culture where innovation ideas can flourish.

4.1.4 Agility and Resilience Teams

Jakhar and Bharadwaj (2018) state that agility is believed to be the new paradigm of 21st century firms operating in the VUCA environment. This has led to an enhanced relevance of agility in today's business environment. Agility has different definitions but the underlying concept remains the same “*Agility is an ongoing process of sensing and responding to the unforeseen changes in business environment effectively and efficiently*” (Jakhar and Bharadwaj, 2018, p. 114). They propose a conceptual framework for identifying the key agile capabilities for two different business strategies - Innovation and Imitation. Innovators aim at providing unique and better products at higher price, whereas imitators aim at serving the general market with lower priced and products with high functionality. Both require different capabilities (competencies) to support their business model (figure 8). Sensing capabilities are those that allow a firm to accumulate and interpret knowledge about changes in the market environment that have a potential to impact business operations. Enabling capabilities are those that enable a firm to effectively and timely react to market changes, ensuring business operations continue without disruption. Firms with a better connection between their strategy and agile capabilities are more equipped to handle environmental changes and in achieving competitive advantage. Troise et al. (2022) share the belief that organizational agility is an highly important strategy to counter the challenges of VUCA.

	Sensing Capabilities	Enabling Capabilities
Innovator	<ul style="list-style-type: none"> i. Customer Preferences ii. Technological Changes iii. Time to market 	<ul style="list-style-type: none"> i. Concurrent Engineering ii. Rapid Prototyping iii. Collaboration for innovation iv. Customer Relationship Management
Imitator	<ul style="list-style-type: none"> i. Rapid cloning of products ii. Legal rules and patents iii. Low cost manufacturing 	<ul style="list-style-type: none"> i. Reverse Engineering ii. Collaboration for knowledge exploitation iii. Access to complementary assets

Figure 8. Conceptual Framework for Agile Capabilities For Innovative and imitating Firms (Jakhar & Bharadwaj, 2018)

To stay competitive, agility is necessary to quickly adapt to market changes (Nascimento et al., 2023). The authors highlight the importance of organizational agility, specifically production agility, in a bibliometric review. Agility helps deliver products faster and efficiently managing uncertainties and complexities in various industries. Nascimento et al. highlights that due to constant alteration in product requirements because of changing client demands, agility helps enterprises faster identify market opportunities and react to competitors. Troise et al. (2022) findings show that digital technologies capability, complemented by innovation and relational capability, acts as an enabler of organizational agility. Their study targeted the Italian context and SMEs, and they define digital technology capability as the ability of an organization to be flexible in its IT infrastructure and the ability to adopt a broad range of technologies. This capability shows how well the organization can adapt and integrate with different digital tools. Managers of SMEs, particularly IT managers should be aware of the strategic role of this capability, as it leads them to be more agile. Hence, managers and IT managers could increase their efforts to develop this capability in order to build OA (Troise et al. 2022).

Supply Chain Management

Xue and Wang (2023) prove that organizational resilience is essential for firms to obtain radical green innovation. Their study explores data from 294 manufacturing firms in China and highlights that organizational resilience is a mediation role between organizational learning and innovation. Additionally, their findings support the argument from previous research, that organizational resilience has an important role in coping with innovation risk and improving firms creativity. Both Jatapoon and Saenchaiyathon 2023; Zhang and Teng 2022 explore supply chain resilience and how to increase that in a VUCA world. Jatapoon

and Saenchaiyathon (2023) brings up important factors such as planning, collaboration and innovation as important to build supply chain resilience. Innovation in particular is an important factor for supporting resilience capabilities as it helps companies to adapt and recover from set-backs within a short time - it also supports better performance and sustainability. Zhang and Teng (2022) uses two engineering companies, China Road and Bridge Engineering CO, Ltd as an example of adopting block chain technology to improve cross-border supply chains. They give suggestions on how to enhance the value chain thought improvements in information systems, production and management. By adopting these digital technologies, they could better navigate the challenges of VUCA environments.

4.1.5 Design Thinking

Niehaus and Mocan (2024); Front-Cot (2024); Cousins (2018) share the same idea of utilizing design thinking as a tool for companies to navigate a VUCA world and combat VUCA related challenges. However, Robbins (2018) states that design thinking might not be applicable in a VUCA world. Niehaus and Mocan (2024) base their study on a German case study. The authors emphasize the role of design thinning, which involves an iterative and non-linear process to both understand and address complex problems. Thus, prompting innovative practices. Achieving innovation by design thinking is considered to be helpful for organizational transformation. Niehaus and Mocan (2024) are however, also addressing that all the factors that a company must recognize in order for design thinking as a tool to operate on full efficiency are rather unknown in today's science. For design thinking to be effective, companies need to ensure that organizational factors like team diversity, purpose alignment so employees share an aligned purpose and a supportive company culture are in place.

Font-Cot et al. (2024) proposed a new framework and came up with the tool ASPECT (Art, Society, People, Economy, Cities and Technology), which extends the principles of design thinking. They propose design thinking as being an essential approach to integrate innovation and to adapt to changing conditions. The ASPECT tool provides a more extensive system to support strategic decision-making in dynamic environments. Cousins (2018) emphasizes that design thinking is crucial for organizational learning. The study shows the positive impact design thinking has on organizational learning and how it improves absorptive capacity - an organization's ability to effectively utilize external knowledge inside the company. According

to the author, these effects are said to have increased the agility of decision-making and foster innovative practices, essential for thriving in VUCA conditions.

Robbins (2018) conducted a case study of a cultural institution in Dublin and found that design thinking might not be, in that context, the best tool for the complex and uncertain characteristics of a VUCA world. Instead, he presents Art thinking as a modified version of design thinking. Art thinking is more drastic and more suitable to embrace VUCA times than what design thinking is in practices of the art institution. Robbins discusses that design thinking focuses more on enhancing practices from the current state, and would not produce the drastic changes as needed. Art thinking can take more fuzzy constraints into account and embrace them with more eagerness than design thinking that favors to take approaches known to be successful and enhance them further instead (Robbins, 2018).

4.2 Technological Innovation Adaptations

4.2.1 Technological Innovation Management

Zhao et al. (2023) examined the impact of innovation organizations networks have on cross-organizational techniques in Chinese megaprojects. Mega Projects refers to large scale investment and implementation of complex technologies that are major in their effects on national economies. The authors provide a theoretical framework for SEMs that discuss innovation organization networks and Cross-Organizational Technological Innovation COTI synergies in megaprojects. In a VUCA world, collaboration of megaprojects has become more complex in nature and therefore this calls for cross-organizational arrangements that are better suited for uncertain times (Zhao et al. 2023). In order for COTI synergies to be successful, the relationship between involved corporations become more important than ever where the willingness to communicate to understand development of current innovations (Zhao et al. 2023).

Fernandez et al. (2022) highlights the impact of highly technological tools such as AI technologies should be used to increase productivity. Because of changes, project management has had to adapt. There is a transformative potential of AI in managing innovation projects across different sectors. It can be used to enhance decision-making, efficiency and sustainability. Mathew et al. (2023) writes about the Indian healthcare industry and what measures they took during the Covid-19 pandemic to soften its impact. Disruptive

and technological innovations had a significant role in addressing the crisis, such as telecommunications and medical systems and machines. The study is based on secondary data and it is suggested that moving away from traditional supply driven healthcare approaches towards a more personalized system where the patient is in the center, is especially important in the VUCA world.

Sahoo et al. (2022) reviewed 74 papers from 2014 to 2021 with a systematic literature review approach where they discussed industry 4.0. They focused on the critical success factors to implementing these technologies in a VUCA world and made two theoretical contributions. Firstly, 47% of the research they investigated addressed industry 4.0 in relation to the manufacturing industry. The second contribution is the twelve crucial factors to successful implementation of industry 4.0 which consists of innovation capabilities, technological infrastructure, organizational communication, structures among others.

4.2.2 Product Innovation Management

Frynas et al. (2018) present about how emerging market companies create new management practices for a VUCA environment. The authors explain how companies such as Haier created management innovations in a high VUCA context. Instead of having a single new practice, the Haier group developed “Rendanheyi” - a platform made up from multiple management practices. It is a management model with the goal to “zero distance to the user” and give entrepreneurial autonomy within the organization. Increased management innovation efforts are necessary during times when technological change is recurrent and when there is high competitive pressure. The Haier Rendanheyi case and model suggest that The specific context and adapting to the organization's circumstances, supportive and strong leadership, and a flexible experimental implementation process are key factors for management innovation. Münch et al. (2019) writes that in VUCA conditions, organizations are faced with challenges in creating product roadmaps that are viable. These challenges are mainly based on the rapid technological innovations and the inability of companies to successfully apply traditional product roadmaps in this environment. Their study is based on interviews together with 15 companies, and as a result, the authors present a new roadmap that allows companies to do a self-assessment on their roadmapping practices. It is called DEEP 1.0 and it assesses different stages in the production cycle.

For companies to obtain value propositions, identify future trends, evaluate the success rate of their current business model and develop solutions for future user problems, Schmidt and von der Oelsnitz (2020) suggest agile product development. It is as important as a well organized market launch in order to restructure an organization to be better equipped for future competition or for the newest technology. Stage gate is a classic managerial model for product development, however, Trott et al. (2022) critically assess the stage gate approach to product development and highlights that it is not adapted to a VUCA world. They criticize its ability in moderating product development under high uncertainty. Ullrich et al. (2021) writes that because of the VUCA world and its presence in the business environment, Enterprise Architecture Management (EAM) and its impact on IT systems, had to change. Specifically the role of EAM in companies in the way of adaptation towards a more agile role to facilitate necessary corporate changes. To understand, they conducted interviews together with surveys with people who had experience in enterprise architecture. It was found that the task and responsibilities were effective communication of decision-making with management bodies inside the company, ensuring compliance, guidelines and integrating different enterprise components relevant to business architecture.

5. Analysis and Discussion

This section aims to analyze and discuss findings in section 4 and provide additional perspectives from the authors own reflections and additional scholars and literature that help provide meaningful insights to the findings of this study. Together with the findings to answer the proposed research question of this study.

5.1 Analysis

From section 4. Findings, and from reviewing 54 academic articles in detail, we can detect that the research field is scattered with varying proposals of appropriate innovation strategies to thrive in a VUCA world. In order to analyze the findings and present what innovation strategies in a VUCA world the research presents, a thematic synthesis of the findings was employed in the analysis stage, inspired by Booth et.al (2022) and a content analysis provided by Sekaran and Bougie (2016). The combination of these methods have allowed us to investigate commonalities and differences and general themes to emerge naturally from this review.

This means that an analytic method where significant themes that provide a greater understanding of the field are recognized and emphasized. By doing this, important commonalities and differences between themes can be recognized and the analysis of the data can be presented in a clear and easily readable way.

In light of the above, the analysis has been divided into two main categories: strategic proposals that emphasizes innovation as an outcome of a strategy and; strategic proposals that emphasizes innovation as a component of the actual strategy to thrive in a VUCA world. If research and suggestions are put under each of these categories, it means that their commonalities are that they either promote strategic initiatives that create an innovation outcome or that the strategic initiative has innovation as a component of the strategy. Within these two categories, subcategories marked in italics are provided to bring further clarity into more detailed themes found when reviewing the research.

5.1.1 Innovation as an outcome

For a substantial part of the research examined in this study, there was a clear tendency for innovation to be part of the outcome of implementing a strategy. That gives that some of the

suggestions of how to brave or thrive in a VUCA world had a strong focus on that innovation is the sought after outcome of implementing changes, enhancements and strategies.

Leadership to Leverage Innovation

There are various examples of research from the findings of this study that suggests that organizations can enhance innovation and thrive in a VUCA world due to adapted and enhanced leadership capabilities and execution. This is visible through Schoemaker et.al (2018) where business model innovation is said to be crucial for organizations to succeed in a VUCA world. The authors state that synthesizing and sensing are dynamic capabilities that together with entrepreneurial mindsets of leaders and managers will produce business model innovation (Schoemaker et.al, 2018) Thus, the business model innovation seems to be an end stage to where developing dynamic capabilities are successful and have enabled the organization to become more resilient to a VUCA world.

In addition, Moccia et.al (2020) describes how the implications of the VUCA world makes organizations realize that innovation is not only necessary for company survival but also a strategic choice for survival. The authors together with Schoemaker et.al (2018) highlights human resource management as it can leverage important skills and personnel that together can form organizations resilience in a VUCA world. Florek-Paskowska, Ujwary-Gil & Godlewska-Dziobon (2021) also proposes that a substantial part of promoting business innovation is through leadership of human resource management and thus highlighting the importance of human capital and personnel in promoting innovative practices. The importance of human resource management and how leadership can contribute is forwarded by Bucea-Manea-Tonis et.al (2021). They address this importance in times of crisis like the Covid-19 pandemic. Being flexible in times of crisis in this context meant implementing smart working solutions which had a stimulating impact on sustainable development (Bucea-Manea-Tonis et.al, 2021).

It is perhaps no surprise that there is plenty of research that suggests that leadership, especially focused on human resource management, is important in combating a VUCA world. The research on the impact managers and leaders have on the ability to cope with complexity is pronounced by Kotter (1990). He addresses that leadership is about making employees equipped to handle change while managers should make sure that employees feel secure to manage complexity in organizations. Evidently, a VUCA world's impact consists of

high levels of complexity and fast change (Bennet and Lemoine, 2014a). In addition, the research that places emphasis on the manager's role in adapting innovative strategies to thrive in a VUCA world is in line with the five minds the manager is ought to have according to Gosling and Mintzberg (2013). The worldly mindset and the action mindset are particularly relevant for innovation strategies in a VUCA world. These mindsets regard the management of change and context which are highly relevant if the manager is supposed to be flexible to changing conditions in the business environment and organization and stay ahead of the employees demands through this ongoing change (Gosling and Mintzberg, 2013).

Pells (2019) addresses the manager's role in promoting project management work to brave a VUCA world. The emphasis placed on managers and leaders is furthered by Robu and Lazar (2021). They account for how communication of transformations needed in a VUCA world is carried out and that leaders should opt for taking responsibility in making sure that employees are informed and prepared for how a digital transformation is going to affect them. In order to be able to assess and provide useful resources for employees, Garcia et.al (2017) argues that leaders must develop strategic thinking including a proactive and innovation oriented knowledge and mindsets.

There are a few difficulties that are not addressed in the above studies that are important for a leader to be informed about. This concerns the current flow of communication and information and the understanding of the extent to which employees are informed. Pells (2019) articulates that managers are required to make sure to be informed about VUCA related conditions and ensure their personnel are in line with that understanding in order to allow for organizational transformations in a VUCA world to be successful. Schoemaker et.al (2018); Moccia et.al (2020) and Florek-Paskowska, Ujwary-Gil & Godlewska-Dziobon (2021) are scholars that articulate the importance of focusing on human resource management in a VUCA world.

In order to be able successfully manage human resources, there are tools which have not been mentioned that would have contributed to the abilities Pells (2019) mention as crucial. One of these tools is the "Need for Closure" index by Kruglanski and Webster (1998). This refers to an articulation of the degree to which individuals crave confirmation of the direction of a project or are more comfortable with ambiguity (Webster and Kruglanski, 1998). This can be measured through a test to indicate employees' needs for cognitive closure or openness which

could be helpful for managers when assessing how well their employees are prepared for organizational transformations in a VUCA world.

Another aspect to ensure that managers and employees are informed and understand what the VUCA environment entails and how it could affect their daily operations is the growth mindset forwarded by Dweck (2014). This mindset is crucial for employees and managerial positions and leaders in a VUCA world. There is strong emphasis on skills and capabilities of leaders and managers because of their influential role in organizations (Dweck, 2014). Skills and capabilities can usually be taught and improved through training and education. However, without a growth mindset, it is likely that managers have a negative impact on their employees' motivation to withstand a VUCA world if they have a fixed mindset. Dweck (2014) describes the fixed mindset to be closed to challenging what they already know and how they can learn and extend their knowledge. Hence, in a VUCA world that is inherently complex and rapidly changing, opening up one's mindset and challenging capabilities and knowledge to develop understanding is a crucial component to acquiring agile leadership skills.

Another dimension to preparing leaders and managers with the suitable capabilities to motivate, encourage and equip their employees' with the right toolkits for a VUCA world is forwarded by Julia Sloan and her ideas on strategic thinking (2020). Strategic thinking is mentioned by Garcia et.al (2017) one paragraph above and also by Mortlock and Osiyevskyy (2023) and Brooks and Curnin (2021) a bit further down in the analysis. Sloan (2020) is highly influential in the field of global strategic thinking and cognitive complexity theory (IMS, n.d) and therefore we are a bit surprised that the research does not articulate her ideas on strategic thinking and its application in complex environments to a greater extent.

Regardless, Julia Sloan (2020) presents the concept of strategic thinking and how this can assist challenge conventional idea generation in highly complex environments. In comparison to traditional views on strategic planning, strategic thinking highlights an iterative, non-linear way of constructing strategies. It is problem focused instead of solutions oriented and has a greater focus on innovation and creative incentives and thus is not purely financially oriented (Sloan, 2020). From this section it is clear that research deems managerial and leadership agility crucial to thrive in a VUCA world and the concept of strategic thinking is somewhat integrated to a few contributions. We argue for Sloan's (2020) contribution of strategic

thinking to an essential part of the roadmap to developing agile and flexible managers as it allows for an innovative and problem focused approach that can integrate conditions of the VUCA world. Strategic thinking is employed to foster ideas that are suitable for an unpredictable world that VUCA provides and is in relation to a VUCA world a highly agile method of strategic focus of organizations.

Pells (2019) continues by addressing how the organization and the project manager should manage projects in a VUCA world. These ideas further promote a greater focus on strategic agility, managing external and internal risks, managing engineers' salaries in benefits in ways that promote their performance and strategically utilizing diversity in the organization to maximize innovative ideas. Sun (2022) in line with Pells (2019) describes the responsibilities organizations have and should make use of in order to equip employees with managerial competencies to foster innovative practices. Reaching a state of innovative practices is according to Sun (2022) rooted in stimulating employees' needs of emotional and professional support from the leaders around them.

The Cynefin Framework (2010) presents important aspects on what Pandit et.al (2018); McCausland (2022); Robu and Lazar (2021); Pells (2019) among others discuss in their contributions. The Cynefin Framework (Snowden, 2010) is essentially assisting in the sensemaking of complex, complicated, simple and chaotic problems that organizations encounter. It also describes that the differences between the categorizations are not always evident at first glance and thus, it assists in realizing the nuances in differences of problems (Snowden, 2010). In making sense of complex times and issues, leaders are required to being able to differentiate between different sorts of problems for their own awareness and capabilities to brave the VUCA world (Billington and Ellersgaard, 2017) and simultaneously utilize their sensemaking capabilities to become an agile an adaptive leader that provides the necessary resources for employees to understand and be actionable (Sun, 2022); (Pells, 2019).

In a VUCA world, simply stating that the business environment is complex and difficult to navigate can provide a sense of reassurance that times are hard, however it does not provide guidance for moving forward. Pandit et.al (2018) describes their case study of the Indian automobile sector and how they found that leveraging dynamic capabilities as sensemaking

and organizational learning increased production of disruptive innovation. They emphasize the unique case of enabling innovation in emerging economies.

Billington and Ellersgaard (2017) also highlights the importance of leadership and in relation to disruptive innovation, they suggest that strategically disrupting activities of everyday working life with agile and adaptive leadership activities is needed in complex and uncertain business environments. With improving agile, adaptive and disruptive leadership, leaders should be able to promote employees' innovative practices. Cook (2016) also proposes that the sound balance between management and leadership can foster ecological innovations. Parmar and Provodnikova (2022) further accentuates leadership and how leaders utilize visual aiding resources to contribute to employees grasping and understanding complex innovation projects.

McCausland (2022) describes another dimension of leadership where he argues that authentic leadership in a confusing VUCA world allows for an honest and vulnerable side of leaders that strengthen organizations and with this analogy, strengthen innovative practice as well. Authentic leadership is further emphasized by Mohammed and Viswanathan (2019). They present the importance of an authentic leadership style to make innovation grow in pharmaceutical companies in India. Along with appropriate organizational culture, the authors state that a significant relationship with organizational innovation was found.

Thakhathi (2018) articulates that in relation to sound leadership in a VUCA world, it can be difficult to determine the “champions of change” which means who in an organization that is responsible and enables a company to be adaptable in a VUCA world. Thakhathi (2018) describes that assessing general winning concepts and actions that managers and other employees can take to ensure adaptation in a VUCA world is a complicated task due to the many differing scenarios companies are presented with.

We believe that Thakhathi (2018) presents an important insight in the discussion of how to navigate the VUCA world. Presenting ideal strategic action and analysis and if the manager, employees, C-suite or CEO are responsible for successfully navigating complex environments can be useful for practitioners to know where to place resources to do this. On the other hand, Thakhathi (2018) states that winning concepts are usually scattered and dependent on size of the firm and the nature of the issues.

Piel and Fischer (2019) discusses another nuance to the importance of leadership in braving a VUCA world. Their study presents that depending on personal characteristics and interests and motivation of a CEO to conduct innovative practices, the quality of the innovation that was produced at the companies their study investigated increased as a result of the CEOs motivation to do so. Mohammed and Viswanathan (2019) follows Piel and Fischer (2019) argument of the importance of certain characteristics of leaders to foster innovation in companies. Ullrich et al. (2021) also focuses on responsibilities of specific managerial roles in organizations. They base their research on the subject of the Enterprise Architecture Management (EAM) and how it is used to influence IT systems. However, considering that the VUCA world has become present in the business environment, the role of the enterprise architect in companies must adapt to a more agile role to allow for necessary changes in a corporation to be carried out.

As a leader and manager in a VUCA world, the above research clearly presents the various demands that are put on these roles and the effects managerial and leadership roles can have on employees ability to understand and cope with change. For managers and leaders to become more agile and adaptive, Drucker's (2005) insights on how managers should manage themselves first becomes important. To know how to best support the personnel in an organization, it is important to be well acquainted with the manager's own strengths and weaknesses and how they are currently working and adapting to a VUCA world which is also equivalent to the manager's employees. The ability to analyze where professional and emotional support, adaptability of working conditions and other activities are needed are essential in being able to focus a manager's efforts where it is most useful. In doing this, managers and leaders can equip themselves and their employees for an uncertain and complex business environment when they are aware of where their strengths and weaknesses are.

This is especially applicable to Purcell and Chahine (2019) and their case study on Plymouth University reflects another dimension of leadership and its importance of innovation in thriving in complex times. Their findings articulate that leadership and the ability to promote discussion in social networks that offset actions for the future are crucial to thrive in a volatile, uncertain, complex and ambiguous world. Although innovation is part of the

keywords of the article, the application of leadership and support of social networks idea generation is said to support generation of innovation as an outcome.

Lee Kaivo-oja and Lauraeus (2018) addresses managers and leaders importance in corporate foresight and when acquiring a new tool set of agility, adaptability, they have greater competencies to withstand challenges presented by globalization, competitive landscapes and a fast paced technological environment. Frynas et.al (2018) describes that leadership is one of the most important factors to contribute to innovative work. Millar et.al (2018) presents 15 challenges and recommendations where a major part addressed to leaders and leadership abilities are important to understand to thrive in a VUCA world.

The above sections account for the large-scale part that strategies based and motivated by the influence leadership and management have on innovation, especially in a VUCA world. In management and leadership literature, there are various connections to innovation and managing complexity in teams which motivates and justifies the amount of research that supports these statements. Ingrid Bonn (2001) articulates the challenges related to motivating employees and fostering a culture of creating innovation. Managers should and need to be able to enhance creativity among their employees and increase incentives for their team members to understand the importance of their contributions. According to Bonn (2001) there are various components into making employees feel motivated and foster a culture of innovation. She argues that this is brought about by efficient communication, abilities to see and provide resources to ensure employees can work at their full potential and making employees feel satisfied and encouraged to conduct great work (Bonn, 2001).

Innovation through Organizational Development

Through reviewing the research, an additional finding is that organizational development has a central role in various suggestions on how to thrive in a VUCA world. Within organizational development, we can detect that research often differentiates between small, medium and large enterprises, innovators and imitators and how different forms of companies best approach a VUCA world.

Pasmore (2018) offers a three tiered approach of how to thrive in VUCA influenced business environments which concerns organizational development. Pasmore (2018) addresses this partly to smaller firms for gaining advantage by being agile in complex and fast changing

environments with evolving technology as VUCA environments can have greater impacts on a firm's survival if it lacks maturity and size.

Pisano (2015) brings important points to the discussion of organizational agility and the different demands varying sizes of corporations have in a VUCA world. Pisano argues that not only are innovation strategies needed in corporations to make informed choices on what trade offs are needed to stay competitive. More importantly in this discussion, the differences in opportunities to prosper off innovations depending on size and maturity of the firm. For start-ups as Araújo et al (2021) directs attention to, Grant (2018) also agrees on the fact that young companies lack resources to drive prosperity from new innovations.

Jakhar and Bharadwaj (2018) furthers the importance of organizational agility for firms operating in the 21st century and thus, as the authors state, in a VUCA world. What Jakhar and Bharadwaj separate and point out in their research is the different importance organizational agility has for companies that are deemed to be innovators and those to be imitators. Therefore, organizational agility brings about differences in capabilities firms should acquire in order for the agility to prove useful. Imitators naturally must promote agility that enables fast adaptation and copying of products and services while innovators instead should focus on adaptation to current technological changes. This line of thought is relevant in other publications regarding innovation. Namely, Grant (2018) addresses the differing prerequisites of gaining competitive advantage depending if the firm is leading or imitating innovation on the market. In line with Porter (2008), timing of entry into new markets is affected by your position and level of technological innovation and (Porter, 2008) thus, prerequisites and what type of agility needed differs between companies.

Nascimento et al. (2023) also promotes the importance of organizational agility but in the context of production agility. Pasmore (2018) indicated that organizational development is different depending on the size of the firm. Troise et.al (2022) argue that different organizational strategies are needed depending on the size of the firm in order to combat challenges presented in a VUCA world. Despite differences in strategy formulation for large or medium to small organizations, Troise et.al (2022) addresses that organizational agility is required for all organizations non-dependent on size. In discussing different approaches for innovative outcomes, Tabaklar et.al (2021) describes the importance of interorganisational networks and partnerships to achieve social innovation. The main difference between social

innovation and what is generally regarded as just ‘innovation’ is that social innovation aims at producing innovative practices to reach a social need or goal. Despite a difference in what type of innovation that is targeted as the outcome, the importance of interorganizational relationships and collaboration is highlighted. The idea on innovation networks is promoted by Schilling (2020) who argues that these are one of the most powerful sources of technological innovation. Tabaklar et.al (2021) describes how it promotes social innovation which only promotes the importance it has on various types of innovation.

Zhao et al. (2023) focuses on implementing innovation strategies where innovation is a component of the strategy and not as the outcome. However, it connects to Tabaklar et.al (2021) when discussing the importance of cross-organizational innovation opportunities and how collaborating through joint innovation projects can leverage the quality and quantity of innovation output. Xue and Want (2023) research resembles that of Tabaklar et al. (2021) in how specific types of innovation become an outcome of organizational development. In increasing organizational resilience, the authors state that firms can realize the importance of radical green innovation. Mortlock and Osiyevskyy (2023) also describes the organizational development to thrive in a VUCA world. Their suggestions involve organizational adaptability through strategic scenario planning which becomes a toolkit for strategic thinking.

Brooks and Curnin (2021) agrees with Mortlock and Osiyevskyy (2023) outlook on the importance of scenario planning in a VUCA world. Imagining future scenarios represents an important feature of creating competitive business strategy. They develop the term “Stretch-Thinking Loops” as an extension of scenario planning that combines creative constraints thinking with strategic thinking and crisis management to manage events like the Covid-19 pandemic.

Shukla and Singh (2015) proceeds the discussion on the level of organizational development and presents 10 factors to which they believe organizations must adopt to manage their innovative practices. Shintani (2023) directs attention to how redefining the research and development department in technology based companies can foster innovation in a VUCA world. This redefinition is based on a purpose driven management approach and is said to enable the organization to adapt quicker to a fast changing corporate environment and thus foster innovation as a result.

Dynamic Capabilities and Design Thinking

Du and Chen (2018) directs attention to the people oriented focus to increase and manage innovation. In high technological companies, there is a trade off between exploration of new innovation and the exploitation of successful inventions to produce profitability and prosperity for the organization. This organizational ambidexterity is according to the authors important in fostering new incremental, radial and disruptive innovation that high tech companies usually are involved in. Schmidt and von der Oelsnitz (2020) agree and describe their case study of German corporations and what these companies can do to achieve organizational ambidexterity and brave a VUCA world. They argue for a balance between evolutionary and revolutionary ideas. To reach this balance, the authors suggest utilizing scenario planning and corporate foresight.

Brandl et al. (2020) presented the management philosophy Toyota Kata that forwards organizational learning as a tool to increase ambidexterity and thus maintaining competitive advantages in manufacturing companies. An interesting contrast to Brandl, Ridolfi and Reinhart (2020) and the presentation of the Toyota Kata model is Trott et.al (2022) and their critical assessment of the stage gate approach to product development. In their piece, they do not direct critique to the specific case of the Toyota Kata model. Instead, they direct attention to the various limitations they find for the stage gate model when applied in the context of VUCA. The critique consists of the inability for the stage-gate approach to moderate functions of the product development in high uncertainty scenarios. Trott et.al (2022) does not present an alternative approach to the stage gate that could be more optimized to a VUCA world and therefore their contributions are essentially not relevant to answer the research question of this study. On the other hand, they showcase the fragmentation of the suggestions of how to adapt to a VUCA world which we believe is important to describe in assessing the different suggestions put forward.

From the above section and the innovation and management literature, there is a clear focus about the importance of organizational ambidexterity depending on the shape, size and level of maturity at the company (Grant, 2018) (Pisano, 2015). However, in addressing ambidexterity in firms, there are few examples put forward of what companies can do to

ensure competitiveness and prosperity in a VUCA world besides carrying on conventional business practices. Schilling (2020) points out the importance of ensuring and protection of patents. Depending on what market you are innovating in and if you have various innovations that require protection before additional innovations can be explored, the consequences of not protecting innovations vary. For instance, Mohammed and Viswanathan (2019) describe VUCA challenges related to the pharmaceutical industry in which Schilling (2020) argues patents to be highly effective as protection of innovations. On the other hand, implementing research of Dey et.al (2021) considering Czech travel agencies or Robbins (2018) on a cultural institution in Dublin would not be as relevant as the innovation these authors address does not concern technological or radical innovation that must be protected. Instead, these authors are concerned with business model innovation that regards the way the company conducts daily operations and therefore there is no 'one fits all' in innovation management.

Niehaus and Mocan (2024) discuss strategic managerial processes that are crucial to sustainable business transformations in a VUCA world. Basing their suggestions on the idea of design thinking which implies the iterative and non-linear process to understand complex problems which is helpful in promoting innovative practices. In achieving design thinking as a tool to work to full effect and actually contribute to innovation practices, organizational factors must be implemented. These factors include team diversity in composition of teams. Strategic hiring of employees that share an aligned purpose of working at the organization that creates a beneficial organizational culture where innovation can prosper as a result.

Font-Cot et.al (2024) follows the ideas of Niehaus and Mocan (2024) of utilizing design thinking as a tool for companies to navigate a VUCA world in strategic business analysis. Deriving from design thinking, the authors present ASPECT, their own suggested framework that expands factors taken into account when designing innovative solutions in complex times. The ASPECT framework highlights Art, Society, People, Economy, Cities and Technology and aims at assisting strategic decision making in a VUCA world. In empirically testing the effect of this tool, other famous tools like SWOT and PESTEL proved to be less comprehensive in nature compared to ASPECT as this could provide a more simplistic understanding of complex problems.

A third suggestion of how design thinking is useful in a VUCA world is Cousins (2018), where design thinking in this case is proved to be crucial for organizational learning. Here,

Cousins presents that design thinking can be utilized as a way to streamline organizational learning and the absorptive capacity of external information in order to increase agile decision making and innovation practice.

Peschl (2021) presents a new and optimized structure to organizational learning that is adopted to suit a VUCA world. The author proceeds to discuss that basing organizational learning on past events and knowledge is not suitable in a VUCA world and thus proposes that organizational learning should be regarded and constructed as an innovative activity. Peschl (2021) in line with Cousins (2018), argues that for organizational learning to be an innovative activity within a company, absorptive capacity is an essential part in acquiring new internal and external knowledge. Peschl (2021) further highlights that in order for organizational learning as an innovative activity to absorb knowledge that contributes to sustainable development and prosperity in a company, there must be a focus on how to implement absorbed knowledge. Without emphasizing the importance of implementing new knowledge in an efficient way, innovation and new products, services and ideas can be lost in the process.

A fourth research article discusses design thinking and how suitable it is in a VUCA world. Robbins (2018) states that in his case study of a cultural institution in Dublin, design thinking might not be adaptable to the complex and uncertain characteristics of a VUCA world and thus, he presents a modified version of the tool. Art thinking is according to Robbins (2018) adapted to a VUCA world as it can comprehend more vague constraints of projects and thus forward innovative practices better in a VUCA world than design thinking can.

Dey et.al (2021) describes the importance in corporate culture in fostering innovative practices. Their study on Czech travel agencies revealed that when economic possibilities of enhancing innovative practices through consultancy advice and other tools, fostering a corporate culture that focuses and fosters technological innovation have a positive effect as well. Florek-Paszkowska, Ujwary-Gil & Godlewska-Dziobon (2021) describes the dual approach to foster innovation in corporations. According to these authors and as described above, there are human and non-human related factors that the interaction between these sets of factors together fosters innovation. Human related factors include open minded leaders with abilities to motivate employees in VUCA times. The non-human related factors affect strategic decision making and culture of the organization.

5.1.2 Innovation as a Process

There are several research articles presented in findings that based their suggested strategies, tools, frameworks and other solutions on how to thrive in a VUCA world where innovation is part of the process of reaching a thriving state. It becomes evident from the findings that when implementing a strategy that includes innovation as a component of the strategy, technological, supply chain and manufacturing innovation is much prominent in the research as will be showcased below.

Frynas et al. (2018) showcase how companies in emerging markets can utilize context dependent innovations to transform management practices and sustainably transform companies from traditional hierarchical manufacturing organizations to digital platform based entrepreneurial companies. In utilizing context dependent innovations, these companies could thrive in VUCA contexts. Münch, Trieflinger and Lang (2019) describes the challenges organizations have in creating product roadmaps that are viable in VUCA conditions as well. Therefore, the authors present DEEP 1.0 - a product roadmap maturity model that assess different stages in the production cycle and different dimensions of possible difficulties companies can encounter when producing goods such as confidence in how features and details can be added in time and with quality. Sahoo etl. (2022) discusses industry 4.0 and what are the critical success factors to implementing these technologies in a VUCA world.

Kaivo-Oja and Lauraeus (2018) highlights the importance of corporate foresight as a tool for strategic business analysis, especially in what they argue to be “current market conditions” (Kaivo-Oja and Lauraeus, 2018, p.239). They differentiate between disruptive innovation, technological disruptions and radical innovation as they believe their relevance is elevated in a complex corporate environment and for corporate foresight. The authors present technologies they argue to potentially have great economic impact and be disruptive in nature, characteristics the authors argue to be crucial to drive economic impact by 2025. They present the technologies driving economic impact and disruption with examples being: Mobile internet, automation of work, Internet and Cloud technology. In combination with presenting relevant technologies, the authors proceed to discuss qualities of leaders and managers to manage corporate foresight with examples being: anticipation tools and decision making tools.

For innovations Kaivo-Oja and Lauraeus (2018) discuss in their study, there is a greater likelihood that patents and other innovation protection systems would be beneficial (Schilling, 2020). On the other hand, Peschl (2019) describes the importance of innovation networks also mentioned by Tabaklar et.al (2021) and Zhao et.al (2023) when innovation strategies aim to contribute to social and economic outcomes. The variations in the different managerial systems and protection innovation required in different markets and products showcase the brevity of the concept of innovation and also justifies the fragmentation that can be seen from reviewing the selected research for this study.

Case Specific Strategies

An additional important insight into the suggestions that include innovation as part of the strategy and not the outcome is the various case studies produced on the topic. Below we present the research that provides insightful advice on how to strategically address VUCA related issues in a pandemic, crises and specific problems that arise in specific contexts.

Ida and Tumelero (2021) Suggest that an Idea Generation Program (IGP) utilized and tested in a Brazilian bank that generated innovative ideas from employees. This entails that the idea generation program was proposed to stimulate an environment at the bank where employees felt comfortable expressing their innovative ideas. The authors did address the possible decline in relevance of these programs if the ideas were not later implemented and followed up on. Therefore, the IGPs can become successful for innovation generation depending on how well the ideas are implemented and followed up on.

Zhao et.al (2023) explored the impact that innovation organization networks have when implemented on cross-organizational technologies of Megaprojects in China. According to the authors, mega projects have increased in complexity due to the VUCA world and therefore, the authors suggest implementing COTI in megaprojects to allow for sharing and jointly develop and implement technologies in megaprojects. The authors highlight that a crucial aspect of making COTI systems successful is that companies involved in them have good communication and relationships. Fernandez et.al (2022) builds on the impact of highly technological tools and applies this to project management operations. In their bibliometric review of how artificial intelligence can affect innovation projects, they found that the

presence of AI is the most influential and studied in the construction, manufacturing and decision support systems that are connected to knowledge management.

Mathew et.al (2023) describe factors that enabled the Indian healthcare system to brave the VUCA world during the Covid-19 pandemic. The healthcare industry in India saw fast change and complex situations arise as a consequence of the Covid-19 pandemic. Therefore, different innovation techniques were applied as an effort to combat these challenges and this study also proposes other innovative activities to prepare for a complex time ahead in the Indian healthcare industry. Through their literary walkthrough, the ideal way to brave the VUCA world for Indian healthcare is to embrace the change a VUCA world brings. For this specific sector and region, this entails to focus on innovations to develop more customer centric ways of working.

Castro and Moreira (2024) also provides insight related to the Covid-19 pandemic. They conducted a systematic literature review of 88 articles to examine the main messages in the discussion of organizational and strategic initiatives during the Covid-19 pandemic. The findings of this review were three main ways which SMEs (small and medium enterprises) responded to withstand complex changes. These three included organizational focus, organizational dynamics and the role of innovation practices. For organizational dynamics and focus, when SMEs are faced with a VUCA world, it is of great importance to ensure that fast changes and complex issues can be met with appropriate organizational responses. Castro and Moreira (2024) mentions incremental and disruptive innovation as these are of different importance for SMEs. Incremental innovation is useful for short term profitability as it allows companies to improve current products and gain efficiency. Disruptive and radical innovation on the other hand allows for exploitative, new ideas to emerge. These types of innovations on the other hand often require longer time spans to develop products until payoff of the invested resources in new ideas and innovations. Nevertheless, the authors emphasize the importance of employing different innovations to withstand effects of the Covid-19 pandemic.

Araújo et al (2021) discuss the Covid-19 impact on start-up companies and their ability to dissect what factors and ways to innovate that could brave the crisis and its VUCA elements. The start-ups in this piece considered fintech companies which are highly involved in technological and disruptive innovations. The authors present the concepts of effectuation

and causation as two extended parts of decision making processes. These logics include utilizing and realizing the means available in a project and the selection of the relevant means to solve complex issues. The authors argue that effectuation and causation contribute to organizational ambidexterity as Du and Chen (2018) and Schmidt and von der Oelsnitz (2020) discuss.

Yet another research examining the effects and appropriate responses to the Covid-19 pandemic is Pahurkar et al (2023). According to this research, the pandemic was a clear VUCA characterized event and their response to what could have been done to mitigate the consequences is the implementation of digital marketing to make full use of resources. They argue for digital marketing to foster a culture of innovative activities as it allows for social data to provide flexibility and appropriate utilization of resources to maximize output.

Zhang and Teng (2022) describes the usefulness of blockchain and digital innovations in the supply chain industry. By utilizing two Chinese engineering companies in this sector, the authors provide suggestions for how to innovate the value chain from information systems to production and management. By doing this, the authors state that engineering supply chain organizations can brave the VUCA times. Jantapoon and Saenchaiyathon (2023) in line with Zhang and Teng (2022) discusses ways to increase supply chain resilience in a VUCA world. Their main suggestions lie in that innovation, planning and collaborating through the organization increases supply chain resilience. The innovative practices in supply chain organizations will help the companies to absorb and utilize knowledge to grow capabilities to become resilient.

5.2 Discussion

This part will provide critical discussion in relation to findings and the analysis provided above. This will be done through integrating section 2. Theoretical Frame of Reference and other research and literature in order to understand the implications of the findings and analysis and thus answer the research question and the purpose of this study. In the latter part of this section, we will also elaborate on what possible limitations and changes we suggest to this study when in hindsight have chosen and reviewed the 54 research articles.

The fragmented outcome of this systematic literature review is naturally affected by multiple factors, some regarding the inevitable bias and limitations in employing this as a research method (Sekaran and Bougie, 2016). Some factors regard the ability of authors of this study and the authors of the selected research to make empirically and theoretically supported judgements on the management and definitions of the important terms for that has guided this study. These being innovation, strategy and the VUCA world. This discussion has the purpose of accounting for and describing the differences in definitions and management of important terms and concepts and thus not assessing which ones are empirically correct. Instead, it aims at clarifying and shedding light on the wide nature of this academic field and for a researcher or a reader to provide assistance in how to navigate and understand it.

5.2.1 Interpretation of analysis

The analysis presented above consisted of a categorization of the findings and an analysis based on utilizing knowledge of external scholars and research and our own critical opinions. To this, we compared the research with each other to provide insights to how and where they differed or coincided with each other. With these insights in mind, we will now complement these findings with additional critical examination based on discussing how the research defined key terms that were included in our research question. Based on section 2. Theoretical Frame of Reference, we have compared and contrasted how the research treated the different definitions of key terms and what conclusions this allowed us to bring. Before indulging in that however, we will provide a summary of the key findings from the analysis above. To refresh, this study has been guided by the research question:

What suggestions does research provide as innovation strategies to thrive in a VUCA world?

This question puts innovation at the heart of strategy formulation in order to survive and thrive in a world characterized by volatility, uncertainty, complexity and ambiguity. Therefore, when analyzing what suggestions the reviewed research makes for innovation strategies in a VUCA world, one evident finding was the majority of the research argued for innovation to be the outcome of a successful strategy implementation. That meant that there was a clear tendency to present a strategy that provided an outcome the research describes as innovative or that the strategy in itself provided innovation. In these situations, this research

argued that when a strategy had been producing innovation, the company was also to be regarded as thriving in the VUCA world.

This gave rise to the section 5.1.1 Innovation as an outcome. Within this section, we also find the other key finding of this study which was the majority of the research that provided innovation strategies built around the importance of managerial, leadership or organizational agility to thrive in a VUCA world. The explicit theories differed somewhat, where Schoemaker et.al (2018) suggested that leveraging dynamic capabilities of leaders would create business model innovation and Billington and Ellersgaard (2017) presented that utilizing disruptive activities and adaptive leadership would generate employees' increased innovation behavior. Nonetheless, it is still evident that inserting enhanced abilities or leaders, managers or the organization as a whole would generate an innovative outcome that was stated to be beneficial in a VUCA world.

On the other hand, there was a smaller proportion of research that argued that innovation was a key component in strategies that could thrive in a VUCA world where outcomes apart from section 5.1.1, focused on aspects besides innovation itself. This in turn provided the second section of the analysis, 5.1.2 Innovation as a process. In this section, another key finding became evident. This concerns what the figure in section 4. Findings also aimed to visually describe, namely the relatively small proportion of research that ascribed innovation as part of the actual innovation strategy and also the research with strong technological focus. Research put under section 5.1.2 discusses product innovation process, manufacturing and high technological innovation with a focus on integration of disruptive, technological. It also comprises the case specific research we found to have insightful strategies, however, as they were inserted in a specific context as the Covid-19 pandemic, we wanted to direct attention to this fact as the strategies only may be plausible in that specific situation.

In general, we detect the greatest finding of the analysis to be the importance of adaptive, agile and dynamic capabilities, skills and mindsets that generate different types of innovation as a result. This emphasis has support from external scholars in the strategic management and innovation field.

5.2.2 Defining Innovation

This systematic literature review has selected research that addresses innovation strategies or innovation management in combination with either a VUCA world or a volatile, uncertain, complex and ambiguous world as their main topics. Therefore, 54 research articles address and define innovation in their own ways. When Kahn (2018) stated that: “Innovation today is everywhere” (Kahn, 2018, p.453), he referred to innovation as an important concept and practice in the modern world. This judgment is majorly confirmed within the research this study is composed of. What is an interesting finding is the differences in the ways research utilizes innovation as a term. Schoemaker et.al (2018); Moccia et.al (2020) and Florek-Paskowska et al. (2021) all highlight the importance of human resource management in leveraging business innovation and thus build organizational resilience in a VUCA world.

When investigating how Schoemaker et.al (2018) manages innovation as a term, they make detailed descriptions of how a VUCA and a non-VUCA world demand different types of innovation like incremental and radical innovation and how they are useful depending on the context. They utilize UBER as an example of business model innovation that is adapted to combat a VUCA world. In this case, Schoemaker et.al (2018) provides a detailed description of when different types of innovations are appropriate and why business model innovation is required as a response to a VUCA world. Florek-Paskowska el. (2021) describes business innovation and the resources and capabilities needed to achieve business innovation. On the other hand, innovation as a term is discussed in a broad and general manner. A quote from the research exemplifies this:

“Innovation creation in organizations during challenging times depend on the climate inside the organization that focuses on human abilities, creative ideas and employees’ motivation to add value to the organization”

(Florek-Paskowska et al. 2021, p.12).

This statement raised various questions when reviewing the research. Are these factors only plausible in challenging times and is innovation in this regard synonymous to adding value to the organization as the last sentence of the quote suggests? Broad definitions like this one makes the careful reader interested if factors of human abilities and creative ideas only are important in challenging times and thus not in not-challenging times. Similar questions arise

from a generic statement that introduces Cook's (2016) make on how leadership drives innovation and creativity in organizations:

“ Innovation depends to a large degree on the role of leadership in creating a climate and culture where ideas can arise, germinate and then become part of the fabric of society”

(Cook, 2016, p. 295)

Here, the same speculation arises as from the Florek-Paskowska etl. (2021) article. What can be noted is that the two papers have a shared vision in how people oriented factors like motivation and creativity affect innovation. Nonetheless, when reviewing this, we asked ourselves: Does leadership and fostering a culture affect all sorts of innovation in the same ways? Cook (2016) then, on the same page states that: *“ So, leadership sets the tone for enterprise wide-level innovation and creativity”* (Cook, 2016, p.295). The same statement is now somewhat specified to wide-level innovation which is given no further explanation of what that term means. We could assume that it wants to highlight that leadership encourages innovation in general, however that creates a demand for knowing what general innovation then is, especially in the context of strategy formulation in a VUCA world.

Schilling (2020) discusses what different sorts and sources of innovation come from. Innovation can be formulated through individuals, groups or organizations and universities and can be new inventions that bring novelty and also be a process or an outcome that enhances already existing products or services (Schilling, 2020). Kenneth Kahn (2018) in line with Schilling highlights an aspect of innovation creation and management that is essential in discussing and understanding the findings of this study. That is, the important balance organization should aim for in addressing and managing innovation as an outcome and as a process. Kahn (2018) argues that there are values missed out on when only managing different types of innovations as outcomes to the same extent as value is lost when managing innovation as a process instead. This statement made by Khan (2018) indicates one direction of thought into the dynamics of how innovation best is managed and produced. It also highlights the breadth of the definitions and effects management of innovation as a concept has and thus the importance of cautious utilization of it.

In light of the analysis above, we can from Kahn (2018) detect that value is lost in only treating innovation as an outcome or as a process.

5.2.3 Defining Strategy

Another key component of the research question that has guided this study is the concept of strategy. An important finding from having reviewed the research is the abundance of alternative concepts and terms that are used to describe what could be regarded as strategy. Pasmore (2018) describes how organizations should respond to the future. He gives three *suggestions* on how organizations can develop to withstand a future characterized by VUCA. These suggestions involve explicit instructions on what to do and who this is going to affect and how it will contribute to thriving in a VUCA world. Porter (1996) argued for one of the many definitions of what strategy is and put emphasis on producing unique activities that are difficult for competition to imitate. Henry Mintzberg (2009) placed emphasis on constant adaptation and management in relation to changes in the market or organization to enable strategies to remain competitive.

Then in light of the above, are Pasmore's (2018) suggestions of organizational development to stay ahead of the changes occurring in business environments to be considered strategies? And perhaps more importantly for providing answers to the research question of this study, how much does the definition of a strategy actually matter in order to provide insightful advice on how to thrive in a VUCA world? Porter (1996) and Mintzberg's (2009) viewpoints on strategy formulation highlights the choice of activities and the management of activities to stay competitive in fast-changing markets. Thus, having a goal to reach and having the ability to adapt and change the activities that are needed to reach that goal are crucial elements in what strategy from one point of view, is considered to be about. While not downplaying the importance of what these prominent scholars articulate on the subject of strategy, is the definition of a strategy more important than the strategy itself?

While these questions could be interpreted as too theoretical and symbolic, they have become a sufficient part in determining what innovation strategies that should become part of answering the research question of this study. Pasmore (2018) describes the impact of the digital revolution and the need to be proactive in developing organizations to not let changes in corporate environments decrease relevance of organizational development. In order to adapt to these new circumstances, three ways of producing and acting are presented. These are regarded as processes according to Pasmore (2018), nonetheless, they are providing

activities in order to reach a competitive advantage in relation to the prerequisites that are presented.

We have chosen to include all research that suggests ways to combat and thrive in a VUCA world in the findings and analysis for this study for multiple reasons. Some were highlighted in the beginning of this section. However, in this discussion of how to define strategies, multiple research presents suggestions, models, frameworks, concepts, tools or other titles that are not ultimately defined as a strategy. Nevertheless, the description of how these suggestions should be implemented and what outcome is expected corresponds to the important components of what a strategy should provide in order to overcome challenges and thrive in a VUCA world.

On the other hand, this does not ultimately give that all research in this study initially presented all components of what a strategy consists of. This means that without an in-depth analysis of research, their main suggestions to thrive in a VUCA world would be an important skill, capability or mindset. Without criticizing the importance skill sets and mindsets can have on a corporation's performance, they would be insufficient to label as strategies. When instead investigating the research to its entirety, the research thoroughly explains how these skills and mindsets shall be implemented through activities to reach a certain outcome.

Examples of these were Lee Kaivo-oja and Lauraeus (2018) that address important tools for leaders and managers to acquire as adaptability and agility and with these competencies, they have greater possibilities to combat challenges presented in relation to a VUCA world. Lee Kaivo-oja and Lauraeus (2018) proceeds to introduce how these agile capabilities are to be implemented in activities in organizations and how these capabilities ultimately contribute to the creation and maintenance of technological disruption and innovation. Troise et.al (2022) also highlights the role of agility in small to medium sized enterprises that attempt to navigate the VUCA environment. Agility as a capability is divided into innovation capability, technological capability and relational capability where the implementation and outcomes on the three capabilities are accounted for. Troise et.al (2022) describe investing and innovation creation activities to ensure agility in organizations.

The above examples embody that research that does not explicitly refer to their suggestions to thrive in a VUCA world as strategies are yet providing detailed instructions on how skills, mindsets and capabilities form activities to reach a wanted outcome. In the selected research for this study, Jantapoon and Saenchaiyathon (2023); Morais et al (2021); Millar et.al (2018); Frynas et.al (2018) and Robbins (2018) are among the few research articles that includes strategy as part of the keywords of the research. Despite this, the findings and analysis of this study articulate the multitude of research providing insightful advice, suggestions, tools, frameworks on how to utilize innovation to thrive in a VUCA world. Hence, there are incentives for this study to include alternative labeling to strategies as part of the research question as they still provide useful descriptions of how abilities, mindsets and other skill sets will be implemented and how they will produce the wanted innovation outcome for the organization.

5.2.4 Defining VUCA and a VUCA world

The VUCA world is the component of the research question of this study that provides the preconditions in which the innovation strategies should operate in and thus also thrive in. This means that the innovation strategies should be based and adapted to be successful in a business environment characterized by volatility, uncertainty, complexity and ambiguity as the acronym VUCA is (Bennet and Lemoine, 2014a). One finding from reviewing the research is the differences in describing, defining and how the research incorporates and manages the terms in relation to what innovative strategies that are needed.

Zhang and Teng (2022) is a clear example where VUCA is only mentioned in one sentence in the abstract and then left out of the discussion. Brandl, Ridolfi and Reinhart (2020) in addition also state that VUCA presents challenges that the manufacturing industry must adapt to. Besides this statement in the initial sentence of the introduction, there is no description of what these challenges are based on characteristics of a VUCA world and moreover whether the challenges the authors addressed to the manufacturing industry are only present in a VUCA world or not. In contrast, Niehaus and Mocan (2024) mention VUCA 39 times throughout their research and have the second section dedicated towards describing the development and impact of the term over time and the different importances volatility can have for vision and uncertainty for understanding challenges. Munch, Trieflinger and Lang (2019) presents another situation where the preconditions for technological innovation

management is an uncertain and dynamic market. In their piece, VUCA is mentioned once and the authors provide detailed explanations to why an uncertain and dynamic market changes the conditions in how successful product roadmapping is. Robu and Lazar (2021) are other examples of where the conditions of the VUCA world are stated in the abstract and how a VUCA world demands digital transformations. In their piece however, they do not proceed to describe this statement and what it is about the VUCA world that creates the demand for digital transformations.

Intuitively, without formulating a problem statement based on the preconditions of a VUCA world, one could argue that the suggestions for digital transformations made by Robu and Lazar (2021) would be equally as successful in a non-VUCA world. Garvey Berger and Johnston (2015) uplifts the importance in recognizing what statements like “We live in a VUCA world” entails in practice. They argue that non-VUCA world challenges can be solved by contemplating past experiences and knowledge and applying these to solve current and future problems. However in a VUCA world, the authors state that one instead needs to start incorporating a multitude of scenarios without connection to explicit past experiences as these are not viable in a complex and volatile world (Garvey Berger and Johnston, 2015).

To not be explicit about what challenges the VUCA world creates and instead only focus on the solution does not according to us ultimately create bad suggestions. What it does create is speculation regarding what conditions that made the suggestions of innovative strategies or solutions necessary in the context. If the problem statement is context specific and clearly articulated, not only does this present clarity for the reader but this also creates opportunity to recognize similar challenges and from what they can arise in other situations and then more easily assess the situation. The authors Font-Cot et.al (2024) have recognized the importance of being able to assert and produce strategic business analysis out of volatile, uncertain, complex and ambiguous environments. Therefore, they present the ASPECT framework that assists organizations in doing this in order to not miss out on important factors in the analysis formulation.

Context specific problem statements that create demand for innovation strategies in a VUCA world have appeared in this study to be a dual edged sword. On the one hand as stated above, is this a clear way for practitioners and scholars to understand what preconditions that required a certain response. On the other hand, learnings from specific contexts are less likely

to be generally insightful outside of this context. We decided to add a subcategory to the analysis called *Case Study Specific Strategies*. This was added because all the research included presented suggestions of innovation strategies to thrive in a VUCA world that were based in different highly context-specific situation like the Covid-19 pandemic (Mathew et.al, 2023); (Castro and Moreira, 2024); (Araújo et al, 2021) (Pahurkar et al, 2023) or application of certain techniques or technological projects. There are a few attributes about such research that are important to highlight when assessing strategies to thrive in a VUCA world. Firstly, strategies employed during the Covid-19 pandemic were constructed due to conditions during the pandemic and while the relevance for these strategies in pandemics are high, are they applicable to a general VUCA world? This inevitably leads to the question of what a general VUCA world is? This is similar to what has been discussed above namely what general innovation is. For the case of the Indian healthcare system during the pandemic (Mathew et.al, 2023), there is natural likelihood that those conditions would be altered as a result of the end of the pandemic. However in another research that addressed how the Covid-19 provided conditions to be considered a VUCA world (Pahurkar et al, 2023), the shift to a more digital economy was excelled as a result of the pandemic but also a product of globalization and other factors. These different preconditions give rise to critically assess the degree their insights can be generalized and applied in other contexts.

To Thrive in a VUCA World

The word ‘thrive’ was added to the research question of this study because it indicates that we ought to be researching innovation strategies that contributed to not only solve challenges and survive in a VUCA world, but instead to succeed and thrive under preconditions of volatility, uncertainty, complexity and ambiguity. The Cambridge Dictionary (n.d) defines the verb thrive as “To grow, develop or be successful” (Cambridge Dictionary, n.d). Although a predetermined definition of the term is in place, the subjective assessment of what it means in practice to thrive is another important question we have asked ourselves in conducting this study. One major finding is the dispersion between research that only addresses the importance of adapting, evolving and improving strategies to a VUCA world and the research that argues for the balance between VUCA related strategies and the maintenance of ordinary business practices. This in turn provides different outlooks for what it means to thrive implies in a VUCA world in practice.

The balance between exploitation and exploration and organizational ambidexterity are themes in the research that addresses the importance of still focusing on strategies to remain competitive while thriving in a VUCA world. More specifically, Araújo et al (2021); Du and Chen (2018); Brandl, Ridolfi and Reinhart (2020) and Schmidt and von der Oelsnitz (2020) addresses the topic of organizational ambidexterity to achieve prosperity and innovative activities in a VUCA world. The arguments put forward for organizational ambidexterity is that it is said to be correlated with organizational survival and increased financial prosperity. Thus, especially in a VUCA world, without organizational ambidexterity there is less likelihood of remaining competitive (Du and Chen, 2018).

Brandl et al. (2020) describes the need for organizational ambidexterity because they address conditions related to VUCA as destabilizing and increases the risk of unsuccessful innovation product launches in the manufacturing industry. Hence, that ambidexterity is the interplay between maintaining incremental innovation and still improving radical and disruptive innovation simultaneously. The authors also state that successful implementation of this balance can fortify sustainable development of companies (Brandl et al. 2020).

These scholars present an important aspect to the importance of innovation strategies specifically for a VUCA world. There is no doubt in the presented literature that addressing VUCA challenges is important for company survival and success. The findings also indicate that there is research that addresses the VUCA world as the “New Normal” and “We live in a VUCA world” (Garcia et.al, 2017, p.919). Addressing changing preconditions in organizations as the new normal state of operations creates incentives to believe that such research supports that operations should change fundamentally and entirely. Interpreting the entirety of the research by Garcia et.al (2017), there is no description that entire shifts away from conventional business strategies are needed to thrive in a VUCA world. Despite this, there is reason to believe that usage and the brevity of the concept is sometimes elevated for raising a convincing argument. While this is not problematic in itself, by stating the following:

“The acronym VUCA sums up the time of change, a new reality that demands an adaptation of corporate culture, a preparation of organizational structures, a review of the strategies to be followed and the adjustment of the way to manage people to be able to compete” (Garcia et.al, 2017, p. 919)

There are incentives to produce research that correctly articulates a realistic problem statement and then proceeds to present strategies that correspond to this statement accordingly. The contrast in research that assumes there is a demand for balancing VUCA related activities with conventional business practices provides critical understanding of what the actual implementation of VUCA strategies does to a business practice. On the other hand, there is research assuming that moving away from traditional business strategies are key in embracing and thriving the change that the VUCA world brings (Troise et.al, 2022). The importance of highlighting these differences are not in determining which is the correct given the current business environment. Instead, the different streams of research provide unique insights into what is actually noteworthy to consider in implementing innovation strategies in a VUCA world.

Another critical perspective that was briefly touched upon above is the risk in producing convincing initial arguments and problem statements that the research fails to live up to. From the viewpoint of this study, determining whether research that promotes ambidexterity of organizations or research promoting entire shifts toward a VUCA world is not valuable regarding the research question. However, in reviewing what the research deems to be to thrive in a VUCA world, promoting entire shifts or a balance between VUCA and conventional related practices contributes to what type of strategy is proposed. For example, Pandit et.al (2018) describes how the development of disruptive innovation in the Indian automobile sector has been. They recognize that the turbulence caused by a VUCA world enhances disruptive innovation in large scale enterprises. Therefore, they suggest that innovation policies are managed more efficiently to enhance production of disruptive innovation. We argue for Pandit et.al (2018) to exemplify suggestions of innovation strategies to fortify disruptive innovation in a specific context to mirror problem statements and suggestions of strategies in a clear way.

As described above, the word thrive was added to the research question of this study as means to provide a direction that the presented innovation strategies put forward by research would aim to induce a thriving state of corporations in a VUCA world. From the findings it is evident that there is minor representation in the research labeling the outcome for organizations of their strategies as thriving. Instead, examples of research that utilize alternative labeling to thrive are Pells (2019) that argues for their suggestions of increasing

strategic agility as being useful in a VUCA world. Billington and Ellersgaard (2017) proceeds to describe their suggestions including the competence gauge and that with this organizations are required to utilize this in order to face a VUCA world. Finally, Jakhar and Bharadwaj (2018) describe that their suggestion contributes to long term success of organizations in a VUCA world. These examples provide an understanding that there is a direction behind the suggestions in the research despite an alternative labeling to thrive. Nonetheless, we believe that after having reviewed the research of this study, designing innovation strategies to thrive in a VUCA world is yet important for the competitiveness of organizations experiencing a VUCA world. However, evaluating the research based on static usage of explicit words is not of the greatest importance to evaluate their effectiveness in relation to maintaining and achieving prosperity in a VUCA world.

5.3 Critical Perspectives

The above analysis and discussion provides us with various insights and suggestions from the reviewed research. After having performed the systematic literature review, there are factors contributing to the selection of literature and inconsistencies and potential gaps that we believe presents an additional critical perspective to this discussion.

As shown in section 3.2.1 Data collection, the research obtained from the database EBSCOhost was only derived from the business management database *Business Source Complete* and *Academic Source Complete*. It is therefore no surprise that there is heavy representation of organizational, leadership and management oriented research in this study. This choice was performed due to resource constraints of the project and to investigate research that had a strong strategic focus due to the choice of research question focusing on innovation strategies. This heavy difference is best shown in Illustration 1 where the section 4.1 Organizational Adaptations clearly is the most research dense category compared to 4.2 Technical Innovation Adaptations. In hindsight, it is simple to visualize the potential skew towards organizational and people oriented management literature.

On the other hand, it is simple to see why there would be a natural skew in topics of the research based on the academic nature of the VUCA term. Bennet and Lemoine's article (2014a) explaining the meaning of the VUCA acronym is highly influential and as the

authors stem from business management backgrounds, there is little doubt that researchers interested in these concepts are from similar fields. Nonetheless, we did expect to reach more technology oriented research considering the emphasis placed on innovation in the research question. As Schilling (2020) describes in her book “Strategic Management of Technological Innovation”, despite the variances in types of innovations, the emphasis on producing novel ideas, products and services and the ways in which these innovations can be protected through patents, we were a bit surprised to discover that there would be more emphasis placed on technological innovation strategies.

This surprise was also increased due to the minor contribution of artificial intelligence that contributed to this research. Fernandez et.al (2022) was alone providing the perspective of how the integration of AI could affect innovation. Roser (2022) provides a brief rundown of the history of AI and what we can detect from this piece and view globally is the immense impact AI can have on the way we work and sometimes do the work for us, situations we would consider to be highly characterized by a VUCA world. What we would regard as an under-representation of the possible impact of artificial intelligence on innovation and innovation strategies. One characteristic of the research that makes this under-representation relevant is due to the publishing years of the chosen research for this study. With the oldest research being published in 2015 and the most recent in 2024 and the research contribution made by Fernandez et.al (2022) in 2022 describes how young and relevant this academic field presents itself to be.

6. Conclusion

This study has investigated what innovation strategies published empirical and theoretical research suggest to thrive in a VUCA world. The purpose has been to provide what these suggestions are and present an overview of a part of the academic field of innovation strategies and the VUCA concept. From having analyzed, categorized and scrutinized the 54 research articles selected for this study, there are plentiful conclusions to draw and ways to answer the research question of this study. To provide clarity, we argue for two main conclusions that provide an answer to our research question.

The first conclusion as indicated in the discussion above regards that the vast majority of the research reviewed in this study provide innovation strategies to thrive in a VUCA world that are based in the connection between how agile, adaptive, flexible, leadership, managerial positions or the organization as a whole and the production of an outcome of innovative practices and outcomes in an organization. This conclusion is somewhat unexpected due to the unspecified nature of the research question. This means that by investigating what suggestions of innovation strategies research makes to thrive in a VUCA world, there was no intended direction of what type of innovation strategies the study sought to find. Thus, there was no selection criteria of what could be considered as the key strategies, most plausible or most profitable strategies. Such evaluation criteria could have allowed for critically examining the success of implementing suggested strategies that in this way could have produced a somewhat homogenous group of strategies.

Instead, we employed a systematic review of the selected research and provided a content analysis (Sekaran and Bougie, 2016) and thematic synthesis (Booth et.al, 2020). This in turn constructed the conclusion that a vast majority of research could provide commonalities in suggesting that agile, adaptive, flexible leaders, managers and organizations would provide innovative activities and often, general increase in innovation at the organization. With these strategies, the organization would be capable of thriving in a VUCA world. In this conclusion, it is evident from the analysis that there is no identical answer among the research that addresses innovation as an outcome of a strategy and highlights the role of agile, adaptive and flexible leaders and organizations to achieve this. Despite the specific differences in their suggestions, the general message of what a strategic response to a VUCA

world is still resembles one another to the degree we believe it is useful for practitioners and scholars to draw this conclusion.

In drawing this prominent conclusion, we want to acknowledge and provide transparency to the discussion of how research generally in this study defined strategy and what it means to thrive in a VUCA world. Firstly, the discussion of this study provides critical insights on the fact that the presentation of the suggestions made by the research was not formatted and labeled as strategies. Pells (2019) provides labels of strategic agility as one of six concepts that are required to be addressed and implemented to thrive in a VUCA world. Billington and Ellersgaard (2017) addressed the importance of leadership agility through a “Competence Gauge”. Jakhar and Bharadwaj (2018) instead describe organizational agility as the new paradigm and thus propose a conceptual framework which when implemented will contribute to organizations to thrive in a VUCA world.

The discussion of what thriving in a VUCA world implies has also attracted discussion in this study. What it means to thrive was the most clearly described by the research promoting the importance of ambidextrous organizations. Araújo et al (2021); Brandl et al. (2020) and Du and Chen (2018) are examples of research where the importance of balancing conventional business practice with VUCA related activities enriched and provided a thriving state in a VUCA world. On the other hand, a general trend in the research promoting organizational and managerial agility and adaptability as crucial recipes for adapting to a VUCA world, was also generally vague in relation to asserting to what degree the outcome of these suggestions would be. Billington and Ellersgaard (2017) articulates the need to *face* the VUCA world, Pells (2019) labels concepts as *useful* whereas Jakhar and Bharadwaj (2018) describe that long term success depends on levels of agility.

In reference to elaborate discussion of the meaning to thrive, there are evident reasons to vouch for that innovation strategies in a VUCA world should relate to a thriving state of the organizations implementing said strategies. However, from the research reviewed we can also make justified conclusions regarding the incentives to addressing suggestions that could be *useful*, to *face* a VUCA world and provide *long term success* for organizations in a VUCA world are inherently procured as an attempt to maintain competitiveness and succeed in a VUCA world as Mohammed and Viswanathan (2019) articulates it. The formulation of the research question and inclusion of thrive could thus be regarded as self-explanatory in

regards to the research reviewed. Despite this, drawing attention to the importance of not only surviving and critically reflecting on what it entails to thrive in a VUCA world allowed for well articulated suggestions for future research.

The second conclusion of this study is the other pattern of technologically oriented innovation strategies that instead tended to formulate strategies with innovation management and practices as a component of the strategy, and not the outcome. Formulating strategy with practical innovation management as a key component provided research that tended to be more case specific and fragmented to a larger degree than strategies focusing on managerial and organizational agility. Zhao et al. (2023) provided insights to how COTI synergies affected high technological innovation projects in China with magnitude to affect national economy, Sahoo et al. (2022) reviewed suggestion for implementation of industry 4.0 technologies and lastly, Ullrich et al. (2021) reviewed changing role of the enterprise architect from IT to EAM. The mentioned research provided similar focus on technological, radical and disruptive innovation in different contexts while the suggested strategies were specific for the supply chain, manufacturing or high tech industries.

To summarize and answer the research question of this study that was:

What suggestions does research provide as innovation strategies to thrive in a VUCA world?

The main conclusions regard the major tendencies for research reviewed in this study to provide innovation strategies to thrive in a VUCA world based on organizational, managerial and leadership agility, adaptability and flexibility in different ways. By developing organizational and managerial personnel to obtain these capabilities, organizations will be able to produce business models, disruptive, radical and incremental innovations and thus thrive in a VUCA world. The second conclusion suggests that innovation strategies are technologically oriented around how innovation management of disruptive, technological and radical innovation should be developed and maintained to thrive in a VUCA world.

6.1 Suggestions for Future Research

The purpose of this study was to provide the strategic responses that the selected research for this study made in order for organizations to thrive in a VUCA world. This purpose was going to be reached through synthesizing and scrutinizing the research to investigate

commonalities and differences and address possible research gaps and inconsistencies to which we could produce justified suggestions for future research. Through this study we have been able to reach the purpose by answering the research question as per the above section and also account for various differences and commonalities between the 54 research articles.

The critical discussion elaborated on various inconsistencies and potential research gaps from which we can derive purposeful suggestions for future research in this field. The conclusions have provided evidence on the abundance of organizationally focused research that have been produced in the period 2015-2024 in relation to this study. The clear majority of research focused on managerial and organizational resilience in relation to thriving in a VUCA world would produce suggestions to focus on other, less prioritized areas of research. This is part of our recommendations. However, as can be detected from the section 5.3 Critical reflections, the presence of artificial intelligence and possible implications it could have on organizational development is an area of research we would suggest investigating. Due to the short period of time that the research in this study is focused on, published academia provides indication that organizational agility in VUCA times is a relevant field to research. Therefore there are no incentives for this study to recommend eliminating this focus. Due to the high concentration of conference papers derived from Scopus, there are also incentives related to producing more independent research of innovation strategies in a VUCA world in order to allow for more in-depth research on the topic. In addition, due to the ever changing characteristics of the VUCA world and introduction of artificial intelligence in the corporate environment, there are various ends to these subjects that are in demand to maintain updating research on as new challenges are continuously introduced.

The second conclusion of this study elaborates on the minor presence of technologically focused innovation strategies in the academic realm of innovation strategies in a VUCA world. The suggestion to focus more on technologically oriented innovation strategies are similar to the motivation to focus on artificial intelligence to a greater extent. Pasmore (2018) accounted for the digital revolution's impact on the crucialness of organizational proactivity, Pahurkar et al. (2023) describes the impact of Covid-19 on digital marketing and Sahoo et al. (2022) described the critical necessity of implementing 4.0 industry technologies. Therefore, although we acknowledge the importance of addressing organizational development as an important theme in innovation and VUCA world research, attempting to combine these efforts to consequences related to technological advancements of the VUCA world.

Performing research suggestions as these would also contribute to providing clear presentations of particular challenges the VUCA world presents that would be of great use for practitioners and scholars to utilize in their operations and to gather an understanding of what parts of the subject are yet to be discovered.

7. List of References

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