

SCENARIO PLANNING EFFECTIVENESS, CREATIVITY AND
THE SHIPPING INDUSTRY

By Gökhan Gökmen

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Department of Strategy and Organisation

Department of Huntre Centre for Entrepreneurship

University of Strathclyde, Glasgow

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Declaration of Authenticity and Author's Rights

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Signed: Gökhan Gökmen

Date: 30.06.2022

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I vividly remember discovering scenario planning and how ecstatic I was and eager to learn more about it. In about two months, I put together a research proposal and applied for a PhD programme which happened to be assessed by Prof Peter McKiernan.

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“What’s the good of living if you don’t try a few things?”

Charles M. Schulz

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Abstract

Research output investigating the effectiveness of scenario planning has grown over the years. However, a theoretical explanation of scenario planning effectiveness is not documented in the literature. Additionally, scenario planning is often viewed as related to creativity; yet the literature is slim regarding the relationship between the two. Accordingly, this doctoral work investigated the effectiveness of scenario planning in general and further specifically examined the role of creativity in scenario planning effectiveness within the shipping industry.

This work addressed the identified gaps through three original scientific contributions employing a mix of methodological approaches. First, a configurative literature review of scenario planning effectiveness was conducted. Critical Interpretive Synthesis was used for evidence synthesis. Synthesising the literature showed that several areas desired by scenario planning were supported with evidence. However, it also affected its users in undesirable ways. Scenario planning may not be for everyone, not in every condition. Furthermore, the relationship between creativity and scenario planning was not researched extensively. The literature was not able to inform the parties interested in the role of creativity in scenario planning effectiveness for research and practice purposes.

The case study findings showed that the maritime scenarios were not as creative as Shell scenarios. It is revealed that the degree of creativity in scenario planning varied depending on what was desired by practising scenario planning. Creative ideas played a significant role in scenario planning projects that aimed to transform the maritime scenario users' understanding of a given issue. Creativity is also added value to the scenario planning process.

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List of Abbreviations

Abbreviations	Full Words
3PL	Third-party Logistics
CIS	Critical Interpretive Synthesis
CO2	Carbon dioxide
COSCO	China Ocean Shipping Company
CTS	Container Trade Statistics
DRSPAR	Drawbacks and requirements of chosen scenario planning approach and research
EU	European Union
EV	Electric vehicle
GHG	Greenhouse Gas
IL	Intuitive logics
IMF	International Monetary Fund
IMO	International Maritime Organisation
LA	La prospective
LCF	Low carbon fuel
LNG	Liquified natural gas
MSC	Mediterranean Shipping Company
N	Novelty

N/A	Not available/applicable
OESO	Organisation for Economic Cooperation and Development
PIL	Pacific International Lines
PMT	Probabilistic modified trends
PS	Port state
QCA	Qualitative content analysis
S	Surprise
SP	Scenario planning
SPICOST	Scenario planning and its comparison with other strategy tools
STM	Scenario team member
SU	Scenario user
SWOT	Strengths, Weaknesses, Opportunities, Threats
TA	Thematic analysis
TEU	Twenty-foot equivalent unit(s)
TRA	Theory of Remote Association
U	Utility

Chapter 1: Introduction

1.1.Introduction to work

This work explores scenario planning in the context of effectiveness – the success of producing outcomes as desired by scenario users. The author has systematically reviewed the existing literature regarding the effect of scenario planning. A configurative approach to synthesising the research evidence, Critical Interpretive Synthesis, is applied. The author has further populated the review with purposive sampling, e.g., hand-searching and cross-reference checks following a non-systematic review approach. Scenario planning is perceived as an effective intervention by its users. It is found effective for thinking, learning/unlearning, judgement, belief and decision making, reducing cognitive biases, and firm performance. Additional effectiveness areas such as scenario planning users have their voices heard, find opportunities for networking and collaboration, and take action collectively are also revealed. The CIS of research evidence also demonstrates that scenario planning brings several side effects to its users and is found ineffective in several areas. Scenario planning may not be for everyone, not in every condition.

The literature review also reveals several research directions. Creativity and its role in scenario planning effectiveness is a research area that is under-investigated in the literature. A qualitative exploratory study with the shipping industry stakeholders is conducted to explore the relevance of conducting scenario planning research in the industry and identify a research gap that does not only contribute to the scenario planning literature but also to the strategic maritime literature. These aims are achieved by investigating the stakeholders' future-looking activities and strategy-making practices. The study also discovers whether scenario planning is used by any of the participants in the study. The findings have revealed that short, medium and long-term thinking using various sources of knowledge and tools is utilised in the industry. Strategy and decision-making are informed by forecasting, scenario planning, brainstorming sessions and desk research such as maritime consultancy reports. Published maritime scenarios are found very similar by a participant based on her

previous experience with the scenarios and a scenario planning project she was part of.

The author previously identified creativity as an under-investigated research area in the scenario planning literature and made a similar observation to the participant; the maritime scenario published by different organisations were very similar to each other. Therefore, the author has decided to focus on the relationship between creativity and scenario planning effectiveness within the shipping industry in the continuation of the work.

Before investigating the role of creativity in scenario planning effectiveness, the author first questions the creativity of maritime scenarios. The maritime scenarios are compared for creativity against Shell scenarios. The author has approached creativity following a three-dimensional definition; novelty, utility and surprise are looked for in the scenarios. A comparative qualitative content analysis (QCA) of the scenarios is conducted. Only secondary data – the scenarios – is used for this part of the analysis. The findings demonstrate that novelty, utility and surprise are identified in every Shell scenario. The number of creative ideas in Shell scenarios has not varied greatly across the sample. The maritime scenarios, however, have not included creative ideas frequently across the sampled publications. The lack of novelty and surprise in some maritime scenarios has meant that such scenarios have zero creative ideas.

Lastly, a Stakeholder multiple case study is conducted to triangulate the author's creativity assessment of the maritime scenarios and further investigate the role of creativity in scenario planning effectiveness. According to the maritime scenarios' developers, their scenarios are creative. However, similar to the author's creativity assessment by comparative QCA findings, the scenario teams' creativity assessment has resulted in the infrequent presence of creative ideas across the scenarios. The scenario developers have brought up process creativity, which is another aspect of creativity, in the study. The creative process is perceived as creativity and contributed to their subjective assessment of their scenarios. Even when the scenario teams have not identified any creative ideas in their scenarios, they have perceived the scenario development process as related to creativity.

Creativity plays a role in scenario planning effectiveness in two areas. The first area is its role in transforming the scenario users' understanding. Transforming scenario users' understanding is explained in three sub-themes: discovering beyond usual, choosing and combining creatively, and reaching a shared understanding and taking ownership of the scenarios. The second area is creativity's value-adding function. Examples of the added value function are artistic touches, humour, trust playfulness and innovative idea development during the scenario development process.

The study findings assert that the role of creativity in scenario planning depends on the scenario planning projects' purpose – what is aimed with their application. The projects that aim to transform the scenario users' understanding of a given matter utilise all three sub-themes. Those projects have reported their achievements and all three sub-themes reported in the findings contribute to accomplishing them.

The projects that are not concerned with transforming the scenario users' understanding utilise creativity as an added value and focus on choosing and combining ideas creatively for scenario development. One of the main differences in this group of scenario projects is that discovering beyond usual ideas is not observed. Therefore, from the creativity viewpoint, the scenario development process relies on choosing and combining ideas during the scenario construction stage.

This introductory chapter continues by providing the historical context of scenario planning, demonstrating its position in strategic thinking, and linking it to the shipping industry and creativity research. The research problems are also laid out in this chapter. Several definitions are provided in the thesis to help readers unfamiliar with scenario planning, creativity and maritime literature and they can be found in Appendix 1. The rationale for choosing creativity and its relationship with scenario planning effectiveness as a research gap is presented following the discussions on the state of scenario planning literature in this chapter and further detailed at the end of Chapter 2. The following section starts by introducing scenario planning to the reader.

1.2.Introduction to scenario planning

MacKay and McKiernan (2018) trace the origin of scenario thinking to the early Babylonians' celestial science. The modern origins of scenario planning are found in the work of Herman Kahn (MacKay and McKiernan, 2018; Bishop, Hines and Collins, 2007) and the RAND corporation (Barrella and Amekudzi, 2011; Bengston, 2019; Bishop, Hines and Collins, 2007; Bradfield *et al.*, 2005) and its application to business at Royal Dutch Shell (Chakraborty *et al.*, 2011). Pierre Wack's Harvard Business Review Papers (Wack, 1985a; Wack, 1985b) based upon his time at Royal Dutch Shell have been frequently cited in the literature (Amer, Daim and Jetter, 2013).

Since RAND Corporation and Wack's (1985a; 1985b) involvement in scenario planning at Shell and his Harvard Business Review articles, interest in scenario planning has grown (Volkery and Ribeiro, 2009). Open foresight (Schmidhuber and Wiener, 2018; Wiener, 2018; Wiener, Gattringer and Strehl, 2020; Zeng, Koller and Jahn, 2019) and the Coronavirus pandemic have further contributed to businesses' ambition to discover future uncertainties. Current discussions around open strategy and open foresight indicate an anticipated expansion of foresight tools, including scenario planning and their more comprehensive application (Venugopal, Gokmen and Sunner, 2021).

MacKay and McKiernan (2018) suggest that multiple definitions of scenario planning are used interchangeably. For instance, a comprehensive literature review on scenario planning by Amer, Daim and Jetter (2013) has included and presented a wide range of scenario planning methods. Various terminologies exist in the literature, for instance, scenario building, scenario planning, scenario techniques and scenario thinking (Varum and Melo, 2010). Subtle differences are present in these terms, and scholars acknowledge the differences but do not exclude them in the literature (Varum and Melo, 2010; Amer, Daim and Jetter, 2013; Balarezo and Nielsen, 2017).

Chermack, Lynham and Ruona (2001) and, more recently, Crawford (2021) have collated scenario planning definitions. Porter (1985, p. 63) defines scenario planning as "an internally consistent view of what the future might turn out to be - not a forecast, but one possible future outcome". Ringland (1998, p. 83) defines scenario planning as

"that part of strategic planning which relates to the tools and technologies for managing the uncertainties of the future". Schoemaker (1995, p. 13) offers "a disciplined methodology for imagining possible futures in which organisational decisions may be played out" as a definition for scenario planning. Scenario planning is also described as "a futures process that combines the creation of several stories of plausible futures with the strategic responses required to deal with them." (Adapted from McKiernan, 2012, cited in McKiernan, 2017, pg. 68). Finally, Schwartz (2012, p. 21) defines it as "a tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out".

1.3.Setting the Scene: Shipping Industry, Strategic Thinking, Scenario Planning and Creativity

The author's background in marine transport and his interest in strategy have laid the foundations of this scientific work. As an essential mode of transport (Duru, Bulut and Yoshida, 2011), shipping plays a vital role in the global economy (Stopford, 2009). It is capital-intensive (Omrani and Keshavarz, 2015), highly cyclical (Chen, Meersman and Voorde, 2012, Chistè and van Vuuren, 2014, Nielsen et al., 2014), and is composed of non-linear, uncertain, and behavioural factors (Duru, 2016, Greenwood and Hanson, 2015). In an "unpredictable, highly volatile and competitive marketplace, a capacity for innovative, divergent strategic thinking at multiple organisational levels is seen as central to creating and sustaining competitive advantage" (Liedtka, 1998, in Graetz, 2002, p. 32).

Mintzberg and Porter have central positions on the interrelationship between strategic thinking and strategic planning. Mintzberg argues that strategic thinking and planning consist of distinct thought processes. Strategic thinking is creative and strategic planning is analytical. In contrast, Porter believes that analytical tools achieve strategic thinking (Heracleous, 1998). Strategic thinking is characterised by synthesis, divergent, creative, intuitive, and innovative, while strategic planning is logical, systematic, conventional, prescriptive, and convergent (Graetz, 2002).

Both strategic thinking and strategic planning are needed – neither is sufficient without the other. Creative, revolutionary strategies arising from strategic thinking still have

to be implemented through convergent and analytical thought. However, strategic planning is not able to create original strategies unless it promotes a “creative mindset in the process, as in the case of using alternative scenarios for the future” (Heracleous, 1998, p. 486). Furthermore, strategic thinking is concerned with “exploring options” whereas strategy development is with “making decisions and setting directions” and “strategic planning is about implementing actions” (Voros, 2003, p. 13). Hax and Majluf (1988) divide strategies into two camps, deliberate and emergent. Another school of thought in the strategy domain is strategy-as-practise (Jarzabkowski and Paul Spee, 2009; Fenton and Langley, 2011; Jarzabkowski, 2005).

Foresight is located under strategic thinking (Shoemaker, 1995) and scenario planning is one of the foresight tools (MacKay and McKiernan, 2010; Rohrbeck, Battistella and Huizingh, 2015; Tapinos, 2013; Lew, Meyerowitz and Svensson, 2018; Cook *et al.*, 2014a; Cook *et al.*, 2014b; Hirsch, Burggraf and Daheim, 2013). Given that this work focuses on scenario planning, strategic thinking that precedes strategic planning is at the core of this research. Therefore, scenario planning as a foresight tool is closely related to strategic thinking. Foresight is meant to unfold a broader range of perceptions about the strategic options available, steering strategy-making towards a potentially wiser direction. Foresight is related to exploration and options. Implementing the options is the domain of strategic planning (Voros, 2003).

Following the success of the Shell scenarios, scenario planning gained traction in various environments, e.g., corporate strategy and policy making. Scenario planning research has grown to an identifiable size (Amer, Daim and Jetter, 2013; Balarezo and Nielsen, 2017; Varum and Melo, 2010). However, foresight and foresight tools such as scenario planning have shortcomings. According to Bowman (2016), scenario planning does not belong to a unifying theory and several scenario planning techniques shift between a large number of frameworks. Scenario planning literature has repeatedly reported that the methods used in scenario planning are chaotic and one reason given for that is the insufficient theory (Spaniol and Rowland, 2018). Furthermore, a recent discussion on the epistemological paradigm (Fergnani and Chermack, 2020) and the comments received from various experts on scenario planning, e.g. Cairns (2021); Hodgkinson (2021); Kishita *et al.* (2021); Minkinen

(2021); Münch and von der Gracht (2021); Phadnis (2021); Schoemaker (2021), reflect the domain's current situation in terms of the reputable scenario planning experts' non-agreement on essential issues.

Several research papers have criticised SP's shortcomings from different aspects. These shortcomings of scenario planning are about its aims and how they are sometimes not achieved through its application. Such criticism is based on the scholars' investigation of what scenario planning literature has promoted and what is achieved in practice; for example, see Bartholomew (2007) on scenario planning ineffectiveness for land-use transportation projects, and see Mason (2003) for the scenario planning failure cases.

Despite its limitations, scenario planning is an alternative to linear thinking. It has much to offer to the strategists, e.g., helping broaden horizons and think the unthinkable (Wack, 1985a; Wack, 1985b). However, it is a practice-based approach, and further research on scenario planning effectiveness is required. For instance, Moats, Chermack and Dooley (2008) have pointed out the necessity of evidence support for scenario planning effectiveness and recommended additional research on the issue. Scientific support on why and how SP may or may not work is not completely laid out in the literature yet but research output on the effectiveness of scenario planning on scenario users has grown in the past few years (Burt and Nair, 2020; Phadnis *et al.*, 2015; Schmitt Olabisi *et al.*, 2016; Totin *et al.*, 2018).

In terms of creativity, it is often misunderstood (Patston *et al.*, 2018; Runco, 2010a) so far that it has even been considered "deviant behaviour" by some people (Runco, 2010a, p.236). It is also often mistaken for only highly original or novel ideas.

Scholars and practitioners have yet to agree on a creativity definition universally. For instance, single-dimensional, two-dimensional, and three-dimensional definitions of creativity exist (Runco and Jaeger, 2012). However, Stein's definition introduces the notions that are mostly agreed upon. Those are a creative work is novel and accepted useful or satisfactory by a group (Stein, 1953). Regarding creativity and scenario planning, the latter is considered both science and art (Schwartz, 2012; Van der Heijden, 2005). Amer, Daim and Jetter (2013) have laid out a summary of scenario

validation criteria, including creativity/ novelty necessary for validating the scenarios. Considering one of the objectives of scenario planning intervention is challenging mental models and introducing changes, novelty is a commonly used validation criterion (Crawford, 2019).

Scenario teams may uncover a “novel” future state during the scenario planning exercise. For example, Pierre Wack, a prominent figure in scenario planning, is known for his role at Shell and for experimenting with scenario thinking (MacKay and McKiernan, 2018) in the business setting for the first time states:

Scenarios deal with two worlds, the world of facts and the world of perceptions. They explore for facts, but they aim at perceptions inside the head of decision-makers. Their purpose is to gather and transform information of strategic significance into fresh perceptions (Wack, 1985b).

These “fresh” perceptions make up the novelty in the scenarios. Wack (1985b) continues: “This transformation process is not trivial – more often than not it does not happen.”. This is where Wack also acknowledges that scenario planning does not always lead to uncovering a “novel” future state. He concludes his thoughts: “When it works, it is a creative experience that generates a heartfelt ‘aha’ from your managers and leads to strategic insights beyond the mind’s previous reach” (Wack, 1985b).

The vitality of fresh perceptions as a signifier of the successful scenario planning process, the “aha” moment, is apparent. Therefore, challenging conventional thinking is another ambition for applying scenario planning to “reframe perceptions and change the mindsets of those within organisations” (Wright, Bradfield and Cairns, 2013 pg. 633). Challenging conventional thinking can happen through exposure to non-conventional ideas.

Boden’s (2010) approach to creativity identifies two different senses of “novel” that lead to the differentiation of P- level and H-level novelty. P- level novelty refers to the occurrence of an idea to a person for the first time, whereas H-level novelty indicates an idea new to human history. The P and H-level novelty perspectives are akin to

subjective and objective novelty concepts – P- level novelty corresponding to subjective and H-level to objective novelty (Kaufmann, 2003).

Scenario teams may not necessarily come up with H-level novel ideas, but instead with P- level novel ideas, or there may not be any novel ideas. It has different implications in consideration with Wack’s comments. In one scenario, there may not be any novel ideas in the scenario development process; in another scenario, there may be multiple P- level novel ideas: meaning new to the person who has it, which are then passed on to other scenario team members. H-level appears to have the highest likelihood of leading to an “aha” moment. However, conventional thinking can be challenged, and “aha” moments can be observed in situations where P- level ideas are novel to the rest of the scenario team and users. Experiencing the “aha” moment is closely associated with novelty and surprise.

1.4.Statement of the Problem

Scenario planning is often not investigated for effectiveness (Wright, Bradfield and Cairns, 2013). Although scholarship in scenario planning has grown over the years, scholars have focused on why to exercise it and the recommendations for good practice aspects (Varum and Melo, 2010). The problem concerning the lack of scenario planning theory (Burt and van der Heijden, 2008; Burt, 2011; Chermack, 2004) has improved over the years, but the theoretical explanation of scenario planning is still considered insufficient by some scenario planning scholars, e.g. Spaniol and Rowland (2018). Developing a unifying theory of scenario planning is still being pursued (Crawford, 2019). Given the state of the SP literature, this doctoral work is not concerned with developing a meta-theory of scenario planning. The author believes that working towards the development of a middle-range theory of scenario planning effectiveness is a step forward for practice and knowledge. Additionally, various schools of scenario planning are observed in practice. Therefore, the author reckons that instead of excluding a type of scenario planning school, scientific work can be established in a unifying fashion including all schools.

In terms of scenario planning effectiveness and creativity, novelty is reportedly an essential part of scenario planning (Amer, Daim and Jetter, 2013) and necessary for its

effectiveness - including surprise (Van der Heijden, 2005, p.145). However, there is not enough research on the role of creativity in SP's effectiveness. Adding to this unclarity, scenario planning scholars sometimes use creativity and novelty interchangeably.

Regarding business and management research in the shipping industry, a recent systematic review of the strategic management research literature in the maritime industry has revealed valuable insights. Wang and Mileski (2018) have concluded that strategic maritime management is an emerging discipline that closely resembles the emergence phase of strategic management from decades ago. For instance, until 1990, only three research papers investigated the industry from the strategic management perspective. The dominant lenses in the past decades investigating the industry have been the competitive advantage theory (Porter, 1997), the resource-based view (Barney, 1991) and the dynamic capability theory (Teece, Pisano and Shuen, 1997).

Since the late 2000s, scenario planning has started receiving attention from the maritime industry (Arctic Council, 2009; Corbett *et al.*, 2010; Ruske *et al.*, 2010; Wärtsilä Corporation, 2010; Storgård *et al.*, 2012; Dalsøren *et al.*, 2013; Fang *et al.*, 2013; Wolters *et al.*, 2013). However, maritime economics and forecasting models still dominate the research in the industry, e.g., seaborne trade forecast, merchant fleet forecast, and port throughput forecast (Fiskin and Cerit, 2021). Further research is called for using qualitative techniques (Mansouri, Lee and Aluko, 2015) in scenario planning investigating the maritime industry (Bathke *et al.*, 2022).

A scientific investigation of scenario planning effectiveness and more specifically the role of creativity in scenario planning effectiveness within the shipping industry is a timely and relevant research area. A theoretical framework grounded in available research evidence and further discovering the role of creativity in scenario planning effectiveness would lay the ground for a middle-ranged theory of scenario planning effectiveness.

1.5.Statement of Purpose

This doctoral work addresses the identified gaps through original scientific contributions employing a mix of methodological approaches. It constitutes a necessary scientific inquiry on scenario planning effectiveness in general and further explores the role of creativity in SP effectiveness within the shipping industry.

First, the work aims to understand better the effectiveness of scenario planning on scenario users through critically synthesising evidence of the SP's effectiveness on scenario users in Chapter 2. The chapter presents an inductively developed theoretical framework using the critical interpretive synthesis (CIS) approach to systematic review. The CIS findings explain SP's desired impact areas, requirements for effective practices, side effects, ineffectual conditions, and comparisons between scenario planning and other strategy tools. The CIS findings are further discussed and a research agenda is presented.

Despite the reported relevance of scenario planning and creativity in the literature, creativity is seldomly researched. The literature review of SP effectiveness has not identified any research output that set out to test the role of creativity in SP effectiveness. Therefore, in the continuation of Chapter 2, a brief literature review of creativity is also presented to establish the position of creativity in scenario planning. The review consists of the definitions of creativity and scholars' approaches to conducting creativity research. Contextuality of creativity and creativity assessment are also discussed in the chapter. The chapter concludes with the chosen definition of creativity which guides the remaining parts of the doctoral work and finalises the research questions that are pursued.

An important side note about this doctoral work is that its industrial focus is the shipping industry. The relevance of investigating scenario planning effectiveness within the shipping industry is not established in the literature. Furthermore, the work aims to contribute to not only scenario planning literature but also strategic maritime management literature. The author aims to identify a research gap and offer scientific findings that contribute to industrial knowledge and practice. Hence, the necessity of

an exploratory qualitative pilot study investigating the forward-looking practices of the stakeholders has emerged. The investigation has aimed to

- explore the suitability of scenario planning research, and
- identify a research gap by discovering long-term thinking and strategy-making approaches in the industry.

The findings can be found in Appendix 2. The study findings are decided to be presented in Appendix 2 to sustain the focus of the work on scenario planning effectiveness and creativity. In that way, it is judged that the reader would remain focused on the primary issues this work is investigating.

Chapter 3 introduces the chosen research design to answer the research questions. Methodologically, the original contributions presented across all chapters in this work develop and present a tailored approach for pursuing a range of research questions related to SP's effectiveness and creativity and mechanisms to support evidence-based management practices.

Chapter 4 aims to understand whether maritime scenarios are creative or not. The maritime scenarios are compared against Shell scenarios for creative ideas. Comparative qualitative content analysis is conducted to answer the related research question. Maritime and Shell scenarios are identified systematically and selected following theoretical and snowball sampling strategies. The author concludes the chapter with his interpretation of the findings.

In Chapter 5, the work continues delving into creativity and scenario planning from an effectiveness viewpoint, expanding on the previous chapter's findings by applying Stake's multi-case study approach. It is applied to further inquire into the scenario team's definition of creativity, their creativity assessment, their perception of the role of creativity in scenario planning, and their perceived effectiveness of scenario planning. The investigation provides further evidence on scenario planning effectiveness and creativity-related components concerning the CIS framework, drawing on the interviews with scenario developers, relevant documents, and scenario publications.

Chapter 6 proposes answers to the research questions significant for scenario planning effectiveness and creativity, including its capacity to broaden horizons, thinking, learning, decision-making, networking- collaboration, and the thought leader image of the scenario users. Finally, the chapter presents the key learning points concerning the research questions, findings, limitations, implications for practice and contribution to knowledge.

1.6. Research Questions

Firstly, the work aims to better understand the effectiveness of scenario planning by synthesising evidence of its effects on scenario users. Accordingly, the following research question is directed:

RQ 1: What are the areas scenario planning is effective on scenario users?

Based on the CIS findings, the author has decided to conduct interviews with the shipping stakeholders to discover whether scenario planning is a relevant research area in the industry and further identify a research gap that contributes to industrial knowledge and practice in addition to scenario planning effectiveness literature. Their forward-looking and strategy-making processes are explored to achieve the aims. The following research question:

RQ 2: How do shipping industry stakeholders make strategy?

is developed and answered. The findings of the study can be found in Appendix 2.

Following the CIS and exploratory qualitative study, the importance of investigating the creativity aspect of scenario planning is revealed.

The continuation of the work utilises case-based approaches to answer the second research question. The following research question:

RQ 3: Are maritime scenarios creative?

is answered by conducting a comparative qualitative content analysis.

Finally, a Stakian multiple case study approach is taken to answer the last research question:

RQ 4: What is the role of creativity in scenario planning effectiveness on scenario users?

The next sections present research reflexivity and conclude the chapter.

1.7. Research Reflexivity

The motivation of this work is grounded in the author's observations on the shipping, and more broadly, the maritime industry, from 2009 to 2017. The author has a background in marine transportation through training and work experience. First, the author has experienced the aftermath of the 2009 Financial crisis as a newly enrolled undergrad student in the department of maritime business administration. The maritime industry's financial crises and cyclical nature have caught his attention throughout his studies. Industrial research has been informed predominantly by economics and accompanying forecasting methods. However, despite the advancements in research output in the field, the decision-makers were constantly labelled as short-sighted and prone to making inconvenient decisions (Duru, 2013; Duru, 2016; Duru, 2018). Second, through his work experience, alas short, the author has experienced the business side of the industry. His knowledge of the industry players' long-term thinking practices has expanded through business connections. In his and business connections' experience, most companies operating in the industry were not taking a long-term view in their decisions. Third, as a stakeholder in the industry, he was curious about the means of making strategies for the industry that have the potential to eliminate or reduce incompetency in making decisions. Finally, the industry has been going through a transitioning period. The author intends to learn about the industry's current status and potential futures and reflect on them.

1.8. Conclusion

Scenario planning literature has grown over the years. Several approaches to practising scenario planning have been documented. However, research investigating its

effectiveness and advancing its theory is still required; the creativity aspect of scenario planning is mostly neglected.

Positivist approaches dominate research on the maritime industry. The industry can benefit from research positioned in a different paradigm, asking different questions. Strategic management research in the maritime industry has not caught up with the discipline's full array of perspectives. As a result, foresight and especially scenario planning research in the industry is minuscule. However, since the late 2000s, industry stakeholders have publicly shared their scenario planning practices.

The work advances the theory by investigating scenario planning effectiveness and specifically further the role of creativity in SP effectiveness. It lays the groundwork for developing a middle-range theory by investigating SP effectiveness through critically synthesising empirical findings. Also, particular attention to the creativity perspective offers fresh scientific insights into scenario planning and strategic maritime management literature.

In this chapter, the rationale of the doctoral work was presented. The historical origins and the position of scenario planning in the strategy literature were introduced to the reader, linking it to the maritime industry. The chapter further demonstrated the rationale for choosing the initial research gap, and the other research questions that emerged and answered were laid out. Given the work's transdisciplinary¹ (Klein, 2008) nature, the author used several definitions relevant to scenario planning,

¹ In this work, the transdisciplinary nature of scenario planning as a foresight tool (Bengston, 2019; Fergnani and Chermack, 2020; Frijns *et al.*, 2013) is reflected in the research questions and design through including several different disciplines, e.g. creativity research, maritime research, management research, cognitive psychology, in consideration with the various stakeholders in the maritime industry and grounding the research based on stakeholder problem.

creativity and the maritime industry. They are provided to the reader and can be found in Appendix 1.

Chapter 2 presents the systematic review of scenario planning effectiveness literature and the critical interpretive synthesis findings, answering the first research question:

RQ 1: What are the areas scenario planning is effective on scenario users?

The chapter reviews empirical research that was expressly set out to test the effect of scenario planning on scenario users. Evidence is synthesised by the CIS method and the findings are presented. Chapter 2 also offers a research agenda that the author has considered for the continuation of the work. Given the focus of the work is later decided to be scenario planning effectiveness and creativity, special attention to creativity literature is paid and its relevance to scenario planning effectiveness is demonstrated at the end of the chapter.

Chapter 2: Scenario Planning Effectiveness Literature Review: A Critical Interpretive Synthesis of Research Evidence

This chapter introduces the taken approaches to reviewing the literature and method of analysis and presents the CIS findings and the discussions. The CIS findings presented in this chapter answer RQ 1. The findings are divided into three sections. The first section provides the reader with a descriptive overview of the literature, detailing the research design of sampled publications and the choice of scenario planning techniques. The second section presents the CIS findings. The third section discusses the finding and makes recommendations for future research. The final section introduces creativity literature to the work and discusses its place in scenario planning effectiveness conceptually. Two research questions are developed at the end of the chapter and answered in the continuation of the work.

2.1. Systematic Literature Review and Critical Interpretive Synthesis

The work follows a systematic and configurative literature review approach which is then enhanced by merging the findings with a non-systematic review to increase the explanatory power of the review. The review aims to answer RQ 1, develop a new theoretical framework and offer future research directions. Critical interpretive synthesis (CIS) is chosen as a method of analysis since it can facilitate those ambitions (Depraetere *et al.*, 2021; Dixon-Woods *et al.*, 2006b; Entwistle *et al.*, 2012; Flemming, 2009; Flemming, 2010; Moat, Lavis and Abelson, 2013). Configurative reviews are interested in theory generation; the choice of methods is iterative, the review findings are “emergent concepts”, and the review is used to increase the understanding of whatever questions are directed to the review (Gough, Thomas and Oliver, 2012, p. 3).

Systematic reviews follow closely a “set of scientific methods that explicitly aim to limit systematic error (bias), mainly by attempting to identify, appraise and synthesize all relevant studies” to answer a specific research question (Petticrew and Roberts, 2008, p. 9). On the other hand, non-systematic reviews pursue a “more strategic and adaptable approach to selection and extraction” (Cook, 2019, p. 55).

In this work, the literature review adopts a systematic approach to reviewing the literature to identify research output that explicitly set out to test the effectiveness of scenario planning. Twenty-two research papers are identified in the process. Systematic reviews can identify wide-ranging studies and condense information about each study, finding research gaps and synthesising research results through meta-analysis (Cook, 2019).

Following the systematic review and the application of CIS, the author further populates the literature review by taking a non-systematic approach to increase the explanatory power of the review. By doing so, the review gives more room for discussing the scenario planning effectiveness literature. Non-systematic approaches to reviewing the literature enable researchers “to reflect broadly upon a theme, drawing upon research, frameworks, and philosophy both within their field and from other fields” (Cook, 2019, p. 56). The author reveals several research directions based on past research output, stemming from the research interest of the identified papers’ authors. However, restricting the research directions to past research interests could be a barrier to investigating a fresh research area. An additional non-systematic approach that supports the systematic and configurative review has meant that drawing from other fields is made possible. Consequently, creativity is identified as an under-researched area in the scenario planning literature. The author has merged the CIS findings of the systematically derived research papers which are later enhanced by a non-purposive review process with discussing the findings in the SP effectiveness and creativity context. The overall process has allowed for conceptualising the continuation of the work and development of RQ 3 and RQ 4.

The next section begins with presenting the general trends in the scenario planning effectiveness literature; identified and sampled research papers’ authors, names of the journal of publications, and research design characteristics of the review papers are detailed.

2.2. General Trends in the Literature

The literature on scenario planning effectiveness has grown recently, but it is still limited. Since the first publication by Schnaars and Topol (1987) and a few years later

by Schoemaker (1993), the matter was not scrutinised systematically until the early 2000s.

Most studies analysed in this review paper are published in journals with high impact factors. Only three journals, *Elementa: Science of the Anthropocene* (About the Journal, 2022), *Journal of Leadership & Organizational Studies* (About this journal, 2022), and *Human Resources Development Quarterly* (Human Resources Development Quarterly, 2022), are not present in the ABS ranking, with impact factors of 6.053, 3.448 and 4.007 respectively (see Chart 3.1).

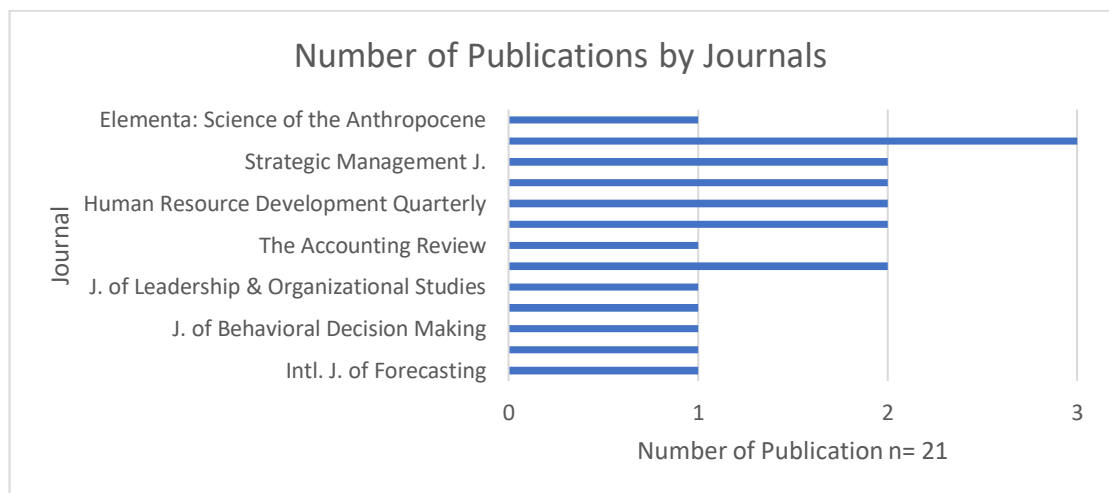


Chart 2. 1: Number of publications by journals

Source: Chart created by the author based on sampled research papers following the systematic literature review process

2.2.1. Study Design, Quality and Sample Characteristics

Regarding the research design, most researchers applied a version of experimental designs to test the effectiveness of the scenario techniques. Forms of the quasi-experimental design were popular amongst the researchers where they applied a pre and post-test, and the scenarios or scenario development processes were applied as an intervention. Consequently, questionnaires were the most common means of data collection.

2.2.1.1. Sample Characteristics

Five out of twenty-one studies either partially or fully include students in their samples. For example, of the six studies in which scenario thinking impact was evaluated, five studies sampled students doing business degrees² (Meissner and Wulf, 2013; Min and Arkes, 2012; Schnaars and Topol, 1987; Schoemaker, 1993; Sedor, 2002) and one sampled psychology students (Kuhn and Sniezek, 1996). Sixteen out of twenty-one studies sampled professionals³ (Chermack et al., 2015; Chermack et al., 2017; Chermack and Nimon, 2008; Glick et al., 2012; Haeffner et al., 2012; Johnson et al., 2012; Marquitz, Badding and Chermack, 2016; Phadnis et al., 2015; Phelps, Chan and Kapsalis, 2001; Sedor, 2002; Totin et al., 2018; Veliquette et al., 2012; Visser and Chermack, 2009; Zegras and Rayle, 2012; Burt and Nair, 2020; Schmitt Olabisi et al., 2016).

2.2.1.2. Scenario Schools and Study Designs

Few studies used the IL school of scenario planning, e.g., Schoemaker (1993), Zegras and Rayle (2012), and Meissner and Wulf (2013)⁴. Among four studies where researchers presented the scenarios to subjects⁵, three studies employed factorial design (Min and Arkes, 2012; Schnaars and Topol, 1987; Sedor, 2002). Among the four, one study presented loss vs. profit scenarios (Sedor, 2002), another study tweaked the scenario development structure by asking participants to create scenarios in an easy

² Sedor (2002) included various subjects in their experiments. For instance, in one experiment, students were the subjects, and in another, couples engaged to get married were the experiment subjects.

³ Sedor (2002) Experiment 1 only.

⁴ In Schoemaker's (1993) study, IL school scenario planning steps are executed in one group fully, in another group from step one to four.

⁵ Delivered scenarios.

two-step or five-step way, also altering the sense of accountability of participants as in a high vs low ranking (Min and Arkes, 2012). The last study changed the scenario structure to an optimistic, pessimistic and middle ground one (Schnaars and Topol, 1987). In the fourth study in which the scenarios were presented to subjects, an increase, decrease and hybrid scenario were used (Kuhn and Sniezek, 1996). Furthermore, three studies by Totin *et al.* (2018); Schmitt Olabisi *et al.* (2016); Johnson *et al.* (2012) conducted participatory scenario planning workshops using I-NSPECT for scenario generation (Olabisi *et al.*, 2010). Finally, Phadnis *et al.* (2015) adopted Schwartz's scenario planning approach (Schwarz, 1991). They argued that their study was not based on the Shell School for two reasons: a) lack of subject accountability for the decision made; and b) it was a one-off application of scenario practice. Interestingly, Shell's approach, also known as Intuitive Logic school of scenario development, was used only by a few researchers.

2.3. CIS Findings

The critical interpretive synthesis of the scenario planning effectiveness literature included twenty-one⁶ peer-reviewed publications. To make sure the analysis captured all empirical findings of the reviewed literature, firstly an in-vivo coding was administered. First cycle coding produced 2039 codes and further translated into one another to produce a reduced number of themes, concepts and metaphors (Dixon-Woods *et al.*, 2006b; Flemming, 2009; Dixon-Woods *et al.*, 2005). As a result, 375 translations were then processed through reciprocal translation analysis to produce 12 third-order constructs, also called synthetic constructs (see Table 2.1). Finally, four synthetic arguments were constructed (see Table 2.2). These were:

- Scenario Planning as an Enhancing Technique
- Scenario Planning and Change

⁶ The process initially included nineteen papers; the author later identified two more research papers in 2021 which were published after the systematic review in 2018.

- Drawbacks and Requirements of Chosen Scenario Planning Approach and Research
- Scenario Planning and Its Comparison with Other Long-Term Planning Tools.

Theory development is an essential aspect of meta-ethnography research (France *et al.*, 2019). CIS is a method rooted in meta-ethnography and facilitates the development of a theoretical framework.

Synthetic Construct	Contributing Articles
The Perceived Role of Scenario Planning	Chermack <i>et al.</i> (2017); Phelps, Chan and Kapsalis (2001); Schmitt Olabisi <i>et al.</i> (2016); Visser and Chermack (2009)
Desired Impact of Scenario Planning	Chermack <i>et al.</i> (2015); Chermack and Nimon (2008); Haeffner <i>et al.</i> (2012); Johnson <i>et al.</i> (2012); Kuhn and Sniezek (1996); Meissner and Wulf (2013); Min and Arkes (2012); Phadnis <i>et al.</i> (2015); Phelps, Chan and Kapsalis (2001); Schoemaker (1993); Sedor (2002); Totin <i>et al.</i> (2018); Visser and Chermack (2009); (Burt and Nair, 2020; Schmitt Olabisi <i>et al.</i> , 2016)
Have Voice	Chermack <i>et al.</i> (2015); Haeffner <i>et al.</i> (2012); Johnson <i>et al.</i> (2012); Totin <i>et al.</i> (2018)
Networking/ Collaboration	Chermack <i>et al.</i> (2015); Haeffner <i>et al.</i> (2012); Johnson <i>et al.</i> (2012); Totin <i>et al.</i> (2018); Visser and Chermack (2009); Zegras and Rayle (2012)
Taking Action	Chermack <i>et al.</i> (2015); Johnson <i>et al.</i> (2012); Min and Arkes (2012); Totin <i>et al.</i> (2018)
Adverse/Unexpected effects / No Influence Conditions	Chermack <i>et al.</i> (2015); Glick <i>et al.</i> (2012); Haeffner <i>et al.</i> (2012); Marquitz, Badding and Chermack (2016); Meissner and Wulf (2013); Min and Arkes (2012); Phadnis <i>et al.</i> (2015); Phelps, Chan and Kapsalis (2001); Schnaars and Topol (1987);

	Schoemaker (1993); Sedor (2002); Totin <i>et al.</i> (2018); Zegras and Rayle (2012); Schmitt Olabisi <i>et al.</i> (2016)
Scenario Planning May Not Be for Everyone	Glick <i>et al.</i> (2012); Kuhn and Sniezek (1996); Phadnis <i>et al.</i> (2015); Zegras and Rayle (2012)
Measurement Issues	Chermack <i>et al.</i> (2015); Johnson <i>et al.</i> (2012); Phelps, Chan and Kapsalis (2001); Visser and Chermack (2009); Schmitt Olabisi <i>et al.</i> (2016)
Requirements of Successful Scenario Planning Practices	Chermack <i>et al.</i> (2015); Haeffner <i>et al.</i> (2012); Johnson <i>et al.</i> (2012); Kuhn and Sniezek (1996); Min and Arkes (2012); Phadnis <i>et al.</i> (2015); Phelps, Chan and Kapsalis (2001); Schnaars and Topol (1987); Sedor (2002); Totin <i>et al.</i> (2018); Visser and Chermack (2009); Zegras and Rayle (2012); Schmitt Olabisi <i>et al.</i> (2016)
Scenario Planning Practitioners & Prior Experience and Knowledge	Phelps, Chan and Kapsalis (2001); Visser and Chermack (2009)
Scenario Planning and Its Comparison with Other Long-Term Planning Tools	Meissner and Wulf (2013); Phelps, Chan and Kapsalis (2001)

Table 2. 1: Synthetic Constructs and Contributing Translations and Publications

Source: Created by the author based on the CIS findings of the sample research papers

Synthesising Arguments	Synthetic Constructs
Scenario Planning as an Enhancing Process	<ul style="list-style-type: none"> • The Perceived Role of Scenario Planning • Desired Impact of Scenario Planning

Change	<ul style="list-style-type: none"> • Have Voice • Networking – Collaboration • Taking Action
Drawbacks and Requirements of Chosen Scenario Planning Approach and Research	<ul style="list-style-type: none"> • Adverse/ unexpected effects/ No influence Conditions • Scenario Planning May Not Be for Everyone • Requirements of Successful Scenario Planning Practices • Measurements Issues
Scenario Planning and Its Comparison with Other Long-Term Planning Tools	<ul style="list-style-type: none"> • Scenario Planning in Comparison to Other Strategy Tools • Scenario Planning Practitioners & Prior Experience and Knowledge

Table 2. 2: Synthesising Arguments and Contributing Synthetic Constructs

Source: Created by the author based on the CIS findings of the sample research papers

2.3.1. The Synthesising Arguments

2.3.1.1.Scenario planning as an enhancing process

This synthesising argument has been constructed around the perceptions of participants on the effectiveness of scenario planning and the empirical research findings that were gathered as a result of investigations on SP’s effect on a variety of areas.

The Perceived Role of Scenario Planning

Analysis showed that the studies on the desired impact of scenario research had approached the issue from psychological, organisational, and managerial perspectives. Albeit enriching, researchers from different backgrounds did not always make enough effort to put the pieces together. Consequently, they did not always consider their predecessors’ results before starting their research. Additionally, it appears that

scenario users and academics see the foundations and outcomes of SP differently. While scenario users tend to focus on its tangible effects and outcomes, researchers have paid particular attention to the interaction between scenario planning and learning, thinking, cognitive biases, judgement and decision making, and firm performance.

During the synthesis, the questions, “Why do organizations practise scenario planning? What do they expect from it? and What benefit do they think they derive from it?” emerged and were posed. Analysis revealed that scenario users think of scenario planning as:

- “an effective intervention”,
- “good for testing robustness of strategies”,
- “a forum to explore and communicate”,
- “provoking and helping see the bigger picture”,
- “allows vivid description and storytelling”,
- “helping users expecting the unexpected and performance increase in organisations” (Visser and Chermack, 2009).

Furthermore, practitioners considered SP a helpful process in terms of its usefulness for technological awareness and firm vision (Phelps, Chan and Kapsalis, 2001), an opportunity to hear from diverse perspectives (Schmitt Olabisi *et al.*, 2016) and a potential means of improving organisational resilience (Chermack *et al.*, 2017). Most scenario users stated that scenario planning was a valuable component of envisioning the future of their organisation for the next 3 to 10 years. The implementation of SP for up to 25 years was also reported.

Available evidence supports the desired impact of SP on ‘learning’ (Haeffner *et al.*, 2012; Johnson *et al.*, 2012; Totin *et al.*, 2018; Schmitt Olabisi *et al.*, 2016; Burt and Nair, 2020); ‘unlearning’ (Burt and Nair, 2020); ‘thinking’ (Chermack *et al.*, 2015; Haeffner *et al.*, 2012; Johnson *et al.*, 2012; Phadnis *et al.*, 2015; Schoemaker, 1993; Totin *et al.*, 2018); ‘cognitive biases’ (Kuhn and Sniezek, 1996; Meissner and Wulf, 2013; Min and Arkes, 2012; Schoemaker, 1993; Sedor, 2002); ‘judgement and

decision making' (Chermack and Nimon, 2008; Johnson *et al.*, 2012; Kuhn and Sniezek, 1996; Min and Arkes, 2012; Phadnis *et al.*, 2015; Schoemaker, 1993; Sedor, 2002; Totin *et al.*, 2018; Visser and Chermack, 2009); and, on 'firm performance' (Phelps, Chan and Kapsalis, 2001; Visser and Chermack, 2009).

Desired Impact of Scenario Planning

Studies that have inquired into scenario planning's desired effect on decision-making have revealed interesting outcomes. Overall, available evidence suggests that scenario planning affects both the individuals' and the board of management's decision-making. For example, a research stream on cognitive biases and scenario planning suggests that two cognitive biases reduced by scenario planning are the framing bias and, under certain circumstances, the optimistic prediction bias. Additionally, scenario workshop practitioners' decision-making styles and mental models were reported to be changed towards a more flexible way of thinking. In addition to these, scenario workshop practitioners' "systematic thinking", "systemic thinking", "systems understanding", and "systems mental model" changes were investigated. Evidence of an increase on all accounts was reported. However, observed changes were small to medium across studies seeking scenario planning practitioners' perceived scenario planning workshop effectiveness in pre-post surveys and interviews. One study could not provide evidence of increased systems thinking among scenario planning workshop participants, pointing out the study's limitations as the reason. The CIS of literature has revealed that most sampled papers had the learning through systems thinking at the core of their research (Jackson, 2003; Meadows, 2008). While several researchers have investigated learning through systems thinking, scenario planning impact literature does not always clearly define systematic, systemic, and systems thinking.

How learning, cognitive biases, and thinking are processed individually among the scenario users and how desired impacts of SP manifest collectively in groups remains unclear. Those are particularly important as the analysis has revealed that judgement, belief, and decision-making changes occurred through the SP process and after its completion. Findings echo Balarezo and Nielsen (2017), pointing out a knowledge gap

in the processes that turn SP learning from the individual level into the organisational level.

The sample of this review includes a range of scenario planning workshops and scenario planning applications. Regarding scenario type and effectiveness, there is no agreement on whether one way is superior to another and if so, which way is more effective. A similar discrepancy was observed in scenario content, information structure, and process interpretation. However, available evidence suggests that developing scenarios from scratch – the developed scenarios – is favourable. It is based on two studies in which subjects who received scenarios prepared by other parties – delivered scenarios – either partially or entirely rejected the scenarios (Phadnis *et al.*, 2015; Kuhn and Sniezek, 1996). Further discussion on this is presented under SP ineffectiveness in this study.

2.3.1.2.Change

The synthesising argument “change” was developed based on the changes among practitioners/subjects following scenario interventions and attempts to answer how scenario thinking affects subjects after the intervention and what changes occur. This synthetic argument suggests that scenario planning practitioners perceived themselves as more resilient (Chermack *et al.*, 2017). Other changes that were formed in synthetic constructs are detailed below.

Have Voice

Some practitioners have shown improved empowerment⁷ (Haeffner *et al.*, 2012). At the end of the workshops, they felt that they counted, and their voices were heard (Totin *et al.*, 2018; Johnson *et al.*, 2012).

⁷ “Empowerment refers to the perception that employees are involved in setting the agenda, able to take ownership in decision making, and are accountable to the collective vision” (Haeffner *et al.*, 2012)

After scenario workshops, evidence of such behaviour change was playfulness and humour, trust and openness, and the freedom elements of a creative organizational climate (Chermack *et al.*, 2015). Similarly, dialogue and inquiry⁸ have been observed to have increased after scenario workshops among the practitioners. More support for the impact of SP on perceptions of conversation quality and engagement contributes to the “have voice” synthetic construct.

Networking/Collaboration

The networking/collaboration synthetic construct emerged very clearly during the CIS process. Practitioners who knew each other before scenario workshops had a chance to reunite (Zegras and Rayle, 2012; Totin *et al.*, 2018). Scenario workshops also helped create new, rapid relationships (Johnson *et al.*, 2012). Evidence of the impact of the scenario workshop on perceptions of conversation quality and engagement and an improved tendency to collaborate after the workshops was strong (Zegras and Rayle, 2012). Consequently, newly built and enhanced social networks transpired (Totin *et al.*, 2018). The scenario experience turned into knowing people, the practitioners could contact, exchanging ideas (Johnson *et al.*, 2012), creating networks, and collaborating in different events (Totin *et al.*, 2018). Social mental model increases in already formed organisations and networks suggest improved inter-organisational relationships (Chermack *et al.*, 2015). However, not every new connection remained intact, and some of the newly-met practitioners lost contact or stopped communication (Totin *et al.*, 2018). A scenario practitioner stated that relationship building was minimal. Most of them knew each other, and shortage of time was an issue due to their busy schedules (Johnson *et al.*, 2012).

Scholars have previously brought up the required time for scenario development processes through workshops, e.g. one or two-day workshops were considered too

⁸ “Dialogue and Inquiry refer to the extent to which the organization supports employees to express their views whether they are questioning, giving feedback, or experimenting” (Haeffner *et al.*, 2012).

little by some, though there has never been an agreement on the sufficient time frame. More discussion on this is presented in the following parts.

Taking Action

Following scenario workshops, future events were organised by those newly-met acquaintances (Johnson *et al.*, 2012; Totin *et al.*, 2018), such as committee members developing programmes and addressing the subject matter (Johnson *et al.*, 2012). Moreover, the reported changes transcended practitioners' professional lives and impacted their daily lives. After a year following the scenario workshops, such changes were still observed (Totin *et al.*, 2018). In some cases, former scenario practitioners reported lifestyle changes (Johnson *et al.*, 2012). These results bear a resemblance with Min and Arkes (2012); when planning an event is introduced in a scenario context, participant behaviour change was observed.

Risk-taking, an element of creative organisational climate, increased after scenario workshops. Apart from organising new events, scenario workshops spurred bolder, new initiatives among already formed organisations (Chermack *et al.*, 2015). Nonetheless, there was no evidence for the effectiveness of scenario planning on policy and policy-making. In the case of one-off scenario workshops, it may mean that the opposite might be true (Totin *et al.*, 2018).

2.3.1.3. Drawbacks and Requirements of Scenario Planning and Research

This synthesising argument is developed from the evidence on adverse-unexpected effects, ineffectual conditions, measurement issues and requirements of scenario planning.

Adverse/Unexpected Effects/ No Influence Conditions

Available evidence suggests there is an increased confidence optimism bias (Kuhn and Sniezek, 1996; Schnaars and Topol, 1987) and optimistic prediction bias (Min and Arkes, 2012; Sedor, 2002) rooted in SP contrary to the claims of some scenario planning advocates. Even though a full application of scenario planning was suggested to ensure its debiasing effect (Meissner and Wulf, 2013), some studies that applied SP

entirely still reported those issues. One study proposed planning difficulty tweaking to tackle the optimism bias (Min and Arkes, 2012). This suggested approach's effectiveness and applicability to scenario development require further research.

As discussed, evidence suggests that scenario planning affects judgement, beliefs and decision-making. However, it was also argued that scenario construction appeared to alter beliefs but not always in a direction predicted by reason generation (Schoemaker, 1993). Another unexpected result of CIS was that the scenario user companies tended to perform less successfully in customer services due to focusing on commercial return (Phelps, Chan and Kapsalis, 2001). Glick et al. (2012) supported this occurrence, who found that scenario planning intervention resulted in an increased 'efficiency mental model style' among participants.

Scenario planning is found to be ineffective as a change management and grief processing tool (Marquitz, Badding and Chermack, 2016). Results report an increase in complex change and grief in participants after scenario planning interventions, contrary to the researchers' hypothesis. Organisational death looks at events such as business failures, downsizing and site closures and is offered as a lens to study organisational loss and grief (Bell and Taylor, 2011). It is applied in the scenario planning study by Marquitz, Badding and Chermack (2016). The literature reports the scenario planning and change management relationship conceptually (Van der Heijden, 2005; Mclean and Egan, 2008; Chermack, 2011; Wilkinson, Kupers and Mangalagiu, 2012). Marquitz, Badding and Chermack (2016) suggest that the unexpected result might be potentially due to the scenario planning workshop facilitation, e.g., workshops ended too soon. Further research on scenario planning and its effectiveness as a change management tool is required.

In terms of forecast accuracy, scenario planning was compared with quantitative forecasting methods and performed the least accurately (Kuhn and Sniezek, 1996; Min and Arkes, 2012). It is expected from SP as it does not aim to forecast (Amer, Daim and Jetter, 2013), and SP's inferior forecasting accuracy for the short term was anticipated (McKiernan, 2015).

The other areas in which the scenario technique was found ineffective were:

- continuous learning (Haeffner *et al.*, 2012)
- policymaking (Totin *et al.*, 2018)
- the degree of surprise (Schnaars and Topol, 1987; Totin *et al.*, 2018)
- no changes in some organisational climate variables (e.g. challenge and involvement, idea-support, debate) (Chermack *et al.*, 2015).

Scenarios Planning May Not Be for Everyone

Another issue observed in some cases in both single and multiple scenario development is SP's inability to change opinions (Glick *et al.*, 2012; Phadnis *et al.*, 2015; Zegras and Rayle, 2012). After scenario workshops, some practitioners still preferred the least favourable option. Phadnis *et al.* (2015) argued that if a decision-maker had a high level of confidence in the judgement prior to a scenario intervention, altering such knowledge was difficult. They further stated that that was the case, especially when the scenario development was a one-off application. This situation can, at least partially, be explained by mental models. Scenario workshop participants with financial mental models were found to be the least affected by scenario intervention in terms of opinion change (Glick *et al.*, 2012). Similarly, Balarezo and Nielsen (2017) have suggested looking into the SP team formation, function and positioning. They are concerned with participant selection criteria such as optimal background, experiences, and personalities. "Scenarios may not be for everyone" as a construct appears to be linked to participant personality. In their recent study, Burt and Nair (2020) have another explanation for 'unchanged opinions'. They emphasise the importance of 'unlearning' to tackle deeply rooted assumptions within the organisations, allowing them to 'open up to new thoughts and ideas not previously considered.'

Scenario planning also proved ineffective when subjects received scenarios that other parties prepared, also referred to as developed scenarios. As a result, subjects partially or entirely rejected the scenarios (Kuhn and Sniezek, 1996). This phenomenon was observed by other researchers and articulated as disconfirmation bias - a condition of scenarios being inconsistent with the participants' ex-ante beliefs (Phadnis *et al.*, 2015).

Measurement Issues

This synthesis has been formed around two types of measurement issues in scenario planning research. One of them is rooted in scenario planning, and the other one is rooted in the study design of sampled research papers.

The difficulty of measuring the success of scenario interventions is noted by both experts and scenario practitioners (Johnson *et al.*, 2012; Visser and Chermack, 2009). Therefore, the approach taken in this study to measure SP's effectiveness is its success in achieving the objectives.

The synthetic construct "scenario planning as an enhancing process" reveals the existence of currently available evidence on desired changes in participant thinking, cognitive biases, learning, judgement, belief, and decision making. For instance, after scenario workshops, some practitioners expressed how they "stopped thinking in silos", and they could see how their present behaviours could connect or affect the future (Totin *et al.*, 2018). There is also evidence for improved systematic thinking (Johnson *et al.*, 2012; Chermack and Nimon, 2008; Haeffner *et al.*, 2012; Totin *et al.*, 2018) and understanding complexity better (Totin *et al.*, 2018; Visser and Chermack, 2009).

Several aspects of measurement issues hinder substantial SP effectiveness claims. Despite a low to medium increase in practitioner systems thinking and understanding as reported by several research papers, Schmitt Olabisi *et al.* (2016) reports no evidence on the issue. They suggested that the reason for not gathering evidence for practitioner systems thinking change might have to do with their study design. However, there could be other valid reasons for their findings. Similarly, another study remained inconclusive regarding enhanced practitioner understanding of the subject matter. They reported that scenario workshops were least effective at stimulating systems understanding, among other factors, e.g. changes in practice, learning across boundaries, networking (Zegras and Rayle, 2012). Even though practitioners expressed changes in their understanding of the issue, pre and post-test results did not identify a significant improvement in the shared understanding of the problem. A discrepancy between qualitative and quantitative self-reported results and

psychometric testing results was observed. Researchers' approaches to systems thinking and systems understanding also showed differences. While some researchers emphasised systems thinking from a social learning point of view, others developed a psychometric test reflecting on a general system understanding following the systems thinking definition. It has meant one study focusing on the "organisations as an organism" aspect inquiring into changes among participants on items such as "organisations are best viewed as complex networks of interrelated components", and "people are critical components in a complex organisational system". Additionally, systems thinking was used as an umbrella term to refer to "systemic thinking" and "systematic thinking". The latter two were used interchangeably in one study.

Analysis cannot identify a rich account of the evidence for challenging status quo thinking. In a study conducted by Johnson et al. (2012), three interviewees expressed "breaking free from normal thinking". Further information on to what extent and how this was experienced would allow for a deeper discussion. Unlearning, inquiry and (re)learning reportedly functioned to help challenge managerial assumptions through a longitudinal scenario planning exercise (Burt and Nair, 2020). While the previous research focused on learning, the role of 'unlearning' offered a newer perspective to scenario planning effectiveness literature. Arguably, the closest experience to challenging scenario participants' thinking is thinking differently. Current evidence supports thinking differently among scenario participants

- in the form of changing mental models (Glick *et al.*, 2012),
- through decreased framing bias (Meissner and Wulf, 2013),
- about priorities of the elements discussed during the scenario practice (Johnson *et al.*, 2012),
- shifting understanding through learning (Totin *et al.*, 2018),

all of which relate to challenging usual thinking in the form of "reframing perceptions and therefore the mindsets" (Wright, Bradfield and Cairns, 2013). The challenging status quo thinking phenomenon could be investigated in terms of creativity. However, it appears that scenario planning researchers have not factored in creativity in their empirical studies to investigate the effectiveness of SP on scenario users' thinking.

Creativity and challenging SP users' thinking as well as shifting SP users' understanding is a research area worthy of investigation.

Although evidence on enhancements in decision making, strategy development and firm performance is not particularly rich, few studies have attempted to demonstrate SP's effectiveness in those areas. SP appears to motivate practitioners towards more flexible strategies (Phadnis *et al.*, 2015), foster communication in scenario users companies for strategy making, provide means of testing strategy robustness through storytelling (Visser and Chermack, 2009), and improve decision making (Phelps, Chan and Kapsalis, 2001).

There is a growing interest in the validation aspects of future studies in general (Lehr *et al.*, 2017; Shala, 2015; Kuusi, Cuhls and Steinmüller, 2015b; Guimaraes Pereira, Von Schomberg and Funtowicz, 2006; Kuusi, Cuhls and Steinmüller, 2015a). However, almost none of the studies analysed in this review tested the scenarios against factors such as plausibility, internal consistency, coherency, transparency, creativity, novelty and surprise (Bradfield *et al.*, 2005; Lehr *et al.*, 2017; Van der Heijden, 2005; Urueña, 2019; Kosow, 2015; Greeuw *et al.*, 2000; Walton, O'Kane and Ruwhiu, 2019). Meissner and Wulf (2013) ran a consistency and plausibility test, but other factors were missing.

Evidence shows that “a changed judgement is likely to become favourable if the investment is found useful in the scenario” (Phadnis *et al.*, 2015). Phadnis *et al.* (2015) presented a single scenario to decision-makers for their decision-making on a real-life investment plan. However, the researchers did not investigate whether their approach caused a potential representativeness heuristic (Tversky and Kahneman, 1974). It is also unclear in the study whether decision makers' perception of the usefulness of the investment plan concerning the scenario acted as a confirmation bias (Tversky and Kahneman, 1974). Another critical aspect to consider is ‘usefulness’. Do the scenario practitioners/users often approach the scenarios in terms of given future scenarios' usefulness in relation to their ex-ante ideas and decisions? For instance, Phadnis *et al.* (2015) presented a single scenario to a group of subjects different from those who developed it. They concluded that “if a decision maker's judgement of a long-term

investment changes after evaluating it using one scenario, it will become (a) more favourable of the investment if it is found useful for the scenario, and (b) less favourable if it is found wasteful for the scenario”. However, the question of whether practitioners in a scenario development process focused on the usefulness aspect of the outcome (scenarios) in relation to their existing ideas and plans remained undiscovered. Their study also does not differentiate whether the usefulness of the ideas or the usefulness of the overall scenario was a criterion for the scenario participants who rated highly for favourability when the scenario was perceived useful. Nevertheless, scenario practitioners’ perception of usefulness in the development phase should be researched further.

Most sampled studies neglected confounding variables⁹, and only a few recognised their potential ill effects on study results. The confounding factor “company size” required further investigation in one study. Even though the follow-up research concluded that the size effect was minimal (Phelps, Chan and Kapsalis, 2001), other confounding factors such as layoffs, merger and acquisition activity, changes in leadership, and changes in organisational structure (Chermack *et al.*, 2015) might have discredited the results. Additionally, Wright, Bradfield and Cairns (2013) point out that the study by Phelps, Chan and Kapsalis (2001) was criticised for methodological weaknesses by Harries (2003). The criticism is directed to the case studies evaluating scenario planning. Regarding Phelps, Chan and Kapsalis’s (2001) study, Harries (2003, p. 802) finds the scenario users’ self-reports in the study not an objective measure and considers the “mismatch between verbal reports and behaviour” a weakness.

Phelps, Chan and Kapsalis (2001) acknowledge the same weakness in their study, stating that subjective performance measures contributed limited value to the literature. Their analysis revealed that where their study participants were tasked with

⁹ “A variable that is related to each of two variables the results of which it to produce the appearance of a relationship between the two variables. Such relationship is spurious relationship” (Bell, Bryman and Harley, 2018, p. 590).

responding to whether their understanding of a given topic after scenario intervention was increased or not, subjective and objective results were different. However, as they pointed out, such differences in findings might be due to participants not good self-awareness. Burt and Nair (2020) emphasised the usefulness of a process approach to scenario planning through a longitudinal study design. Further research on the various desired impact areas of scenario planning employing subjective, objective, and longitudinal studies is required.

Meissner and Wulf (2013) stated that there was evidence for SP's debiasing effect on overconfidence and confirmation bias based on the studies by Schoemaker (1993) and Bradfield (2008). However, Kuhn and Sniezek (1996) reported contrary results to Schoemaker (1993), which was not mentioned by Meissner and Wulf (2013). They also referred to Bradfield (2008), stating his research paper provided empirical evidence for reduced overconfidence and confirmation bias among SP participants. However, the CIS of SP effectiveness literature review has not included the Bradfield (2008) research paper for two reasons. Firstly, reported case study findings were preliminary. Bradfield (2008) stated that finalised analysis was on-going and scheduled to be published, and the interpretation of data was not complete. Secondly, a critical appraisal of the study revealed missing information on the research design, such as insufficient information provided about their data analysis.

Requirements of Successful Scenario Planning Practices

This construct attempts to explain and discover the “right way” of practising scenarios. Evidence suggests an increase in cognitive biases. These are optimistic prediction bias (Min and Arkes, 2012; Sedor, 2002), the overconfidence bias (Kuhn and Sniezek, 1996; Schnaars and Topol, 1987) and the emergence of the disconfirmation bias (Phadnis *et al.*, 2015). Furthermore, scenario planning was not able to accommodate continuous learning (Haeffner *et al.*, 2012), policy-making (Totin *et al.*, 2018) and was ineffective in terms of challenge and involvement, idea-support, and debates measurement (Chermack *et al.*, 2015). Additionally, the firms that use scenario planning for strategy making appeared to perform poorly in customer satisfaction (Phelps, Chan and Kapsalis, 2001).

Participatory scenario planning studies suggested that lacking diversity in a group of practitioners caused less successful scenario interventions (Johnson *et al.*, 2012). Further, practitioner groups that were too convergent or divergent might prevent divergent views from flourishing (Zegras and Rayle, 2012). It may have implications for creative thinking and SP's effectiveness, as Van der Heijden (2005) suggested. It was argued that the inclusion of higher-level actors is required for extensive networks. Therefore, a careful selection of practitioners is essential (Totin *et al.*, 2018). Scenario planning appears to be effective in organisations where there is no hesitation about true openness and acceptability of engaging in challenging conversations (Chermack *et al.*, 2015). These results emphasise the need for practitioners who are willing to engage with each other in an open, challenging, and true manner so that different opinions flourish and develop. Inviting subjects is also important for scenario planning research. Results suggested that the subjects' background in terms of professional experience is not necessarily an influencing factor of effectiveness. However, concerns on the education level - as it may affect subjects' ability to express themselves in the workshops - were articulated (Totin *et al.*, 2018)¹⁰. This potential complication indicates a need for the criterion on sample selection for scenario planning studies considering the importance of salient feedback for qualitative research. It is another worthy future research area.

Scenario planning should be conducive to building a collaborative environment in its scenario workshops, but there were instances where this did not occur. For instance, this shortcoming has been confirmed by Zegras and Rayle (2012). However, apart from discussions on why this was the case, this phenomenon has not been investigated thoroughly. Some practitioners complained about time pressures, highlighting the need for more extended periods to reflect on their learning, consider plans, and anticipate possible changes at the end of scenario workshops (Totin *et al.*, 2018). A perception-

¹⁰ Articulation of Totin *et al.* (2018) based on their findings with limited supporting evidence.

based study on scenario practitioners reported an increased idea-time¹¹ factor for elaborating new ideas (Chermack *et al.*, 2015). The scenario planning literature needs to examine the idea-time factor; for instance, is there an optimum number of hours/days needed to be allocated to the scenario development process?

2.3.1.4.Scenario Planning and Its Comparison with Other Long-Term Planning Tools

The synthetic construct “scenario planning and its comparison with other long-term planning tools” was formed around:

- the variety of scenario planning approaches used,
- practitioners’ prior experience with SP and,
- practitioners’ prior experience with other strategy-making tools.

SP approaches varied in terms of how the scenarios were developed, their time horizon target, the frequency of scenario updates, scenario team characteristics, and scope, e.g., business, industrial, competitor-oriented, and global. While some organisations had a designated department for developing scenarios, others had an ad hoc approach, limited to a one-off intervention. Regarding the professionals’ knowledge of scenario planning, some of the non-scenario users in the control group had no prior knowledge of a scenario technique (Phelps, Chan and Kapsalis, 2001). Companies that hired strategy consultants mentioned Shell’s scenario planning approach (Visser and Chermack, 2009).

Studies also revealed that most scenario planning users aimed for short-term planning (Phelps, Chan and Kapsalis, 2001). However, a few prospected over 25 years. This latter time horizon may be due to the employment of external scenario practitioners.

¹¹ “The amount of time people can, and do, use for elaborating new ideas. When idea-time is high people can explore and develop new ideas that may not have been included in the original task” (Chermack *et al.*, 2015).

Such companies focus on technology, the environment, and customer behaviour (Visser and Chermack, 2009). More than half of the study participants stated that they revised scenario planning whenever they felt necessary (Phelps, Chan and Kapsalis, 2001). The revision process appears to be another issue in SP practice. Developing future scenarios from scratch and revising what is already available are two different activities. Having a set of scenarios and revising them might mean being anchored in an already established mindset for the future. Should the scenarios be scrapped if the world order is unexpectedly changed? For instance, if COVID-19 and other pandemics are a new normal, should all the previous future scenarios be scrapped instead of being revised? Are revisions as effective as developing the scenarios from scratch? The scenario planning literature is unable to answer to those questions. Nevertheless, since there are no guidelines on how to update the scenarios, this aspect of SP is also another future research area.

Only a few studies investigated the firms' strategic planning practices, and their results focused on the effectiveness of scenario planning. Available evidence suggests that scenario planning has increased decision quality more than traditional strategic planning tools and appeared to be a better debiasing tool. However, other strategy-making tools e.g., SWOT, Porter's five forces, and value chain, also showed a debiasing effect (Meissner and Wulf, 2013). Nonetheless, research in this area is scarce and therefore encouraged.

The CIS findings of the literature are presented in this section. In the next section, the author presents the theoretical framework of scenario planning effectiveness in a diagram, explains the logic behind its construction and discusses the findings and provides the reader with recommendations for future research areas. The future research areas are not presented at the end of the work but in the next section. The author judged that laying out the potential research areas in this chapter that he gathered as a result of the CIS process would illustrate his train of thought clearly. The research design of the work is emergent. Therefore, the author made decisions central to the work's direction after answering every set of research questions and proposed new ones to pursue.

2.4. Discussion and Recommendations for Future Research

The critical interpretive synthesis of the literature explored the use of scenario planning through synthesizing empirical studies that investigated the effectiveness of scenario planning with qualitative, quantitative, and mixed methods. By applying the CIS process, a critique of the perceived role of SP (effect, adverse effect, requirements) and the limitation of SP is presented. The four synthesising arguments, “scenario planning as an enhancing process”, “change”, “drawbacks and requirements of scenario planning”, and “SP practice in business and comparison with other strategy tools”, have demonstrated the sophisticated nature of scenario planning. In a previous systematic literature review, Balarezo and Nielsen (2017) presented the state of scenario planning literature in general. They constructed a conceptual framework similar to this review and “represented a stylized understanding of the different constructs and mechanisms underpinning scenario planning” (Balarezo and Nielson, 2017, p. 4). The qualitative analysis they applied evaluated the five impact areas of SP: improved cognition, learning, strategic decision-making and organizational performance, in a similar way to Chermack’s (2004) scenario planning theory. However, this review was made possible by critically interpreting the evidence and producing new insights and fresh ways of understanding the matter. The meta-ethnography-based structure of CIS also allowed the development of a theoretical framework. Synthesising arguments and constructs that have built the framework was presented in the previous section of this chapter.

Figure 2.1 illustrates the theoretical framework of effective scenario planning. The author has carefully positioned the reported effects of scenario planning based on their reported temporal occurrence. The synthetic arguments and constructs are positioned according to their temporal occurrences. Temporality is illustrated by four categories; *prior to SP process*, *during SP process*, *end of SP process*, and *post SP process*. *Prior to SP process*, depending on the applied scenario planning technique, indicates the stage before the development of the scenarios or presentation of the scenarios. *During SP process* indicates the stage where the scenarios are developed with the practitioners, e.g. scenario workshops or the presentation of the scenarios to a group of people. *End of SP process* indicates the stage where the scenario development with practitioners is

concluded. The *end of SP process* category represents the time frame where the practitioners are concluding the scenario development process before leaving the final meeting. The author has constructed this category between “during SP process” and “post SP process” to accommodate research evidence relevant to the practitioners’ networking and future collaboration efforts. *Post SP process* indicates the stage where the scenario development process is concluded with the practitioners or the scenarios are presented to study subjects/ scenario users.

The synthetic argument “scenario planning and its comparison with other strategy tools” (SPICOST) is positioned under “prior to SP process” as it relates to the central decision of choosing scenario planning or other strategy-making tools for long-term thinking. Another synthetic argument, drawbacks and requirements of chosen scenario planning approach and research (DRSPAR), is linked to SPICOST since research evidence for choosing and practising SP effectively is built into the synthetic argument. DRSPAR offers research evidence related to both *before the SP process* and *during the SP process* and therefore positioned under them.

DRSPAR is also linked with two synthetic arguments; scenario planning as an enhancing process and change. The reason for that is DRSPAR consists of suggestions that can improve the effectiveness areas of SP. The linked synthetic arguments were constructed around research evidence supporting the effectiveness of SP.

The synthetic arguments, scenario planning as an enhancing process and change are positioned under *during SP process*, *end of SP process* and *post SP process*. The effects of SP are reported in the literature starting with the development/ presentation of the scenarios and after the scenario development processes. SP is found effective for cognitive biases, thinking, learning and unlearning during the SP processes. Desired changes in judgement, belief and decision-making are supported with research evidence during and at the of the SP processes. Increased firm performance is reported after completing the scenario planning projects.

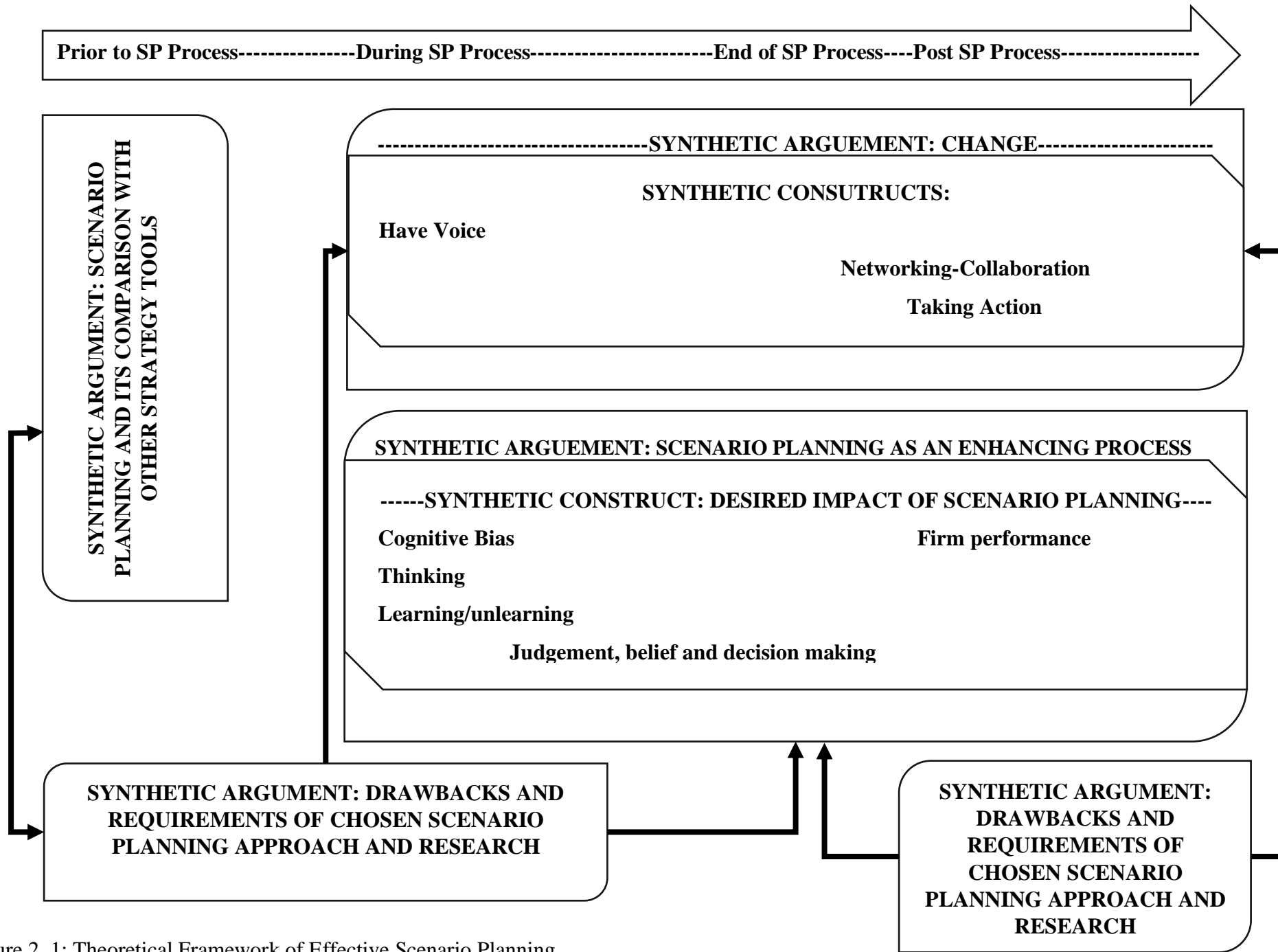


Figure 2. 1: Theoretical Framework of Effective Scenario Planning
 Source: Author's illustration, based on the CIS findings

SP practitioners reported that they had the opportunity to have their voices heard during the SP processes. They also reported that they found the opportunity for networking with each other *during* and at the *end of the SP processes*, some of which resulted in starting and actualising future projects after the completion of the SP projects. Therefore, collaboration and taking action are positioned under the *post SP process* category.

Synthetic argument drawbacks and requirements of chosen scenario planning approach and research is placed under *post SP process* as there is some evidence reporting the drawbacks of scenario planning, e.g. side effects, ineffectiveness conditions, after its completion.

Scenario planning was evaluated and empirically supported as an enhancing approach in its impact on thinking, judgement, decision making, learning and firm performance. Although the findings of subjective and objective measures suggested contradictory results in some cases, the available evidence points out the existence of the scenario techniques' desired impacts. Mainly, scenario planning can be seen as a means of empowering participants, letting them have their voices, joining in discussions, and making them feel valued as individuals and valuable to the organisations they are part of. In this regard, the perceived increase in resilience appears to be a relevant phenomenon to "have voice". Furthermore, in some cases, the networking opportunities turned into future collaborations. Finally, scenario workshops were most likely to change participant behaviour, both in their daily and professional lives.

The requirements and drawbacks of scenario planning were identified and further interpreted in this review. In as much as SP's desired effects were supported empirically, the adverse and no-effect areas were also reported. Type, content, information structure, and participants' interpretation of the scenarios emerged as important issues. Experiments on the subjects by manipulating the scenario type (developed scenario, delivered scenarios), content, and information structure resulted in conflicting findings. However, the critical interpretative synthesis of literature has revealed that study subjects' perception of scenarios plays a significant role. The

findings assert that scenario planning may not be for everyone. The requirements for successful scenario planning were outlined in line with the findings.

Regarding the construct “have voice”, as this phenomenon occurs during the application of the techniques, it is coded in *during scenario process*. The “Networking-collaboration” construct fits at the *end* of and *post scenario process*. At the end of scenario workshops, “networking” was observed, and further collaboration based on these new contacts was carried on in some instances after scenario workshops. The “Taking action” construct is detected after the end of scenario workshops. SP’s impact, adverse effects, no effects, unexpected effects, and effects on cognitive biases, thinking, judgment, belief, and decision making were observed *during*, and at the *end of scenario process*¹².

The synthetic and second-order constructs derived from the scenario planning effectiveness literature are not a complete guide and require enhancements. Several authors recommended the temporal aspects of scenario planning for further research (McKiernan, 2017; Phadnis *et al.*, 2015). Have voice, networking-collaboration, and taking action constructs appear to be the relevant-sequential-phenomena in scenario exercises. Concerning the impact of the SP techniques, further research can help us understand more about where a scenario intervention's influence begins and ends.

This review has presented the results of a critical synthesis of the available empirical research on the desired impact of scenario interventions and used available evidence to develop a theoretical framework of scenario planning effectiveness. Although there is much research to undertake in this domain, this review should be considered the first step to building a complete picture of the effectiveness of scenario planning. So far, what we know is that it is not for everyone in every situation.

¹² For the most part, scenario quality has been neglected in the papers reviewed.

2.5. Future Research Direction

Analysis has revealed multiple research directions that can be pursued in the continuation of this doctoral research. One research direction is to enhance the theoretical framework developed through the CIS of evidence by investigating scenario planning projects. Another approach would be conducting a longitudinal study to measure the desired impact areas of scenario planning over a longer time. Experimental studies can also offer much-required evidence for us to understand the effectiveness of scenario planning.

Analysis was based on produced research evidence by several researchers and therefore limited to the thinking patterns of the sampled papers' authors. Suggested future research directions predominantly reflect the sampled papers' authors' thinking but also introduce novel research areas.

Further research on the various desired impacts of scenario planning employing subjective, objective, and longitudinal studies is required. Figure 2.2 demonstrates various research directions. A maze metaphor was used to describe those directions.

The objective of foresight practices through scenario planning should be decided upon entering the maze, e.g., scenario planning for strategy development, policy development. The number of scenarios varies in practice, and therefore this is the second decision researchers should make. The next decision is about the school of thought. Various scenario planning schools are available, such as Intuitive Logic, La Prospective, etc. The next part of the phase requires deciding on the scenario team/practitioners' role. Are the scenarios merely presented to subjects in the study or are the subjects also part of the scenario development? This decision should be followed by what specific SP impact area or areas are aimed to be measured. The final section of the maze focuses on the quality criteria of the scenarios. Although it is not included as a research area, the author wanted to emphasise that checking the scenarios against criteria should be a standard approach and therefore placed in the maze. Other research directions also emerged throughout the analysis.

How learning, cognitive biases, and thinking are processed individually among the participants and how desired impacts of SP manifest collectively in groups remains unclear. The SP processes' knowledge gap that turns SP learning from the individual level into the organisational level is still under-researched.

The sample of this study includes a range of scenario planning workshops and scenario thinking applications. Regarding scenario type and impact, there is no agreement on which approach is superior to another. A similar discrepancy was observed in scenario content, information structure, and process interpretation. Nevertheless, available evidence suggests that developing scenarios from scratch is favourable. For instance, scenario planning was found ineffective in some cases when subjects received scenarios that other parties prepared. As a result, subjects partially or entirely rejected the scenarios (Kuhn and Sniezek, 1996). This phenomenon was observed by other researchers and articulated as disconfirmation bias - a condition of scenarios being inconsistent with the participants' ex-ante beliefs (Phadnis *et al.*, 2015). However, further research comparing different approaches and a better understanding of the issue is necessary.

Scholars previously mentioned the required time for scenario development processes through workshops; for instance, some considered one or two-day workshops too little. Presently, there is no agreement on a sufficient time frame.

Analysis was not able to identify supporting evidence for the effectiveness of scenario planning on policy and policymaking. However, scenario planning has been used for decades for policy development (Volkery and Ribeiro, 2009). Therefore, a special focus on the effectiveness of scenario planning should be paid for in the policymaking domain.

Depending on scenarios, optimism bias might be counteracted by manipulating planning difficulty, as one study proposed planning difficulty manipulation to tackle the optimism bias (Min and Arkes, 2012). However, this suggested approach's suitability for wider settings and effectiveness in scenario development require further research.

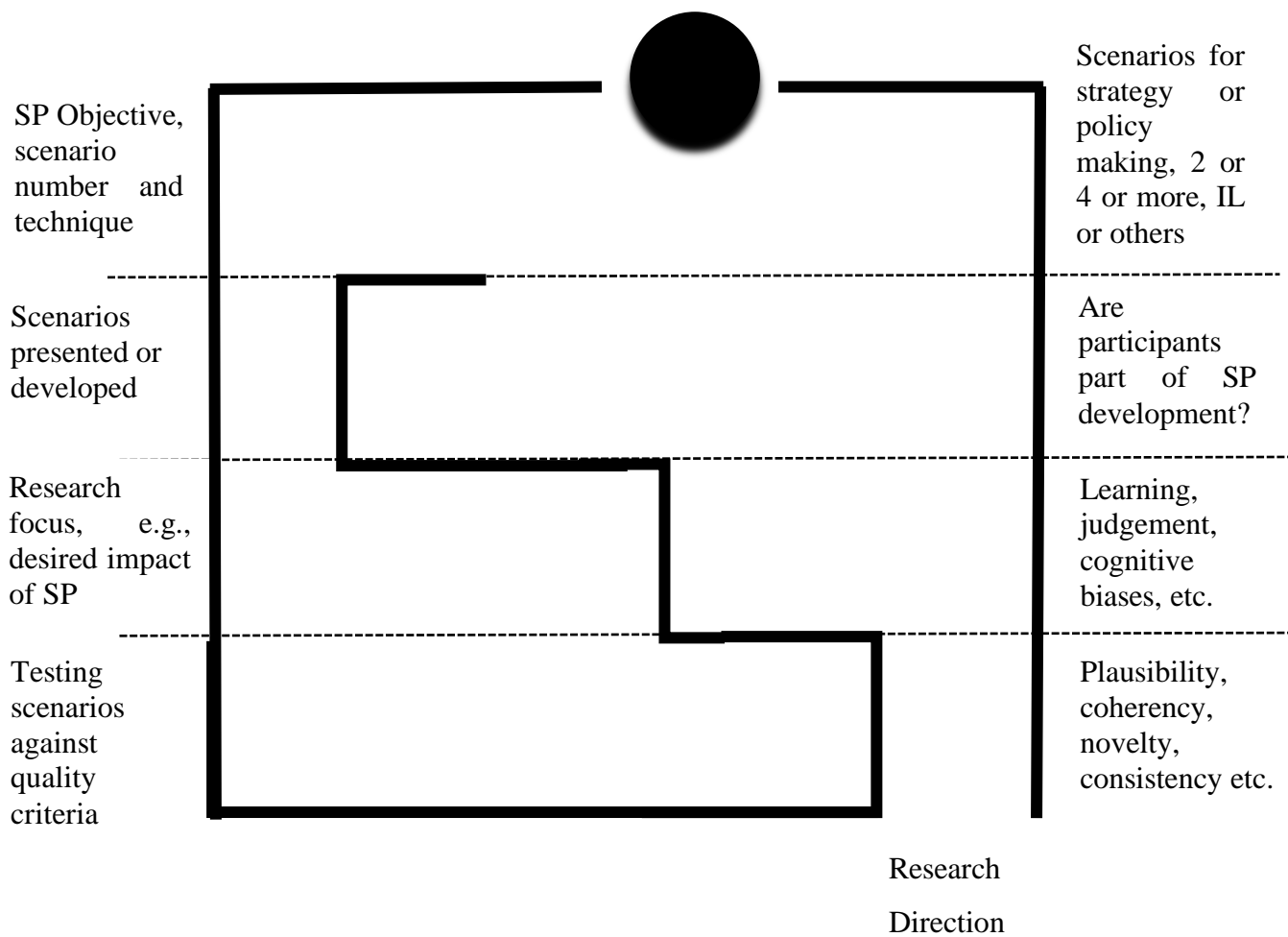


Figure 2. 2: Research direction generator for scenario planning effectiveness research

Source: Author's illustration, based on the CIS findings

As suggested with “scenario planning may not be for everyone”, scenario planning appears to be ineffective for some people. Being exposed to scenario thinking through being part of scenario development or presented with future scenarios did not always lead to changed opinions and judgement. For instance, scenario workshop participants with financial mental models were found to be the least affected by scenario intervention in terms of opinion change (Glick *et al.*, 2012). This situation has several implications. Previously, Balarezo and Nielsen (2017) suggested looking into the SP team formation, function and positioning. They were concerned with practitioner selection criteria such as optimal background, experiences, and personalities.

Developing future scenarios from scratch and revising what is already available are two different activities. Having a set of scenarios and revising them might mean being anchored in an already established mindset about the future. Should the scenarios be scrapped if the world order is changed unexpectedly? For instance, if COVID-19 and other potential pandemics are the new normal, should all the previous future scenarios be scrapped instead of being revised? Are revisions as effective as developing the scenarios from scratch? The scenario planning literature is unable to answer those questions. Nevertheless, since there are no guidelines for updating the scenarios, this aspect of SP is another future research area.

Available evidence suggests that scenario planning has increased decision quality more than traditional strategic planning tools and appeared to be a better debiasing tool. However, other strategy-making tools e.g., SWOT, Porter's five forces, value chain, also showed a debiasing effect (Meissner and Wulf, 2013). Nevertheless, research in this area is scarce and therefore encouraged.

There is a growing interest in the validation aspects of future studies in general (Lehr *et al.*, 2017; Shala, 2015; Kuusi, Cuhls and Steinmüller, 2015b; Guimaraes Pereira, Von Schomberg and Funtowicz, 2006; Kuusi, Cuhls and Steinmüller, 2015a). However, almost none of the studies analysed in this review tested the scenarios against factors such as plausibility, internal consistency, coherency, transparency, creativity, novelty and surprise (Bradfield *et al.*, 2005; Lehr *et al.*, 2017; Van der Heijden, 2005; Urueña, 2019; Kosow, 2015; Greeuw *et al.*, 2000; Walton, O'Kane and Ruwhiu, 2019). Meissner and Wulf (2013) ran a consistency and plausibility test, but other factors were missing. It is not so much of a future research area suggestion but a recommendation for general scenario planning practices and future scenario planning effectiveness research. Without knowing how well the developed scenarios achieved plausibility, consistency, coherency, creativity, novelty, surprise, and transparency and so on, it is challenging to investigate SP's effectiveness in several aspects.

Another critical aspect to consider is "usefulness". Do the scenario users often approach the scenarios in terms of given future scenarios' usefulness in relation to their ex-ante ideas and decisions? For instance, Phadnis *et al.* (2015) presented a single

scenario to a group of subjects different from those who developed it. They concluded that “if a decision maker’s judgement of a long-term investment changes after evaluating it using one scenario, it will become (a) more favourable of the investment if it is found useful for the scenario, and (b) less favourable if it is found wasteful for the scenario”. However, the question of whether participants in a scenario development process, e.g., workshops, focused on the usefulness aspect of the outcome (scenarios) concerning their existing ideas and plans remains undiscovered.

Participatory scenario planning studies suggested that lacking diversity in a group of practitioners causes less successful scenario interventions (Johnson *et al.*, 2012). Further, groups that were too convergent or divergent might prevent divergent views from flourishing (Zegras and Rayle, 2012). It may also have implications for creative thinking and SP’s effectiveness, as Van der Heijden (2005) suggested. Furthermore, it was argued that the inclusion of higher-level actors is a requirement for extensive networks. Therefore, carefully selecting the scenario team/practitioners is essential (Totin *et al.*, 2018).

Scenario planning appears to be effective in organisations where there is no hesitation about true openness and acceptability of engaging in challenging conversations (Chermack *et al.*, 2015). These results emphasise the need for practitioners who are willing to engage with each other in an open, challenging, and true manner so that different opinions flourish and develop. The subject selection is also important for scenario planning research. Results suggested that the practitioners’ background in terms of professional experience is not necessarily an influencing factor of effectiveness. However, concerns on the education level - as it may affect practitioners’ ability to express themselves in the workshops - were articulated (Totin *et al.*, 2018)¹³. This potential complication indicates a need for the criterion on sample

¹³ Articulation of Totin *et al.* (2018) based on their findings with limited supporting evidence.

selection for scenario planning studies, considering the importance of salient feedback for qualitative research.

Although it is not very apparent at first sight, creativity's role in scenario planning and scenario planning effectiveness is a research direction worth pursuing. This direction was acquired through:

- the realisation that there is little evidence supporting the challenging status quo thinking and breaking free from normal thinking phenomenon in the SP effectiveness literature, and
- reading further on scenario planning validation criteria that emerged in the analysis.

Analysis cannot identify a rich account of the evidence for challenging status quo thinking. In a study conducted by Johnson et al. (2012), three interviewees expressed “breaking free from normal thinking”. Unlearning, inquiry and (re)learning reportedly functioned to help challenge managerial assumptions through a longitudinal scenario planning activity (Burt and Nair, 2020). Further information on to what extent and how it was experienced would allow for a deeper discussion. Creativity and challenging status quo thinking and breaking free from normal thinking are relevant phenomena in terms of scenario planning effectiveness. Additionally, creativity and its dimensions, e.g. novelty, relevance and surprise, are considered part of the scenario planning validation criteria. However, the author has recognised discrepancies in the positioning of creativity, novelty, relevance and surprise conceptually. There are instances in the literature where creativity and novelty are seen as synonymous while there is little mention of how relevance and surprise are related to creativity. Therefore, the author presents a brief creativity research literature review in the next section. The section is aimed to introduce the essentials of creativity to the reader and highlight its importance to scenario planning effectiveness and this doctoral work. The overall process has allowed for conceptualising the continuation of the work and development of RQ 3 and RQ 4.

2.6. Creativity and Scenario Planning Effectiveness

Stein (1953) defines creativity for the first time in the literature. According to him,

the creative work is a novel work that is accepted as tenable or useful or satisfying by a group in some point in time By “novel” I mean that the creative product did not exist previously in precisely the same form The extent to which a work is novel depends on the extent to which it deviates from the traditional or the status quo. This may well depend on the nature of the problem that is attacked, the fund of knowledge or experience that exists in the field at the time, and the characteristics of the creative individual and those of the individuals with whom he [or she] is (Stein cited in Runco and Jaeger, 2012, p. 94).

Although scholars and practitioners have yet to agree on a creativity definition universally, for instance, single-dimensional, two-dimensional, and three-dimensional definitions of creativity exist (Runco and Jaeger, 2012), Stein’s definition introduces the notions that are mostly agreed upon. Those are a creative work is *novel* and accepted *useful* or *satisfactory* by a *group* ¹⁴ .

Since Stein’s definition in 1953, numerous scholars and practitioners have offered various definitions; however, novelty and usefulness tend to be accepted by most researchers (Newell et al., 1962; Stein, 1974). For instance, Barron (cited in Amabile, 2018, p. 21) stresses two criteria by which acts may be judged as original: The response "should have a certain stated uncommonness in the particular group being studied," and it must be "to some extent adaptive to reality".

Kaufman and Sternberg (2010, p. 467) have observed that creativity scholars agree on the main aspects of a creativity definition based on novelty and quality. They further explain that “creative work is original and somehow distinctive with respect to the work with which it is compared”. The term quality they use refers to “the judgment of

¹⁴ Italicised by the author of this doctoral work.

some reference group that the work is not merely novel, but also good, or perhaps even useful, according to some reference group”.

Puryear and Lamb (2020) have reviewed the creativity literature, looking for any changes in the definition of creativity from 2004 to 2020. They have observed that the choice of definition across disciplines, e.g., business, education, and psychology, varied. Overall, uniqueness and usefulness are the most used dimensions to define creativity. While uniqueness and usefulness are most common in business and creativity research, psychometric and measurement-based conceptions are most used in psychology-based creativity research (Cayirdag and Acar, 2010).

Divergent thinking (Guilford, 1956) is a concept commonly used in psychology and creativity research. It is defined as “the ability to produce various responses” (Guilford, 1968 in Cayirdag and Acar, 2010, p. 3236). It is related to “searching or going off in various directions” (Guilford, 1956, p. 274) and idea generation (Berg, 2016). A necessary clarification about divergent thinking is that it is not creative thinking but is accepted as an indicator of creativity (Runco and Acar, 2012). Therefore, divergent thinking tests are “useful estimates of the potential for creative thinking” (Acar, Runco and Park, 2020, p. 39), but they do not measure creativity directly.

Another related concept to divergent thinking is convergent thinking (Guilford, 1956). The difference between the two types of thinking is:

“When individuals try to generate novel ideas, they engage in divergent thinking, which involves searching for novel associations, combinations, or perspectives that may be useful (Guilford, 1967). When individuals evaluate ideas, they engage in convergent thinking, which involves applying criteria, standards, and logics based on their priori knowledge and experience...” (Berg, 2016, p. 436).

In the past decades, the stakeholder defined definition of creativity has also gained traction in peer-reviewed research articles. The contextual differences where the creative action occurs impact the adapted definition of creativity, leading to variance

in the defining properties of the term. The varying descriptions of creativity are expected given the interdisciplinary nature of creativity. However, a “lack of precise definition contributes to a science of creativity that is inconsistent... and limits researchers from holding a shared understanding of what creativity is and what it is not...” (Puryear and Lamb, 2020, p. 2).

Although novelty and usefulness appear to be commonly used elements to define creativity, a summary of the discussions in the literature is not complete without talking about a third dimension: surprise. For instance, Bruner (cited in Amabile, 2018, p. 21) stated that the creative product is “anything that produces ‘effective surprise’ in the observer, in addition to a ‘shock of recognition’ that the product or response, while novel, is entirely appropriate”. Until Bruner’s (1962) definition, previous creativity definitions focused on:

- uncommonness,
- novelty,
- usefulness , and
- adaptivity to reality.

Bruner (1962) is not the only creativity scholar arguing the importance of surprise in defining creativity. In a recent study, Acar, Burnett and Cabra (2017) have concluded that surprise is the second highest factor explaining a significant amount of variance in creativity after originality in their research. Runco and Jaeger (2012) have also previously observed that surprise was making a strong comeback. Recently, Simonton (2012) has made a strong case for the inclusion of surprise in creativity definition, suggesting a quantitative three criterion definition of creativity:

Creativity = Novelty x Utility x Surprise

Like Simonton (2012), Boden (2010) advocates surprise as part of the creativity definition. However, she further differentiates three meanings of surprise:

1. “One may be surprised because something is statistically unusual, so contrary to common-sense expectations – like an outsider winning the Derby.”

2. “One may be surprised because one hadn’t realised that the new idea had been a possibility all along – like discovering a beautiful village tucked away in a hollow between two spurs of the motorway. (Its location had always been marked on the map, but one hadn’t examined the whole map closely).”
3. “One may be surprised by something that one had previously thought impossible, and which one still sees as utterly counter-intuitive. (here, think of the events categorized by the religious as miracles, or imagine the impact on non-physicists of the introduction of wireless, or television” (Boden, 2010, pg.71).

Her approach to creativity also identifies two different senses of “novel” that lead to the differentiation of P- level and H- level novelty (Boden, 2010). P- level novelty refers to the occurrence of an idea to a person for the first time, whereas H-level novelty indicates an idea new to human history. Drawing from Boden’s terminology, Suwa, Gero and Purcell (2000) have introduced a third perspective; S-level – situated-invention. The underlying basis of the S-level perspective is that “designing is a situated act; designers invent design issues or requirements in a way situated in the environment in which they design” (Suwa, Gero and Purcell, 2000, p. 539).

Similarly, Sosa and Gero (2003) have introduced situated creativity, arguing that “the socio-environmental conditions within which the design practitioners produce such (creative) solutions equally define, constrain, and facilitate their creative practice” (Sosa and Gero, 2003. in Nguyen and Shanks, 2009, p. 656). The researchers using the third category appear to position novelty between the personal and historical level: in the society that exists when performing a creative task. The P and H-level novelty perspectives are akin to subjective and objective novelty concepts – P- level novelty corresponding to subjective and H-level to objective novelty (Kaufmann, 2003).

Finally, five strands of creativity are identified in the literature: person, products, places, processes (Runco, 2010b) and persuasion (Simonton, 1995).

The discussions in the creativity literature demonstrated so far have three important implications for this doctoral work. Firstly, similar to designers, the scenario teams are bounded to the environment in which they are situated. Therefore, when assessing the

scenarios for creativity, the environment that scenario teams are in should be considered. The issues, environment and requirements call for thinking about the context during the assessment. Secondly, “the creativity involved in producing subjective novelty is just as genuine as that involved in objective novelty” (Kaufmann, 2003, p. 237-238). Kaufmann (2003, p. 236) explains the subjective and objective novelty discussions with the following: “a general theory of creativity can be developed through the controlled study of the conditions that facilitate or inhibit creativity in tasks requiring *subjective* novelty”. Therefore, conducting a subjective creativity assessment of the scenarios with the scenario teams is a proper scientific investigation like the objective creativity assessment of the scenarios is. It also allows for considering the context during the research. Lastly, creativity can be investigated in terms of person, products, places, processes and persuasion. In the scenario planning context, the author takes the scenarios as creative products and the scenario planning exercise as a creative process. Therefore, the scenarios can be assessed for creativity, similar to the assessment of other creative products.

Despite the relevance of creativity in scenario planning, creativity is an under-researched area in scenario planning. Scenarios are not previously investigated for creativity. Accordingly, based on the creativity and scenario planning literature review, RQ 3 is developed, asking

“are maritime scenarios creative?”

The author takes the scenarios as creative products and assesses their creativity. The findings are presented in Chapter 4.

Regarding scenario planning effectiveness and creativity, scenario planning is considered both science and art (Schwartz, 2012; Van der Heijden, 2005). Amer, Daim and Jetter (2013) have laid out a summary of scenario validation criteria, including creativity/ novelty necessary for validating the scenarios. Considering the role of scenario planning intervention is challenging mental models and introducing changes, novelty is a commonly used validation criterion (Crawford, 2019).

The scenario team may uncover a “novel” future state during the scenario planning exercise. For example, Pierre Wack, a prominent figure in scenario planning, is known for his role at Shell and for experimenting with scenario thinking (MacKay and McKiernan, 2018) in the business setting for the first time states:

Scenarios deal with two worlds, the world of facts and the world of perceptions. They explore for facts, but they aim at perceptions inside the head of decision-makers. Their purpose is to gather and transform information of strategic significance into fresh perceptions (Wack, 1985b).

These “fresh” perceptions make up the novelty in the scenarios. Wack continues: “This transformation process is not trivial – more often than not it does not happen.”. This is where Wack also acknowledges that scenario planning does not always lead to uncovering a ‘novel’ future state. He concludes his thoughts: “When it works, it is a creative experience that generates a heartfelt ‘aha’ from your managers and leads to strategic insights beyond the mind’s previous reach.”

The vitality of fresh perceptions as a signifier of the successful scenario planning process, “Aha” moment, is apparent. Therefore, challenging conventional thinking is another ambition for applying scenario planning to “reframe perceptions and change the mindsets of those within organisations” (Wright, Bradfield and Cairns, 2013 pg. 633). Challenging conventional thinking can happen through exposure to non-conventional ideas. Drawing from the creativity literature, the author of this doctoral work argues that P- level novelty can invoke non-conventional ideas, new to the person but not necessarily to the history.

Scenario teams may not necessarily come up with H- level novel ideas, but instead with P- level novel ideas, or there may not be any novel ideas at all. It has different implications in consideration with Wack’s comments. In one scenario, there may not be any novel ideas in the scenario development process; in another scenario, there may be multiple P- level novel ideas: meaning new to the person who has it, which are then passed on to other scenario team members. H- level appears to have the highest likelihood of leading to an “aha” moment. However, conventional thinking can be challenged, and “aha” moments can be observed in situations where P- level ideas are

novel to the rest of the scenario team and users. Experiencing the “aha” moment is closely associated with novelty and surprise.

Accordingly, the author develops RQ 4 based on the scenario planning effectiveness and creativity literature review findings. The following question is developed:

What is the role of creativity in scenario planning effectiveness on scenario users?

Before concluding this chapter, the author observes the need for establishing several definitions related to creativity. Although a definition of creativity in scenario planning or foresight context is not provided in the literature, establishing a definition of creativity to guide the work that includes surprise is apparent. Scenario planning and creativity are not well researched and documented in the literature; few studies have investigated the relationship between the two. The approach to research creativity has a lasting impact on scientific inquiry (Puryear and Lamb, 2020). Therefore, establishing a sound strategy to study creativity is crucial. Accordingly, the author has come up with his definition following the creativity and scenario planning literature and used the following definitions to guide the work:

“Creativity is an idea that offers novelty, utility and surprise to the person producing it. Such an idea can offer novelty, utility and surprise to a person who has not produced but encountered it.”

“Creative scenarios are the future narratives created through scenario planning that has novelty, utility, and surprise in a single idea, and such ideas are present across the scenario narratives.”

The novelty, utility, and surprise definitions are presented below to prevent confusion.

Novel: Of a new kind or nature; not previously imagined or thought of; (now) esp. interestingly new or unusual (OED, 2nd meaning)

Utility: The fact, character, or quality of being useful¹⁵ or serviceable; fitness for some desirable purpose or valuable end; usefulness, serviceableness. (OED, 1st meaning)

Surprise: Something that takes one by surprise; an unexpected occurrence or event; anything unexpected or astonishing (OED, 3rd meaning)

2.7. Conclusion

This chapter presented the CIS findings of research evidence and further introduced the essentials of creativity to doctoral work. Findings pointed out the necessity of assessing the scenarios for creativity and further exploring the role of creativity in scenario planning effectiveness on scenario users.

There are several facets to creativity. For instance, creativity can be investigated as a process, product, person, place or persuasion. The author takes the scenarios as products and suggests they can be investigated for creativity. Another critical decision in researching creativity is clarifying its definition in the research context. The author follows the approach of Simonton (2012) for creativity assessment. Boden (2010) is influential to the doctoral work regarding the P and H- level novelty differentiation she offers. The perspective MacKay and McKiernan (2010) take on creativity in their scenario planning paper also influenced the author while developing a definition of creativity in the scenario planning context to guide the work.

The creativity definition that the author created guides the rest of the work. Accordingly, the future scenarios developed for the maritime industry are assessed following a three-dimensional creativity assessment. It has meant assessing the scenario narratives for ideas that have novelty, utility, and surprise. The contextuality

¹⁵ Usefulness: The state or condition of being useful or serviceable; utility, serviceableness (OED, 2nd meaning)

of creativity also suggests that employing a research strategy accommodating the situated factors during scenario planning, the context, is necessary.

Chapter 4 presents the multi-case study findings, starting with the author's subjective creativity assessment of the maritime and Shell scenarios, answering RQ 3. The findings are further interpreted and discussed in the chapter's conclusion. RQ 4 is answered in Chapter 5. Before sharing the findings, the author presents the research design in the next chapter.

Chapter 3: Research Design

This chapter presents the work's research design. An overview of business and management research is given by introducing common research design elements to the reader. In doing so, the author demonstrates his approach to designing the research.

Ontological and epistemological positions taken in the work are presented. It is followed by introducing the competing methodologies and methods the author has considered for the research. The choice of methodologies and their associated methods are clearly stated and the underlying reason for the choices is explained. Finally, the author illustrates how the chosen approaches are applied in the work.

First, the work utilises a systematic literature review methodology to answer RQ 1, establish a new theoretical framework and receive guidance on future research directions. The critical interpretive synthesis (CIS) is chosen as a method since it can facilitate those ambitions (Depraetere *et al.*, 2021; Dixon-Woods *et al.*, 2006b; Entwistle *et al.*, 2012; Flemming, 2009; Flemming, 2010; Moat, Lavis and Abelson, 2013). The CIS findings are further enhanced by populating the review with additional research output. By doing so, the explanatory power of the review has increased and the depth of discussing the CIS findings has been enhanced. A non-systematic approach to the literature review is used for that purpose.

Literature reviews can be conducted for various reasons. They aid the researchers in investigating old theories or suggesting new ones, offering guidance to researchers with their prospective studies or playing a summative role in the literature of interest (Petticrew and Roberts, 2008). Like most doctoral research, this doctoral work aims to contribute to knowledge by laying the foundations for developing a middle-range theory. A middle-range theory is “a set of ideas and concepts relevant to explaining social or physical phenomena within relatively specific contexts, normally empirically testable” (Easterby-Smith *et al.*, 2021, p. 144).

Second, the work investigates the long-term thinking practices in the shipping industry, identifies the relevance of SP in the industry and finally aids the author with choosing a research direction that is both relevant to the industry and scenario planning

literature. The author conducts qualitative exploratory research with the stakeholders in the industry for that purpose.

Third, the work questions the creativity of maritime scenarios. Rather than assuming the scenarios are creative, the author assesses them for creativity. This part of the work utilises secondary data. The secondary data are scenario publications. The maritime scenarios are compared against Shell scenarios for creativity. A multiple case study strategy has aided the creativity assessment. Assessing the scenarios for creativity has allowed for progressing the work without making assumptions about the scenarios' creativity. The maritime scenarios have constituted one set out of two in the analysis. Shell scenarios have made up the second set. A comparative qualitative content analysis between the two sets is conducted to interpret the creativity of the maritime scenarios and Shell scenarios.

Forth, the work continues by investigating the role of creativity in scenario planning effectiveness on scenario users, drawing from the scenario teams' experience. This part of the work uses a combination of primary and secondary data. The multiple case study strategy continues guiding this stage of the work. The scenario teams' creativity definitions are also sought to develop a definition of creativity in the scenario planning context. The author's previous creativity assessment of the scenarios is triangulated with the scenario teams' creativity assessment of the scenarios. The maritime scenarios' scenario teams are invited to the study to

- learn from them about their view of the scenarios' creativity,
- receive their definition of creativity, and
- discover their perceived role of creativity in SP effectiveness.

Additionally, the author's creativity assessment of the scenarios has sometimes required further elaboration. Interviewing the scenario teams also allows the author to ask about the parts of the scenarios that are not clear to the author.

This doctoral work has been assessed by a panel of experts annually throughout its progression. The panel members consisted of experts in scenario planning and

innovation. The feedback received during the panel evaluations has supported the development of the work.

The primary concern of the research design has been adhering to the epistemological underpinnings of the taken approach to scenario planning and accomplishing the research aims while maximising research quality. Challenges with data access have been tackled with every ethical means available.

3.1. Business and Management Research Overview

This section introduces and discusses the philosophy of social sciences, methodologies, and methods to identify a philosophical perspective that guides the work. The term research philosophy refers to a “system of beliefs and assumptions about the development of knowledge” (Saunders, Lewis and Thornhill, 2019, p. 130). Relatedly, a paradigm is a “human construct” (Guba and Lincoln, 1994, p. 108) “set of beliefs that guide action”, constructed by the researcher to “define the worldview of the researcher-as-interpretive bricoleur” (Denzin and Lincoln, 2017, p. 195).

Ontology and epistemology are at the centre of debates among philosophers. Ontology is about the “nature of reality and existence and epistemology is about the theory of knowledge” which helps researchers understand the best means to investigate the world's nature (Easterby-Smith, 2018, p. 64). A lack of understanding of the philosophical nature of the research might seriously alter the quality of the research outcome. Furthermore, how the researchers see and interpret reality will affect the research process (Ates, 2008). Awareness of philosophical assumptions contributes to researchers' creativity (Easterby-Smith, 2018).

Ontological positions are presented on a continuum by various sources, e.g., Bell, Bryman and Harley (2018); Easterby-Smith (2018); Crotty (1998); Saunders (2012). Four central ontological positions can be summarised as realism, internal realism, relativism, and nominalism (Easterby-Smith, 2018).

“Epistemology is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both

adequate and legitimate” (Maynard, 1994, p. 10). Positivism, sometimes used as synonymous with objectivism (Samy and Robertson, 2017), constructionism and subjectivism are the three epistemological stances (Crotty, 1998). Although subjectivism is sometimes used for constructionism, the difference is that in subjectivism, “meaning does not come out of any interplay between subject and object but is imposed on the object by the subject. Here the object as such makes no contribution to the generation of meaning” (Crotty, 1998, p. 9). Whereas constructionism states that “the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (Crotty, 1998, p. 42).

Constructivism is “a social scientific perspective addressing how realities are made”, assuming that the realities are created by the people – including the researcher. (Charmaz, 2006, p. 187). “Constructivists are deeply committed to the contrary view that what we take to be objective knowledge and truth is the result of perspective. Knowledge and truth are created, not discovered by mind” (Schwandt, 1994, p. 236). Constructivism emphasises that every human being’s way of making sense of the world is as valid and worthy of respect. Different from constructivism, social constructionism emphasises the hold out culture has on us: it shapes how we see things and gives us a definitive worldview. Constructivism focuses exclusively on “the meaning-making activity of the individual mind” and the focus of constructionism includes “the collective generation [and transmission] of meaning” (Crotty, 1998, p. 58). Constructivism, however, is not a homogenous perspective; they vary in how far they are willing to take the idea that reality is constructed (Riegler, 2012).

Constructivism is underpinned by relativist ontology and transactional/ subjectivist epistemology (Guba and Lincoln, 1994). Transactional refers to:

... an epistemology that sees truth as arising out of the interaction of the elements of the rhetorical situation: an interaction of subject and or of subject and audience or even of all the elements – subject, object, audience, and language – operating simultaneously (Berlin, 1987, p. 15).

The conventional differentiation between epistemology and ontology disappears in constructivist research since “the investigator and the object of investigation are assumed to be interactively linked so that the ‘findings’ are *literally created* as the investigation proceeds” (Guba and Lincoln, 1994, p. 111)

Crotty (1998) differentiates the research frameworks based on their grounding in epistemology. Research framework refers to “the philosophical stance lying behind a methodology”, providing a “context for the process involved and a basis for its logic and its criteria” (Crotty, 1998, p. 8). He further explains that assumptions are buried in methodologies, the assumptions that are related to the methodology that envisages the world; “different ways of viewing the world shape different ways of researching the world”. From a theoretical perspective, interpretivist approach is suitable for the doctoral work, given its interest in “understanding” and “interpretation” (Crotty, 1998). Interpretivism respects the understanding of multiple realities as it has a relativist ontological view. Interpretivism and constructivism share similar perspectives as to “develop a natural science of the social”, emphasising “the world of experience as it is lived, felt, undergone by social actors” (Schwandt, 1994, p. 236).

This section has explored ontologies, epistemologies, and theoretical perspectives, predominantly guided by Crotty’s (1998) research framework. In the next section, the author first states the ontological and epistemological stance of the work. Second, the competing methodologies and methods are presented. Finally, the chapter details the methodologies and methods of choice and summarises the chapter.

3.2. Philosophical Stance of the Work

Following the discussions on the philosophical underpinnings of scenario planning and the author’s experience in supporting several scenario planning projects and research questions, an ontological position is taken. The author’s beliefs about the truth and the source of knowledge have also contributed to that choice. As a result, a relativist ontology that suggests that facts depend on the viewpoints of observer is followed. Epistemologically, the work is grounded in transactionalist/ subjectivism. Constructivist perspective guides the work.

The aims of the work have required understanding the shipping stakeholders and scenario teams. The shipping stakeholders are approached for their experience and knowledge of forward-looking industrial practices. They are also part of the scenario team and scenario users at times. The scenario teams can consist of the shipping industry stakeholders, e.g., researchers in the maritime industry undertaking maritime scenario projects. The line between the shipping stakeholders and the scenario teams is sometimes blurry.

Nonetheless, this doctoral work is interested in individuals working within a society and the organisations that comprise scenario development activities. Therefore, this research problem is related to the “social world” rather than the natural world. More specifically, the objectives of the work have required exploration of the scenario team’s perceptions of creativity definition and assessment and the role of creativity in scenario planning effectiveness on scenario users, which can be researched by enabling scenario teams to communicate their experience. “The data required to study experience require that they are derived from an intensive exploration with a participant. Such an exploration result in language data¹⁶” (Polkinghorne, 2005, p. 138). The languaged data in this doctoral work is the interviews with the shipping industry stakeholders and scenario teams, the scenario publications, the scenario narratives and the internal reports.

Hence, adopting a qualitative methodology is the most appropriate approach to this research problem. “Qualitative methods are specifically constructed to take account of the particular characteristics of human experience and to facilitate the investigation of experience” (Polkinghorne, 2005, p. 138). Qualitative research is conducted when there is a need for exploring a problem or issue and,

¹⁶ Polkinghorne (2005) further explains that the alternative term “accounts” are also used to refer to qualitative data. However, like Polkinghorne (2005), the work uses the term “data”, yet acknowledging the differences between the terms used in quantitative and qualitative research.

- “a complex, detailed understanding of the issue is needed”,
- “a desire to empower individuals exist”,
- “an understanding of the contexts in which participants in a study address a problem is warranted”, and
- “a theory to address gaps in understandings is developed” (Creswell and Poth, 2016, p. 85),

The work is concerned with understanding the complex nature of scenario planning and creativity, aiming to empower the scenario teams by giving them a voice regarding their scenarios’ effectiveness and their perception of creativity in their scenario planning projects. The author also aims to answer the research questions considering the context, producing scientific research and laying the foundations for developing a middle-ranged theory of scenario planning effectiveness.

The literature review has revealed that several approaches investigating the effectiveness of scenario planning are used, e.g., pre-post-test experiments, perceived effectiveness through interviews etc. Although most scenario planning effectiveness research has come from following objectivist approaches, research underpinned by relativist approaches also contributes to the scenario planning literature.

A snapshot of research questions and the methods used in this doctoral work to analyse data is provided in Figure 3.1.

3.3. Methodologies and methods

The work offers empirical research findings using primary and secondary data at different stages of the research. A literature review of scenario planning effectiveness literature is followed by continuing the research using primary and secondary data collection. This section presents the available methodologies and methods to the reader. They are further unpacked in the following sections and discussed in detail.

Methodology means “the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the

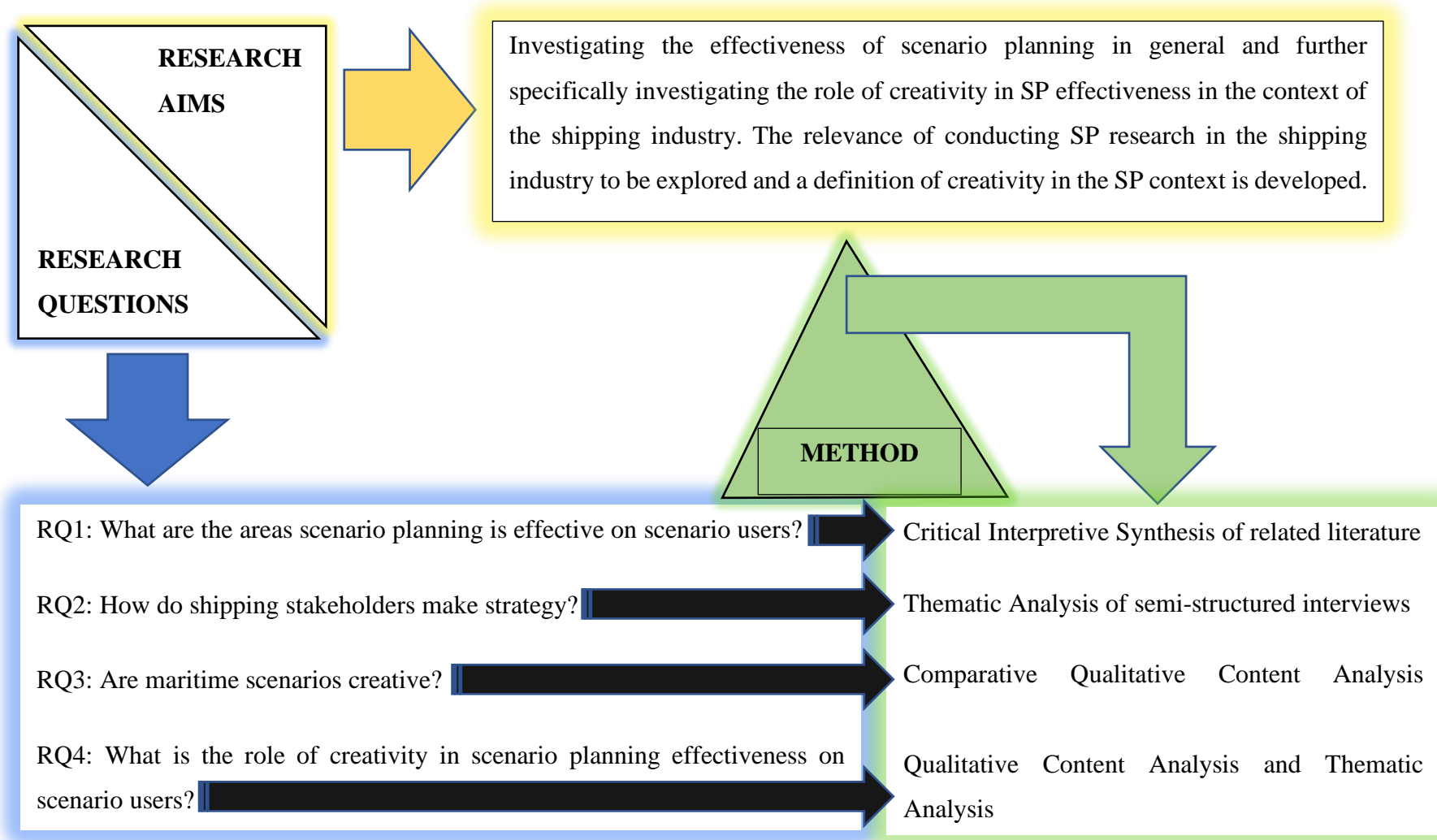


Figure 3. 1: Research design in relation to research questions, aims and methods in use

Source: Author's Research Design Process

desired outcome” (Crotty, 1998, p. 3). Researchers following a subjectivist epistemology and interpretivist theoretical perspective have multiple methodological options available to them. While making a decision, the author considers their suitability for the constructivist perspective.

Five methodologies commonly used in qualitative research – narrative research, phenomenological research, Grounded Theory research, ethnographic research, and case study research (Creswell and Poth, 2016) – are available to the author. More specifically, their constructivist variants, e.g., constructivist Grounded Theory research (Charmaz, 2014), constructivist case study research (Charmaz, 2014; Stake, 2006; Stake, 1995), constructivist research using ethnographic techniques (Williamson, 2006; Knorr-Cetina, 1983), interpretive phenomenology (Burns *et al.*, 2022; Creswell and Poth, 2016) are taken into consideration for the main research part of the work.

Methods refer to “the techniques or procedures used to gather and analyse data related to some research questions or hypothesis” (Crotty, 1998, p. 3). Researchers following the constructivist perspective have several methods at their disposal, e.g., observation, interview, focus group, case study, visual ethnographic methods, theme identification, cognitive mapping, and content analysis (Crotty, 1998, p. 3).

Methodologies chosen for this work are a systematic literature review methodology, a generic qualitative methodology and a multiple case study. Before presenting the chosen methodologies and their respective methods, competing methodologies and methods are presented in the next section.

3.3.1. Competing Methodologies and Methods

Methodologies and methods for reviewing the literature

Scholars divide literature review approaches into two camps, systematic and non-systematic (purposive) reviews. Both approaches have merit (Cook, 2008) and serve valuable and complementary roles in producing results drawn from the literature. However, like any other scientific study, both approaches have strengths and

weaknesses. Therefore, researchers are expected to consider their limitations before conducting a review (Cook, 2019).

Systematic reviews follow closely a “set of scientific methods that explicitly aim to limit systematic error (bias), mainly by attempting to identify, appraise and synthesize all relevant studies” to answer a specific research question (Petticrew and Roberts, 2008, p. 9). On the other hand, non-systematic reviews pursue a “more strategic and adaptable approach to selection and extraction” (Cook, 2019, p. 55).

Systematic reviews can identify wide-ranging studies and condense information about each study, finding research gaps and synthesising research results through meta-analysis. On the other hand, non-systematic reviews enable the researcher “to reflect broadly upon a theme, drawing upon research, frameworks, and philosophy both within their field and from other fields” (Cook, 2019, p. 56).

Similar to the relationship between validity and quantitative research and validity and qualitative research, systematic and non-systematic reviews differ in terms of the approach taken to validity. In the former group, validity is derived from “sufficient number of similar data sources, absence of bias in data sources”, whereas in the latter group “, triangulation (concordant findings from multiple sources)” is sought (Cook, 2008, p. 394).

Analytical approaches to data analysis are divided into configurative and aggregative, and idealist and realist philosophies, respectively, underpin them. Generally, configurative approaches are interested in theory generation; the choice of methods is iterative, the review findings are “emergent concepts”, and the review is used to increase the understanding of whatever questions are directed to the review (Gough, Thomas and Oliver, 2012, p. 3). On the other hand, aggregative reviews aim to test theories with predecided methods; the review process is instrumental to theory testing, and the review findings are informed by the interest in “magnitude and precision” (Gough, Thomas and Oliver, 2012, p. 3).

The choice of data analysis depends on the review's focus, the research question, and the types of studies, e.g., quantitative and/or qualitative studies, included in the review (Petticrew *et al.*, 2013).

Qualitative, quantitative, and mixed-method synthesis methods are documented in the literature (Petticrew *et al.*, 2013; Dixon-Woods *et al.*, 2006a; Dixon-Woods *et al.*, 2005). The aggregative and configurative approaches vary in terms of how they synthesise data - narrative summary, thematic analysis, grounded theory, meta-ethnography, Miles and Huberman's cross-case technique, realist synthesis, content analysis, qualitative comparative analysis, Bayesian meta-analysis (Dixon-Woods *et al.*, 2005), and critical interpretive synthesis (Flick, 2013; Thomas and Harden, 2008; Barnett-Page and Thomas, 2009; Noyes *et al.*, 2019; Petticrew *et al.*, 2013; Harden *et al.*, 2018; Booth, 2016; Dixon-Woods *et al.*, 2006a; Dixon-Woods *et al.*, 2006b; Flemming, 2009; Flemming, 2010; Ako-Arrey *et al.*, 2016; Hopp and Rittenmeyer, 2015) to name a few (See Table 3.1).

Another trait of the synthesis approaches is related to their epistemological positions. While deciding on the appropriate evidence synthesis method, the author has also considered the available approaches' philosophical assumptions. For instance, qualitative evidence synthesis methods draw from idealist epistemologies, "wherein the researcher assumes that all knowledge is constructed" (Hannes and Lockwood, 2011, p.6).

Considering the research aims – developing a theoretical framework to guide the work - and the nature of research evidence, e.g., qualitative and quantitative evidence, the author has considered three approaches for data synthesis – Miles and Huberman's cross-case method, meta-ethnography, and critical interpretive synthesis. However, Miles and Huberman's cross-case method has not been documented in the literature as a review method (Dixon-Woods *et al.*, 2005). The author has decided that as an early career researcher, the lack of guidelines for using the method for evidence synthesis may potentially be a hurdle and jeopardise the research quality.

Approach	Aim to Achieve	Characteristics	Challenges	Advantages
Meta-ethnography	Theory generation	Highly iterative, interpretive	Advanced research skills and high-quality study required	Leads to high-order synthesis
Thematic Synthesis	Theme identification, complementary information generation	Some iteration, employs critical realistic epistemology.	N/A	Limited expertise and experience sufficient, transparent
Critical Interpretive Synthesis	Theory, synthesising argument generation	Highly iterative, more subjective idealistic epistemology	Transparency is difficult to obtain, advanced research skills required	Theory generation allows hypotheses generation
Framework Synthesis	Theory exploration	A priori theory required, deductive, more critical realistic epistemology	N/A	Highly transparent
Realist Synthesis	Theory generation and explanation	More critical realistic epistemology, high level iteration	Novice researchers may struggle, may require additional primary research	Answer to 'what' works for 'whom', 'why' and 'how'.

(fs)QCA	Analysing complex causal connections ¹⁷ modestly, in order to explain a phenomenon ²⁰	Similar to cross-case analysis ¹⁸ , some commonly acknowledged assumptions, mainly	Working examples using QCA struggled to utilise fuzzy set aspect of the method ^{19,20}	Utilises both case-oriented and variable-oriented techniques ²¹
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¹⁷ Dixon-Woods, M. *et al.* (2005) 'Synthesising qualitative and quantitative evidence: a review of possible methods'. *Journal of Health Services Research & Policy*, 10 (1), pp. 45-53.

¹⁸ Burns, J.M.C. (2010) 'Encyclopedia of Case Study Research'. In: Mills, A.J., Durepos, G. and Wiebe, E. (eds.) *Encyclopedia of Case Study Research*. Thousand Oaks, California: Sage Publications, Inc.

¹⁹ Onwuegbuzie, A.J. and Weinbaum, R.K. (2017) 'A framework for using qualitative comparative analysis for the review of the literature'. *The Qualitative Report*, 22 (2), pp. 359-372.

²⁰ Thomas, J., O'Mara-Eves, A. and Brunton, G. (2014) 'Using qualitative comparative analysis (QCA) in systematic reviews of complex interventions: a worked example'. *Systematic Reviews*, 3 (1), pp. 67.

²¹ Ragin, C.C. (2009) 'Qualitative Comparative Analysis using Fuzzy Sets (fsQCA)'. In: Rihoux, B. and Ragin, C.C. (eds.) *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*. Thousand Oaks, California: SAGE Publications, Inc.

		related to causality, are not subject to QCA ²³		
Miles and Huberman's Cross-case method	Theory building ²² , theoretical elaboration ²⁰	Varied philosophical underpinnings, e.g., realist positivist, pragmatic constructivist, constructivist/interpretivist 23	No guidelines on using the method for secondary data analysis and literature review ¹⁹	Highly systematic, reasonably transparent ²⁰

Table 3. 1: Some approaches to qualitative and quantitative evidence synthesis

Source: Partially reproduced from Petticrew *et al.* (2013), expanded further compiling from sources in footnotes (^{19, 20, 21, 22, 23, 24, 25})

²² Eisenhardt, K.M. (1989) 'Building Theories from Case Study Research'. *The Academy of Management Review*, 14 (4), pp. 532-550.

²³ Harrison, H. *et al.* (2017a) 'Case Study Research: Foundations and Methodological Orientations'. *2017*, 18 (1), pp.

Applying meta-ethnography primarily generates theory, for instance, “program theory, implementation theory, or an explanation theory of why the intervention works or not” (Petticrew *et al.*, 2013, p 1240). However, the method cannot accommodate quantitative research evidence as it is suggested for reviewing high-quality qualitative studies (Petticrew *et al.*, 2013).

Critical interpretive synthesis is an adaptation of grounded theory and meta-ethnography. It can accommodate both qualitative and quantitative evidence while still offering theory generation (Petticrew *et al.*, 2013). The literature also notes its use with systematic reviews and illustrates worked examples of integrating qualitative and quantitative evidence in the approach (Dixon-Woods *et al.*, 2006b; Flemming, 2009; Flemming, 2010). Furthermore, critical interpretive synthesis has a constructivist orientation (Hannes and Lockwood, 2011) which aligns with the epistemological underpinnings of this doctoral work.

In this work, a systematic review approach accompanies a configurative data approach – critical interpretive synthesis. The systematic review is later followed by further integrating the relevant literature into the review to enhance the explanation power of the findings. The process follows a non-systematic (purposive) approach and samples additional literature by hand-searching, cross-reference checking and peer consultation.

Methodological options and methods for the pilot and main research

Pilot research

So far, the author has decided to synthesise the research evidence on scenario planning effectiveness to generate a theoretical framework. In continuing the work, the author further explores the shipping industry to better understand the industry's forward-looking practices, questioning the applicability and value of doing scenario planning research in the industry and finalising the research gap to be pursued. The choice of methodology and method is relatively straightforward in this part of the work. Qualitative research methodology is suitable due to two reasons. The first is that it can aid in achieving the research objectives, for instance, investigating a new field of study

(Jamshed, 2014). Second, the work is grounded in constructivist ontology and epistemology, and such positioning is associated with a qualitative research methodology (Jennings, 2005).

Unlike the previous and the next part of the research, this part follows a generic qualitative approach. Considering the exploratory nature of the research phase, implementing a generic qualitative research approach can “assist in ensuring data collection methods and analytical strategies best suit the research question posed rather than fit the question to a particular philosophical stance” (Smith, Bekker and Cheater, 2011, p. 7). Furthermore, qualitative exploratory research supports researchers in their quest to “identify and understand new phenomena as they arise and assess the extent to which they are worthy of academic research” (Doz, 2011). Generic designs – also referred to as “descriptive designs” (Sandelowski, 2000, in Smith, Bekker and Cheater, 2011, p. 2) – are far less theoretically informed than other qualitative approaches, e.g., phenomenological, grounded theory, ethnographic research. Therefore, generic designs are “the least encumbered by pre-existing theoretical and philosophical commitment” (Sandelowski, 2000).

Generic qualitative research design features are outlined by Sandelowski (2000) and demonstrated for each feature of sampling, data collection, data analysis and data representation. Qualitative content analysis, thematic analysis, and phenomenology are commonly used for interpreting and conveying participants’ views (Smith, Bekker and Cheater, 2011). Section 2.3.3. demonstrates the chosen design features in detail.

Main Research

Following the literature review and exploratory qualitative pilot study, the author aims to assess maritime scenarios’ creativity from his and the scenario teams’ views and investigate the role of creativity in SP effectiveness. Doing so requires tapping into the scenario teams’ experience in maritime scenario planning projects. Several approaches to the empirical research part of the work gathering primary data can be followed, adhering to the constructivist paradigm.

Constructivist Grounded Theory research (Charmaz, 2014), constructivist case study research (Charmaz, 2014; Stake, 2006; Stake, 1995), constructivist research using ethnographic techniques (Williamson, 2006; Knorr-Cetina, 1983) and interpretive phenomenology (Burns *et al.*, 2022; Creswell and Poth, 2016) are considered for their appropriateness to the research about their fitness to the research questions.

The research questions and objectives aim to expand the CIS findings and further enhance the theoretical framework in the context of creativity and scenario planning effectiveness. Therefore, a qualitative research methodology that serves to develop another theoretical framework or theory is not desired. While considering a methodology for the research, the author has examined their fitness to enhance further the CIS-generated theoretical framework.

Grounded Theory (Glaser and Strauss, 1999) aims to investigate several individuals who “share in the same process, action, or interaction” (Creswell and Poth, 2016, p. 143) by systematically discovering the theory based on the social research data (Glaser and Strauss, 1999). However, Grounded Theory (Glaser and Strauss, 1999) and its constructivist adaptation – Constructivist Grounded Theory (Charmaz, 2014) – are not well suited to the work as they focus on “creating conceptual frameworks or theories” (Charmaz, 2006, p. 187).

Similar to Grounded Theory, ethnographic research is interested in the individuals’ shared patterns of language, beliefs, and behaviours however, ethnography is primarily focused on cultural practice and cultural meaning (Creswell and Poth, 2016; Flick, 2013), obtaining “an insider view of a particular dimension of people’s everyday lives by participating, overtly or covertly, in it for a sustained period of time” (Flick, 2013, p. 145). The work does not dismiss the role of culture in the social world (Schutz, 1972), but it does not place as much emphasis on the culture either. Examples of using ethnographic techniques in constructivist research are also given. Despite ethnography’s flexibility –participant observation as one way to conduct ethnographic research and “participating in social interaction with them” is another (Williamson, 2006, p. 87), neither approach is suitable for the work. It is because the past maritime

scenario projects are to be investigated for their effectiveness and creativity in this research.

Phenomenological research aspires to describe the “common meaning for several individuals of their lived experiences of a concept or a phenomenon” (Creswell and Poth, 2016, p. 121). Considerable differences between phenomenological research approaches, e.g., descriptive, interpretive, hermeneutic, exist. However, the principle of “staying very close to the text that is being analysed, ensuring that it is the participant’s account” is standard across them (Flick, 2013, p. 143). A phenomenological approach is suggested when researchers aim to inquire into a group of individuals' common and shared experiences. Findings can be valuable for developing practices or policies or developing a richer understanding of the features of the phenomenon (Creswell and Poth, 2016). Considering the research questions and objectives of the work, following a phenomenological approach appears to be valuable. However, the approach does not lend itself to the researcher's theoretical framework in interpreting the lived experience of individuals. “The participant’s account is not just the point of departure but also the foundation of the interpretation” (Flick, 2013, p. 143).

Case study methodology is less straightforward to define and explain than the other methodologies presented so far. At the core, case studies are used to investigate one or “a small number of, organizations, events or individuals, generally over time” (Easterby-Smith, 2018, p. 139).

Several approaches to the methodology exist, informed by different epistemological positions (Hyett, Kenny and Dickson-Swift, 2014; Yazan, 2015). These are positivist and constructionist positions (Easterby-Smith, 2018).

Yin (2018), Eisenhardt (1989) Stake (1995) are the three well-known scholars of the methodology in the social sciences. While Yin (2018) is known for being closer to positivism with his approach, Stake (1995) is positioned in constructionism, and Eisenhardt (1989) is in between, inspired by both worlds (Easterby-Smith, 2018).

Despite Yin's (2018) popularity in case research, the author has directed his attention to Stake (1995) and Eidenhardt (1989) due to their philosophical closeness to his doctoral work. Despite its flexible design, Eidenhardt (1989) is concerned with building theory by developing hypotheses in her approach (Easterby-Smith, 2018). Stake (2005), however, offers a far more flexible design approach, encouraging the researcher to "employ their creativity, intuition and ingenuity" (Fearon, Hughes and Brearley, 2021, p. 1), recommending an emergent design approach to the researcher (Easterby-Smith, 2018). Furthermore, Stake's (2005) approach to case study allows for integrating the CIS-derived theoretical framework findings as foreshadowed issues (Stake, 2005) while maintaining the focus of attention on a phenomenon or condition or object that is being studied (Stake, 2006). Stake's (2013) multiple case study approach is followed in this work.

3.3.2. Systematic Review and Critical Interpretive Synthesis

Research question 1 is aimed to be answered by reviewing the literature and applying CIS to the evidence synthesis. Following the recommendations given for the CIS method, RQ 1 functions as an anchor question and it is presented below.

RQ 1: What are the areas scenario planning is effective on scenario users?

A modified systematic approach to analysing and synthesising scenario planning effectiveness literature is followed by pursuing the predefined steps of planning, conducting, reporting, and disseminating (Tranfield, Denyer and Smart, 2003). In recent years, the interest in systematic reviews has increased following the growth of initiatives such as the Campbell and Cochrane Collaborations, where the researchers "focus on reviews of the effectiveness of interventions" (Petticrew and Roberts, 2008, p. xiii). The author takes scenario planning as an intervention and aims to synthesise research evidence of the effectiveness of the SP intervention in this doctoral work.

David and David (2006, p. 256) have explained that the qualitative research synthesis approach might inform the field by "creating actionable knowledge in the future". The author has applied the Critical Interpretive Synthesis (CIS) method for data synthesis to establish a theoretical framework. Various applications of CIS are observed in the

literature. CIS in systematic reviews differs from its application in sampling. Usually, its sampling process does not involve strictly identified inclusion criteria for publications, as observed in systematic reviews. Instead, CIS starts with purposive sampling and continues with theoretical sampling. The disadvantage of the latter approach is the practicality concern of reviewing a high number of papers and the time limitations (Dixon-Woods *et al.*, 2006b).

On the other hand, there are applications of CIS where researchers review the literature systematically and apply the data synthesis technique developed for CIS, e.g. Dixon-Woods *et al.* (2006a); Flemming (2009); Mays, Pope and Popay (2005); Perski *et al.* (2017). In this work, the literature review starts with a systematic review. However, purposive sampling approaches such as snowball sampling, hand searching, and peer consultation are also taken to increase the explanatory power of the emerging theoretical framework. In doing so, the author has also achieved to increase the depth of the discussions and enhanced the criticality of the review.

CIS allows for synthesising a broad range of evidence (Dixon-Woods *et al.*, 2006a; Flemming, 2010; Dixon-Woods *et al.*, 2006b; Flemming, 2009). It guides the development of new constructs and theories (Dixon-Woods *et al.*, 2006b). Surr and Gates (2017) have reported the method's usefulness, especially when reviewed publications come from different disciplines. CIS is ideal for developing the foundational content for establishing a framework (Nguyen *et al.*, 2020).

In this work, a database scan and sampling process are conducted to capture scientific publications that expressly set out to test the scenario techniques' effect on scenario users. The author has used Flemming's (2010) integrative grid approach to accommodate a diverse range of impact and effectiveness data. Synthesising evidence on complex interventions can be daunting; however, that can be made simpler by breaking it down into a series of stages (Petticrew *et al.*, 2013). The following section introduces the steps taken for data gathering and analysis of the CIS section of the dissertation.

3.3.2.1.Key processes and characteristics of the systematic review and critical interpretive synthesis

Ten key processes of CIS are as follows: purpose, process, synthesis question, search strategy, sampling, critical appraisal, data extraction, coding, analysis, and results (Entwistle *et al.*, 2012; Nguyen *et al.*, 2020; Dixon-Woods *et al.*, 2006b).

Step 1: Purpose

The purpose of systematic review and CIS is to conduct a critical analysis and generate new insights into scenario planning effectiveness by examining a broad base of relevant literature.

Step 2: Process

CIS is an iterative, interactive and recursive approach that recognises the need for flexibility and reflexivity (Nguyen *et al.*, 2020). Systematic literature review steps are later followed by applied snowball sampling/ review of bibliography, hand searching and peer consultation, e.g., doctoral students researching scenario planning. However, a precise protocol for CIS is not offered due to the acknowledgement of the “authorial voice” (Nguyen *et al.*, 2020).

Step 3: Synthesis question

Synthesis questions are not precisely bounded or clearly defined. It is recommended for CIS and applied in this review. Initial anchor question is as follows:

RQ 1: *What are the areas scenario planning is effective on scenario users?*

The question is initial and evolves as the analysis continues (Endres and Weibler, 2017) but serve as an “*anchor*” (Dixon-Woods *et al.*, 2006b). The research question leads to developing the next stage of the review process, the keyword selection and database scan.

Step 4: Search Strategy

Keywords for the scan are established by amalgamating terms used for scenario planning and identifying the synonyms of “impact” based on thesaurus matches. The final search string used was (“scenario thinking” OR "scenario planning" OR "scenario method" OR "scenario methodology" OR "scenario technique”) AND (Effect* OR impact OR influence OR consequence OR outcome). Boolean operators²⁴ and the wildcard²⁵ are utilized whenever they are allowed by database. The search is run in EBSCO, Science Direct, ProQuest, Emerald insight and Web of Science in abstracts, titles, and keywords. Inclusion and exclusion criteria are left as wide as possible due to this area's limited empirical research papers. Both research papers published in peer-reviewed journals and book chapters are included in the scan. However, merely running a database scan can be insufficient (Endres and Weibler, 2017). Hence, this part of the research employs a supporting literature scan in Google scholar. E-alerts are set up, and cross-reference checks are also performed to keep track of newer publications. The scan is completed in May 2018. Another round of scanning the literature is later also performed to keep up with the newer publications in Autumn 2021. Figure 3.2 demonstrates the search strategy and outcomes.

Step 5: Sampling

The sampling process for CIS reviews maximises contributions toward conceptual and theoretical development (Nguyen *et al.*, 2020). The systematic database scan has aimed to identify publications that expressly set out to test the effectiveness of scenario

²⁴ Boolean Operators are “simple words (AND, OR, NOT or AND NOT) used as conjunctions to combine or exclude keywords in search, resulting in more focused and productive results” (Alliant Libraries, nd)

²⁵ The wildcard is a search method that allows for maximising the database search results using an asterisk and/ or a question mark. In this work, the asterisk method is used to include “variable endings of a root word” (APUS Librarians, 2018).

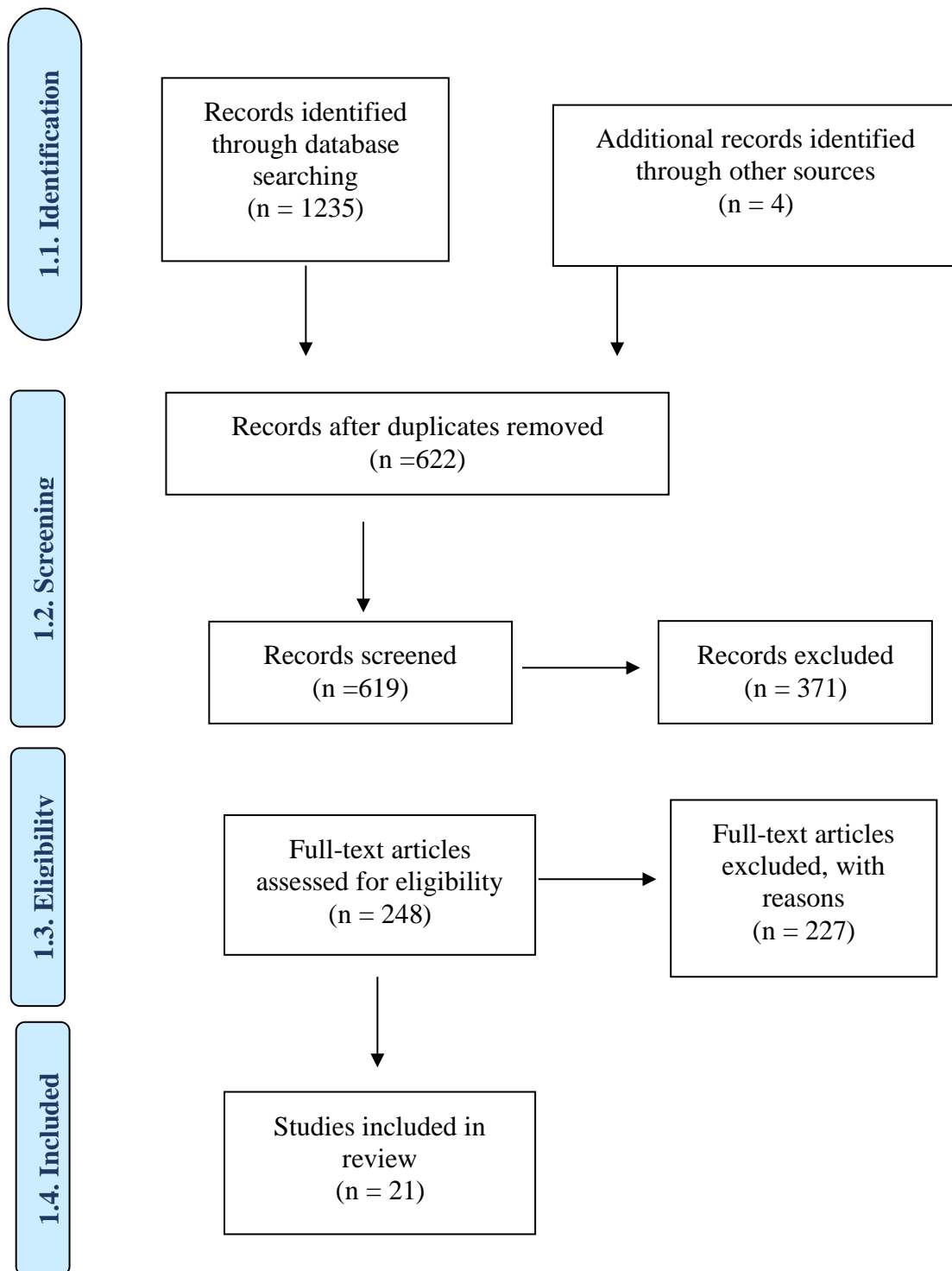


Figure 3. 2: PRISMA flowchart of search strategy and outcomes

Source: Adapted from PRISMA (2018)

planning. In addition, further sampling through non-systematic scans has contributed to the CIS process.

All database and Google Scholar hits are downloaded into Endnote 8.2 referencing software. For this review, Endnote has served two purposes. First, it has allowed for duplicate removal.

After this, the screening of titles and abstracts is completed by taking an approach similar to Thorpe *et al.* (2005). The remaining publications are separated into A, B and C lists.

The screening process in the work is iterative. List A consists of publications that the author evaluates as should be included in the review. However, the author has felt the need to return to the publications whenever he is unsure of their inclusion, e.g., ambiguous publications based on title and abstract are assigned to list B. Therefore, list B has allowed for temporarily holding out such publications until the second or third screening time. Publications in list B are screened by reading the full text. The C list is used to separate the publications from those that meet the inclusion criteria. Finally, List A studies have made up the sample of this review.

As briefly explained, during the screening process, the main aim has been identifying research publications that needed to be discarded by assigning them to list C based on title, abstract and, at times, full-text review. After the first round, 371 articles have landed in list C. The remaining 246 publications are transferred to list B - the initial number of studies sampled for this review. These papers were retrieved for further eligibility screening, and another round of scanning was run. Then, 227 out of 246 studies are assigned to list C type publications and therefore discarded. Finally, 19 papers are left in the sample for this review (see Figure 2.2). In the Autumn of 2021, two more research papers were identified and added to the review.

Step 6: Critical Appraisal

Although critical appraisal is a standard procedure in systematic reviews, the application of CIS means greater emphasis should be placed on critiquing throughout

the approach rather than just critical appraisal during the sampling phase (Nguyen *et al.*, 2020). One difficulty associated with questioning the quality of qualitative research for inclusion in systematic reviews is that it is a contested matter (Dixon-Woods *et al.*, 2007). To choose and apply the most suitable form of quality appraisal to the sampled publications, the author has read several research papers investigating the value of appraisal methods.

The author has taken the study findings on the appraisal tools into consideration, e.g. Hong, Gonzalez-Reyes and Pluye (2018); Pace *et al.* (2012); Evans (2003); Zeng *et al.* (2015); Katrak *et al.* (2004); Majid and Vanstone (2018); Harrison *et al.* (2017b); Shea *et al.* (2007); Dixon-Woods *et al.* (2007); Hawker *et al.* (2002). MMAT version 2018 (Hong *et al.*, 2018a) is chosen due to its suitability for quantitative, qualitative, and mixed-method research evidence synthesis and research conducted on the tool's reliability and usefulness (Hong, Gonzalez-Reyes and Pluye, 2018; Pace *et al.*, 2012). The tool is applied to appraise the quality of empirical studies by assessing a range of criteria, for instance, clarity of research questions, fit/misfit between collected data and research questions, and relevance between sampling strategy and research questions (Hong *et al.*, 2018b). The shortcomings of sampled publications are included in this review and can be found in the literature review table in Appendix 3.

Step 7: Data Extraction

Data extraction is carried out in line with good practice in systematic review reporting and dissemination (Tranfield, Denyer and Smart, 2003). A formal/ standard data extraction form is optional with CIS (Nguyen *et al.*, 2020). This work executes data extraction through two software: Endnote 8 and Nvivo 10.

Step 8: Coding

Coding is done by following the guidelines provided by Dixon-Woods *et al.* (2006b), Flemming (2009) and Flemming (2010). The inductive coding process is reiterative and completed in multiple stages.

To ensure the analysis captured all the reviewed literature's empirical findings, firstly, an in-vivo coding, see Saldaña (2016) is administered. First cycle coding produced 2039 codes, and further translation of the codes into one another to produce a reduced number of themes, concepts and metaphors are performed (Dixon-Woods *et al.*, 2006b; Flemming, 2009; Dixon-Woods *et al.*, 2005)²⁶. As a result, 375 translations are processed through reciprocal translation analysis to produce 12 third-order constructs, also called synthetic constructs. Figure 3.3 represents the translations that contributed to and formed “Networking- collaboration”.

Step 9: Analysis

Data analysis consists of elements of “critique, reflection, interpretation, development of new concepts, and integration. Synthesis goes beyond summarization and includes a critical examination, interpretation, and generating new insights” (Nguyen *et al.*, 2020, p. 4). The recommendations given by Dixon-Woods *et al.* (2006b); Flemming (2009); Flemming (2010) are followed during the development of synthesising arguments and synthetic constructs.

Accordingly, several concepts that are used in the method are examined and understood by the author. Key terms of the CIS are:

- reciprocal translational analysis (RTA),
- refutational synthesis, and
- lines-of-argument (LOA).

Reciprocal translational analysis constitutes systematically comparing the findings of one paper to another, which is also referred to as translation of findings and first order constructs. In this stage, themes, concepts and metaphors are identified. RTA is suitable for a small set of papers, less than fifty.

²⁶ Further information on reciprocal translation analysis, reciprocal translation, synthetic constructs can be found in page 106.

In this review, there are less than fifty papers, and the value of the RTA technique is higher than the reviews sampling over the threshold of fifty papers (Dixon-Woods *et al.*, 2006b).

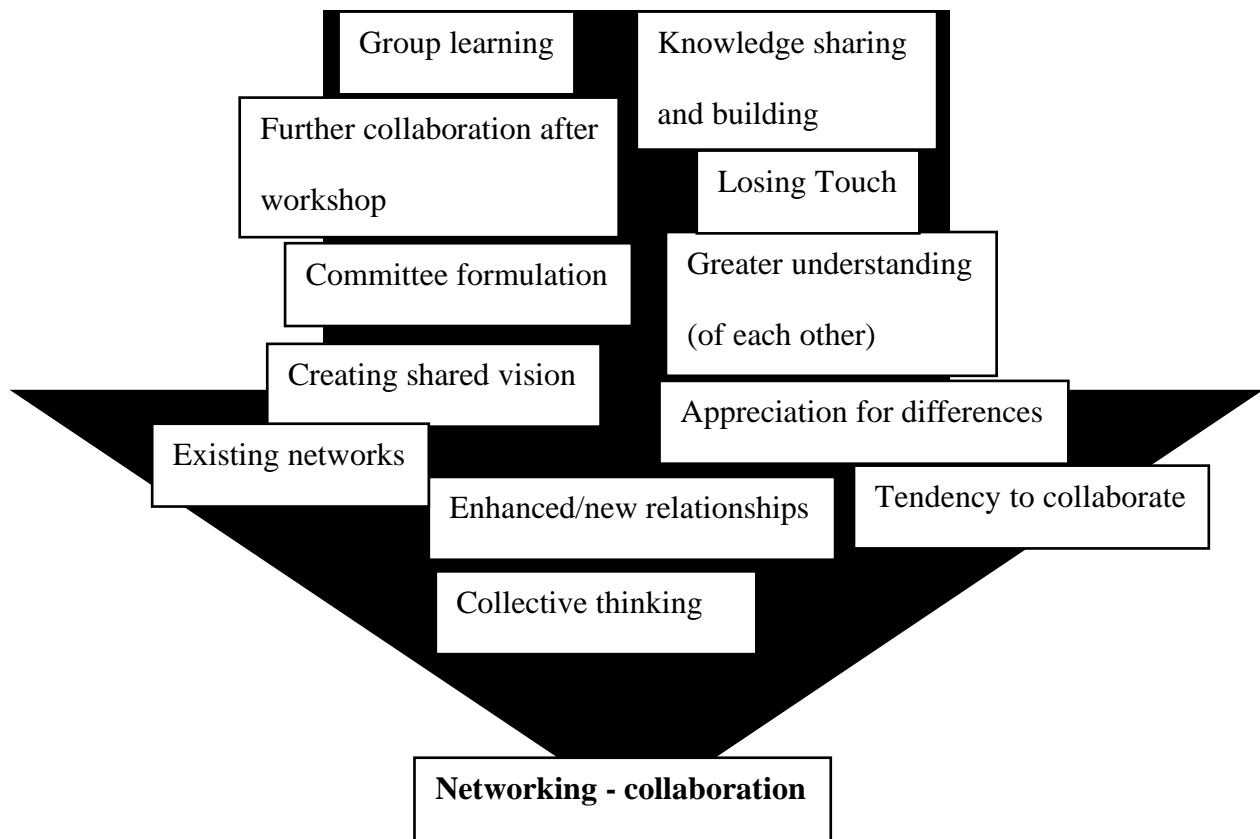


Figure 3. 3: The synthetic construct “Networking – collaboration” (boxes represent translation)

Source: Author’s data analysis of review papers

The author finds the guidelines provided by Flemming (2010) for translating quantitative and qualitative research evidence helpful. The integrative grid method allows for populating each grid row with qualitative research articles. The author has modified the grid method by populating the rows with quantitative research articles and looked for overlaps between the quantitative and qualitative research findings.

Lines of argument synthesis are referred to as second-order constructs or synthetic constructs (Dixon-Woods *et al.*, 2006b). The CIS findings are presented in the synthesising argument form, developed from the synthetic constructs (see Figure 3.4.). It is the point where CIS differs from meta-ethnography (Flemming, 2009).

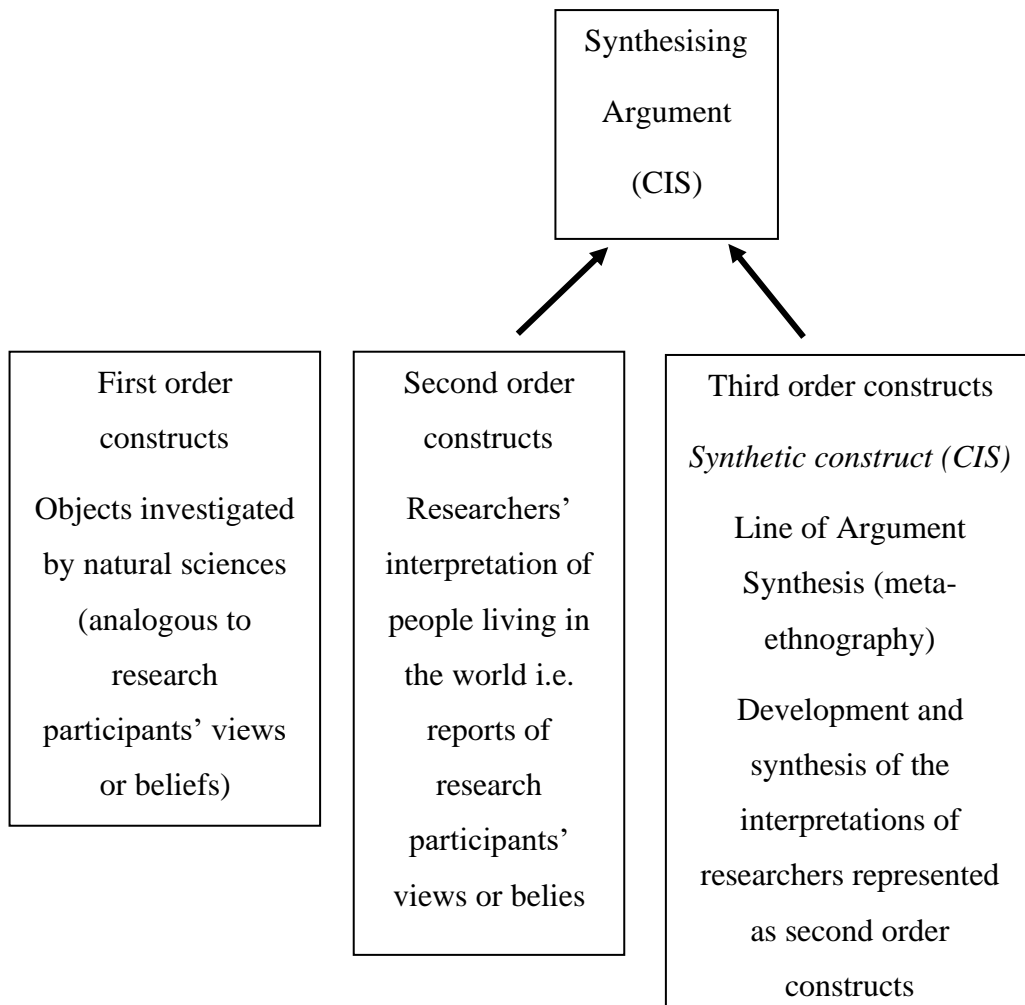


Figure 3. 4: The relationship of a synthesizing argument to first, second and third order constructs. CIS, Critical Interpretive Synthesis

Source: Reproduced from Flemming (2009, p. 213)

Step 10: Results

CIS leads to the creation of a synthesizing argument such as a theory or a framework (Nguyen *et al.*, 2020). Accordingly,

“This critically informed analysis provides new insights by identifying relationships within and/or between existing constructs in the literature and ‘synthetic constructs’ (new constructs generated through synthesis). The synthesizing argument is grounded in the literature and formed by integrating evidence from across the studies” (Nguyen *et al.*, 2020, p. 3).

The findings were presented in Chapter 2. A qualitative pilot study follows this part of the research.

3.3.3. Pilot Study: Semi-structured interviews and thematic analysis

A qualitative pilot study is conducted to develop and test items for the main study (Easterby-Smith, 2018). The item tested through the pilot study in this work is exploring the suitability of scenario planning research in the maritime industry. The developed item is to determine the subject focus – a research gap to pursue. A pilot study is the first step of the entire research protocol and is often a smaller-sized study assisting in the planning and modifying of the main study (Thabane *et al.*, 2010; Arnold *et al.*, 2009; In, 2017). Conducting a pilot before the main study can improve the success of the main study and possibly assist in avoiding doomed studies (Thabane *et al.*, 2010).

As illustrated in an African proverb from the Ashanti people in Ghana “you never test the depth of a river with both feet, the main goal of pilot studies is to assess the feasibility of the research; without a pilot study, the whole research effort could potentially ‘drown’” (Thabane *et al.*, 2010, p. 1).

Aims and Data:

The pilot study aims at exploring the shipping industry stakeholders’ forward-looking practices. They may involve using forecasting or foresight tools and other resources, for example, consultancy services. Additionally, the pilot study also aims to understand the applicability of investigating scenario planning practices in the maritime industry in the continuation of this doctoral work. Conducting a pilot study to explore those aspects is vital for several reasons. First, available literature has not

sufficiently documented scenario planning in the shipping industry. The industry-specific strategy literature is relatively slow-growing and lags thirty years behind compared to the current advancements in general strategy scholarship (Wang and Mileski, 2018). Therefore, before deciding on the research questions and the research design of the main study, exploring the industry practices in scenario planning and broader foresight and forecasting practices have proved to be necessary. A pilot study is also to help focus on an impactful research gap that is worthwhile pursuing from the perspective of both the industry and the scenario planning literature.

This part of the work is designed following the same line of ontology and epistemology. In addition, through an interview-based pilot study, the author would also hone their interview skills before the main study.

The research question for the pilot study is as follows:

RQ 2: How do shipping industry stakeholders make strategy?

The question above is developed following the CIS findings and reading available limited strategic management literature on the industry. The author then brainstormed ideas to discover the place of scenario planning in the industry individually and discussed his findings with other researchers. When designing the research, the author has identified only one research article suggesting that the researchers have not identified scenario planning in their sample (Koufopoulos, Lagoudis and Pastra, 2005). Furthermore, the author realised the maritime literature did not sufficiently report the strategy-making processes of the shipping stakeholders.

Consequently, the author has chosen a research question that facilitates discovering the place of scenario planning in the industry and covering a more comprehensive array of other foresight and forecast activities that may be taking place. Accordingly, the question targets the industry's forward-looking practices, e.g., forecasting and foresighting and aims to learn about how they tackle future uncertainties, e.g., utilisation of forecasting and foresight findings and make strategy. The research question of the pilot study leads the way for developing the main research questions.

The pilot study research question has led to the development of the interview questionnaire. *The Art of Asking Questions* (Payne, 2014) is consulted during the questionnaire development.

The following questions are asked to the participants:

1. Can you introduce yourself and the company you are currently working for? (Aiming to gather information on participant name, job title, number of years working in the current position and previous work experience, and educational background).
2. How do you/your company look ahead into the future?
3. How do you make strategy? Do you use any strategy making tools?
4. How much do you use forecasting? Environmental scanning? Scenario planning? (And others if applicable)

Sampling:

A sampling strategy is needed to be established to set out the criteria for choosing a subset from a broad population (Easterby-Smith, 2018). The sample is chosen among stakeholders from the maritime industry. Among two distinct sampling approaches, probability and non-probability sampling (Baker and Foy, 2008; Easterby-Smith, 2018; Saunders, 2012), non-probability sampling is chosen. The choice of this sampling approach is due to several reasons. The first reason is the sampling frame. Easterby-Smith (2018) defines the sampling frame as: “the list of all of those eligible to be included in the sample”. Gathering such a list is impossible due to the maritime business's global and complex nature. Narrowing down the scope of the study to a specific geographical region might help establish a sampling frame. However, by doing so, the doctoral work would risk losing vital insights that might come out of interviews with participants located outside of the sampling frame. When a sampling frame is not available, non-probability sampling is suggested (Saunders, 2012). Convenience sampling, quota sampling, purposive sampling, and snowball sampling are non-probability sampling designs (Easterby-Smith, 2018).

Purposive and snowball sampling is considered for the pilot study. Purposive sampling is a sampling design where the criteria for inclusion start with screening to see whether prospective participants meet the criteria for inclusion. Participants that meet the criteria are then approached for inclusion in the research. Facilitating interviews that inquire into the strategic thinking and strategy-making practices with the professionals in the maritime industry was expected to be a difficult task. This is due to the nature of strategic information that is sought.

For this reason, snowball sampling is also included in the process. Snowball sampling is a follow-up on purposive sampling in this study, where participants sampled for the interviews are asked whether they knew others who would meet the criteria. This sampling design is reportedly useful where a high level of trust and confidentiality is necessary (Easterby-Smith, 2018).

Criteria set for sampling design are as follows:

- 1) Interviewees need to be working in the shipping industry
- 2) Although there are no set years of experience requirement, interviewees have to be knowledgeable about the company's long-term thinking and strategy-making processes

The author sets out the criteria above to ensure the study participants have the industrial knowledge to share and contribute to the work, answering the research questions. Therefore, the participants are selected based on their involvement and experience in the industry.

Gaining Access to Data

The shipping industry is known for being generally secretive (Mitroussi, 2003; Duru, 2018; Tan, 2005). Gathering information on their long-term thinking and strategy-making approaches has meant utilising every ethical means of data access strategies possible. Easterby-Smith (2018) distinguishes two types of data access: formal and informal. While the formal process involves gaining permission from senior

management to receive information from within the organisation, the informal process is accessing people and documents. The process followed in the work is the following:

- making associations through conference attendance, e.g., London International Shipping Conference, and
- reaching out to LinkedIn users who at the time or previously have held strategy-related positions in the shipping industry
- the author's contacts from the industry.

Through conference attendance, professionals in the shipping industry are introduced to this doctoral work – both the pilot study and potential future research direction. It has meant gathering interested parties' contact details. LinkedIn is searched for various companies operating in the industry, for instance, ship owning and operating companies, ship management companies, ports, and logistics companies. The author's contacts from the industry are also invited to the pilot research.

An access proposal is prepared to formally invite the potential participants to the study (See Appendix 4).

The sectorial background of participants is predominantly liner container shipping (five participants). Participants from one port, one shipping service provider, one logistics service provider, and one dry bulk shipping industry are also interviewed. Geographical locations of the interviewees and the operational geographical of the companies they worked at also varied.

Ethical Approval and Consent

Prior to reaching out to the potential participants, a consent form was prepared, and ethical approval was sought from The University Ethics Committee of the University of Strathclyde and received. Potential participants have received a copy of the consent form and a summary of the study.

Data Collection, Extraction

The interviews took place online, either on Skype or by email. Given the geographical distance of the participants from the author, e.g., different continents, conducting the interviews face-to-face was impossible. However, the interviewees have had the opportunity to choose the most convenient video call platform for them. This is done to ensure the participants interacted with the author on a platform that is the most familiar and comfortable to them. In addition, the author had had experience in video calling on various platforms previously and is skilled in hosting the calls.

Every interview was recorded with the interviewees' consent except for one participant. At the beginning of the interview, a connection issue led the author to panic and forget about mentioning the recording. The participant is later informed about the situation and has not expressed any displeasure. The same participant has signed the consent form and continued participating in the research willingly. The recordings are made through the video call hosting platforms and later downloaded to the author's desktop. Auto transcription support provided by the video call platforms is utilised, and the researcher has made necessary corrections by listening to the recordings. Transcriptions are later sent to the interviewees for further checks. Having received approvals from the participants regarding the accuracy of the transcriptions, the author has transferred the interview scripts to qualitative analysis software Nvivo 10.

One interviewee has not signed the consent form, and further response is not received. Therefore, the interview is discarded. The author later discarded another interview. The participant initially seemed to be positioned in a department in a shipping company that dealt with strategy. However, the participant input did not sufficiently contribute to the work. Therefore, the author discarded the interview. Table 3.2 presents the participants' industrial background, interview setting and duration.

In some cases, the geographical locations of the interviewees are not disclosed due to anonymity reasons.

Coding and Analysis

Thematic analysis (TA) is carried out to analyse the interviews. TA is a method for systematically identifying, organising, and offering insights into patterns of meaning (themes) across a data set (Braun and Clarke, 2012). Similarly, King and Brooks (2018, pg. 2) define TA as “forms of qualitative data analysis that principally focus on identifying, organising and interpreting themes in textual data”.

No	Name	Company	Role	Experience	Setting	Duration ²⁷
1	Mike Simmons	X Liner Shipping	Container Fleet Manager	11 Years	SKYPE	46:47
2	Neil Ramos	C Logistics Services	Group Finance Manager	3 Years	E-mail	N/A
3	Adrie Jansen	T Seaports	Marketing Research Manager	19 Years	SKYPE	52:29
4	Otis Smith	Y Liner Shipping	Regional Owner’s representative	24 Years	SKYPE	1:34
5	Peter Overejinder	Retired	Retired	33 Years	E-mail	N/A
6	Nuwan Indika	Z Shipping company and port agency	Executive Director	4.5 Years	SKYPE	42:02
7	Minke Hansen	O Shipping Line	Director, Head of Strategy Development	6 Years	SKYPE	47:49
8	Putri Sari	M Shipping Lines	Strategy Development and Implementation Support Coordinator	4 Years	SKYPE	44:11

²⁷ The format is in (hours: minutes).

Table 3. 2: List of Pilot Study Participants

Source: Table created by the author, information drawn from the pilot study interviews

They refer to “forms” in the plural because they argue that it is not a single method but a broad approach encompassing many different styles. It begs the question as to what is meant by “themes”. Following King and Horrocks (2010, p. 150), they define themes as “recurrent and distinctive features of participants’ accounts, characterising particular perceptions and/or experiences, which the researcher sees as relevant to the research question”. Others have defined themes as “a broad category incorporating several codes that appear to be related to one another” and indicate an important idea to your research question (Saunders, Lewis and Thornhill, 2019, p. 657). Similarly, Schreier (2012) summarises themes as conceptualised assertions about some subject matter, as abstract constructs or recurrent patterns.

A one-off comment cannot constitute a theme, but Braun and Clarke (2012) argue that they have no problem in principle in identifying a theme that is unique to a single case – in other words, themes do not necessarily have to be identified across cases.

Why Thematic Analysis and Which Type

TA is a foundational method for qualitative data analysis (Braun and Clarke, 2006). It is a systematic and logical way to analyse data and thematic analysis can be applied to large and small qualitative data sets, leading to detailed “descriptions, explanations and theorising” (Saunders, Lewis and Thornhill, 2019, p. 651). Given its flexibility in analysing qualitative data (Braun and Clarke, 2012) and the aims of this pilot research, thematic analysis for analysing interview data is chosen. A necessary clarification is the distinction between methodology-specific and generic forms of thematic analysis since the chosen style in this instance is the generic form. While methodology-specific TA type is tied to one philosophical, theoretical and/or methodological position, e.g., Grounded Theory, Interpretative Phenomenological Analysis (IPA), generic forms of TA are free from such requirements (King and Brooks, 2018). Table 3.3 demonstrates the key issues that need to be considered while applying a generic form of TA.

Philosophical Position	Ontology	Epistemology	Implications for use of generic thematic analysis
Neo-positivism	Realist	Realist	<p>Seeks to build or test theory, minimising impact of researcher subjectivity</p> <p>Use of independent coders to verify accuracy of themes</p> <p>May use strong, theory linked a priori themes</p>
Limited Realism	Realist	Constructivist/ relativist	<p>Seeks to develop an account that is credible and potentially transferable, while recognising conclusions will always be tentative</p> <p>Often uses a priori themes informed by theory or evaluation criteria</p> <p>Quality checks to stimulate critical thinking, specific to needs of particular study</p> <p>Reflexivity in analysis important, to go beyond researcher subjectivity</p>

Contextualism	Relativist (or indeterminate)	Constructivist/ relativist	<p>Seeks to understand participants' meaning making within the specific research context</p> <p>Focus on induction and emergent themes; highly tentative use of <i>a priori</i> themes (if at all)</p> <p>Reflexivity; researcher subjectivity integral to whole process</p>
Radical constructionism	Relativist	Strongly relativist	<p>Seeks to critically examine how the phenomena of organisational life are constructed, including how organisational research itself constructs knowledge</p> <p>Scepticism about any quality criteria in analysis</p> <p>Focus on themes as aspects of discursive construction rather than of direct experience</p>

Table 3. 3: Different Philosophical Positions for Research and Their Implications for the Use of Generic Styles of Thematic Analysis

Source: Reproduced from King and Brooks (2018)

Contextualism – Relativist – constructivist type of TA can assist the analysis of the pilot study as this type of TA seeks to understand participants’ understanding of the issues within the research context. Both inductive and a few *a priori* themes are expected to be gathered.

Another decision is made around the level at which themes were identified (Braun and Clarke, 2006). Semantic and latent themes are the two options available (Boyatzis, 1998). While the semantic approach looks at explicit or surface meanings of the data, the latent approach goes beyond surface meaning and looks into the underlying ideas, assumptions, and conceptualisations (Braun and Clarke, 2006). The semantic approach was taken for the analysis of interview data. This was due to the pilot study aims. The aims were to understand the participants’ experiences within the organisations they worked at and to find significant patterns to summarise and interpret their input (Patton, 1990 in Braun and Clarke, 2006).

For this analysis, the phases of thematic analysis, as recommended by Braun and Clarke (2012), are followed. The phases are as follows:

- Familiarising yourself with the data
- Generating initial codes
- Searching for themes
- Reviewing potential themes
- Defining and naming themes
- Producing the report

Familiarisation with data

Familiarisation with the data started with the audio recordings and reviewing the transcriptions. It is followed by importing the transcript into Nvivo 10 where the coding took place. An inductive approach to TA meant coding the whole of each interview transcript. Initial codes are both descriptive and interpretive (Braun and Clarke, 2012).

Generating initial codes

TA is not prescriptive about how to segment the data – coding large or smaller chunks or no coding in some instances is expected (Braun and Clarke, 2012). In this pilot study, guiding interview questions have meant a reasonably expected thematic distribution across the interview data. Although interview questions reflect the research questions, interviewees have often answered the interview questions and moved on to other aspects of the issue the author has not explicitly asked about. That means coding is focused thematically on the interviewees’ answers to the questions. However, any other responses relevant to the research area are also accommodated (see Table 3.4 for an example of a coded transcript).

Not every coding has led to the development of a theme. This is due to a coded phenomenon being mentioned by a single participant only once and such code not being relevant to the research question. These instances are later re-checked for suitability to any potential themes. Finally, some of these codes have led to the development of the subtheme “The questions participants showed interest for and directed to the author”

Searching for themes

Following the initial code generation stage, as demonstrated above, the next step is theme searching. All initial codes are listed, sorted based on differences and similarities, and similar codes are finally collated (Braun and Clarke, 2006). Mind maps are not used due to the small sample size. However, a thematic map has proved useful and developed throughout the theme-searching stage.

Reviewing potential themes

Some of the codes the researcher initially thought might lead to themes were later reviewed and discarded. That was due to two reasons: not enough data to support them, and data being outside of the research scope.

Transcript	Initial Codes
<p>Participant Otis Smith:</p> <p>Yeah, well, I think in terms of the rationality of the decision making, I think it's fair to say that it's becoming or has become more rational over the years...</p> <p>...with the advent of digitalization with the advent of more accurate information upon which to better decisions and also financial modelling, which were not available, the transparency of information the external organisation is providing economic indicators for countries for regions for hemispheres, etc, or play into the hands of the shipping organisations...</p> <p>and the type of decisions on purchasing of new tonnage, building new vessels or redirecting vessels into new fleets isn't just an operational consideration anymore.</p>	<p>Increased rationality in decision making</p> <p>Contributing factors to increased rationality in decision making.</p> <p>Shift in the scope of decision making from a solely operational view to another</p>

<p>I mean, there are a multitude of different factors to consider a lot of organisations now use external consultants to to verify their own decision making.</p>	<p>Use of external consultants in decision making process</p>
<p>In many cases, now, these organisations are listed companies that are responsible for shareholders as much as the families.</p>	<p>Shipping companies' responsibility for shareholders</p>
<p>Yeah, so, I think that there is more logic and there is more. There's more guts and more consideration in the decision-making process these days, that I would say is case for commercially owned shipping lines. So, the PIL and MSC, CMA-CGM, Maersk and a lot of the smaller feeder organisations.</p>	<p>Rationality and guts in decision making among commercially owned shipping companies</p>

Table 3. 4: Generating initial codes in Thematic Analysis

Source: Author's data analysis of a pilot study interview transcript

Defining and naming themes

Each theme was defined and named to reflect the essence of participant input. The process was iterative. This stage was achieved by collating data extracts for each theme and “organising them into a coherent and internally consistent account” (Braun and Clarke, 2006, p. 92).

Producing the report

The final stage of thematic analysis is laying out the finalised themes. This involves reporting the results and write-up of the report (Braun and Clarke, 2006). Pilot study results are presented in Appendix 2.

3.3.4. Multiple Case Study

Once the critical interpretive synthesis and the pilot study are completed, a multiple case study is conducted to identify and analyse the future scenarios. Multiple case study aims to answer the following research questions:

RQ 3: Are maritime scenarios creative?

RQ 4: What is the role of creativity in scenario planning effectiveness on scenario users?

This part of the work initially only aimed to gather and analyse future scenarios for creativity. Therefore, RQ 3 was at the centre of the inquiry. The scenarios had to be developed for the maritime industry, and Shell scenarios²⁸ were chosen for comparison. The developmental time frame of the scenarios was from 1998 to 2021. The analysis has identified the creative ideas presented in the scenarios and compared two sets of scenario publications. The author later has observed the need for triangulating the creativity assessment by interviewing the scenario teams and inquiring into the role of creativity in scenario planning effectiveness on scenario users. The extended research questions and aims have meant that the author had to reconsider his research design to answer the new research questions while maintaining the research focus – future scenarios’ creativity – in a unified fashion.

Stake (1981) suggests “progressive focusing” to the researchers, explaining:

Progressive focusing requires that the researcher be well acquainted with the complexities of the problem before going to the field, but not too committed to

²⁸ Sampled scenario publications are presented later in this chapter under sampling.

a study plan. It is accomplished in multiple stages: First observation of the site, then further inquiry, beginning to focus on the relevant issues, and then seeking to explain (Stake, 1981 in Sinkovics and Alfoldi, 2012, p. 824).

The author has found Stake's (2013) multiple case study approach suitable for the work due to the design flexibility since it allows researchers to "to make major changes even after they proceed from design to research" (Yazan, 2015, p. 148)

Christensen *et al.* (2011, p.434) define a case study as "research that provides a detailed account and analysis of one or more cases". It is a type of qualitative research that seeks to identify, explain, and/or describe how the person or organization functions within its environment. Stake (2013, p. 2) offers a detailed explanation of a case:

A case is a noun, a thing, an entity; it is seldom a verb, a participle, a functioning. Schools may be our cases—real things that are easy to visualize, however hard they may be to understand (Stouffer, 1941). Training modules may be our cases—amorphous and abstract, but still things, whereas "training" is not. Nurses may be our cases; we usually do not define "nursing activity" as the case. "Managing," "becoming effective," "giving birth," and "voting" are examples of functioning, not entities we are likely to identify as cases. For our cases, we may select "managers," "production sites," "labor and delivery rooms," or "training sessions for voters."With these cases we find opportunities to examine functioning, but the functioning is not the case.

According to Yin (2014, p. 35), case studies support answering questions like "how" and "why" and "arises out of the desire to understand complex social phenomena". Comparative and multiple case study strategies are chosen to compare Shell scenarios and maritime scenarios in terms of creativity. Comparative case studies embody the "logic of comparison that we can understand social phenomena better when they are compared in relation to two or more meaningfully contrasting cases or situations" (Bell, Bryman and Harley, 2018, p. 68).

The literature often divides case study methods into three camps; Yin, Eisenhardt, and Stake. They are informed by different epistemologies and differ in terms of their approach to design, sampling, analysis, and contribution to theory (Easterby-Smith, 2018). Among three main case study approaches (Yazan, 2015), the work has followed a constructivist approach to the case study design found in Stake's work (Lauckner, Paterson and Krupa, 2012; Yazan, 2015; Fearon, Hughes and Brearley, 2021). The reason for that choice was that the case study research was required to complement the findings of the critical interpretive synthesis of the scenario planning effectiveness literature and further enrich the framework focusing on creativity.

Stake (1995) offers two types of case study research: intrinsic and instrumental study in single case studies. He explains that intrinsic case studies are applied when interest is in a particular case rather than a general understanding of a situation. He suggests that instrumental case study research is preferable when the aim is the latter. An instrumental case study is instrumental to understanding a general issue rather than an intrinsic interest in a case. He also notes that case study research types are not dichotomous: a case study research can be instrumental and intrinsic, but one overweighs the other.

Stake (2006) also offers guidelines for conducting a multi-case study. However, although the author has found Stake's guidelines helpful, a recent paper by Fearon, Hughes and Brearley (2021) mentions that there is no clear blueprint for conducting a Stakian multi-case study. Instead, they suggest that researchers conducting a Stakian multi-case study are inspired to use their creativity, intuition, and ingenuity, concluding the study by suggesting Stake's approach to a larger audience.

Quintain is a central concept in Stake's (2013) approach. It deals with targeting the phenomenon or an object to be studied. Stake's approach is interested in a collective target, "not a bull's eye" (Stake, 2006, p. 6). It "replaces and expands on the term phenomenon" that is too tight to describe a multi-case study's relatively broader research target (Fearon, Hughes and Brearley, 2021, p. 3).

Stake (2013) also discusses the case-quintain dilemma, explaining that the attention to the case, e.g., "local situations", and attention to the phenomenon under study –

quintain – are in tension. He further suggests that rushing into merging the cases is not ideal since the cases need to be repeatedly heard before concluding the multicase findings. Nevertheless, he recognises the researchers who pay the most attention to the Quintain and offers three cross-case analysis options. In the first option, the attention is on the individual cases, and in the third option, the quintain is the focus of the analysis. Option 2 is offered as a middle ground.

The steps recommended by Stake (2006) are listed below:

- 1- Identification of the quintain
- 2- Laying out the research question
- 3- Making the individual case report
- 4- Staffing
- 5- Selecting cases
- 6- Data gathering across cases
- 7- Triangulation within cases
- 8- Cross-case analysis
- 9- Triangulation across cases
- 10- The report

The research questions allow for a slow transition from focusing on the individual cases by within-case analysis to multiple cases by cross-case analyses.

From steps 1 to 3, the focus is on a single case. Steps 4, 5, 6, and 7 are suggested for moving from individual cases to multi-case analysis. Steps 8 and 9 are recommended for cross-case analysis, and finally, step 10 is producing the report. It is essential to highlight that conducting a Stakeian multiple case study does not mean researchers should start with step 4. Identifying the quintain is crucial to the case study researcher since the research begins with the quintain. Stake (2013) further explains that although single cases are studied, the analysis aims to understand the quintain through learning the similarities and differences between the cases (Stake, 2006).

Stake (cited in Bell, Bryman and Harley, 2018) recommends that the choice of cases should be primarily based on the expectation of the opportunity to learn. Therefore, the researchers should choose the cases to learn the most about a given issue.

Deciding on what constitutes a case and unit of analysis is an essential step in case study research. In addition to Stake's (2013) case study definition, the case study research definition and the case definition given by Creswell and Poth (2016) have been helpful to the author. Creswell and Poth (2016, p. 153) define case study research as:

... a qualitative approach in which the investigator explores a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case themes. The unit of analysis in the case study might be multiple cases (a multisite study) or a single case (a within-site study).

The case and unit of analysis differentiation are minuscule but essential to explain. The unit of analysis is a bounded system, e.g., bounded by time and place (Creswell and Poth, 2016), and defines the case, and a bounded system is a case (Merriam and Tisdell, 2015). Therefore, cases are multiple bounded systems (Creswell and Poth, 2016).

The unit of analysis in a case study is "studying an event, a program, an activity, or more than one individual" (Creswell and Poth, 2016, p. 164). In deciding the boundary of the case – unit of analysis – Simons (2014, p. 460) suggest asking whether the case is bounded by:

- "an institution or a unit within an institution",
- "people within an institution", or
- a region, project, program or policy.

Scenario planning projects are identified as cases in the work. More specifically, the maritime and Shell scenario projects are of interest to the author.

The unit of analysis is the scenario narratives in the early part of the research. It later shifts to the scenario teams. Scenario narratives as a unit of analysis bound the case so that the author can focus on their creativity assessment. In continuing the work, the unit of analysis shifts to the scenario teams. Such departure from the scenario narratives to the scenario teams allows for investigating the cases for their effectiveness and creativity's role.

Identification of the cases required conducting a systematic review of the scenario publications. The author presents the review and sampling procedure in the next section.

3.3.4.1. Identification of the cases

Identification of the maritime scenarios

The first step in searching the publications is scanning databases. The keywords chosen for database search are (“scenario thinking” OR "scenario planning" OR "scenario method*" OR "scenario methodology" OR "scenario technique”) AND (“shipping” OR “maritime” OR “logistics” OR “transport*” OR “freight”). Although not every database has allowed using Boolean operators in their systems, the structured search string above is applied whenever possible. When not possible, the search is run manually. EBSCO, Emerald, Proquest, ScienceDirect, SCOPUS, Web of Science, Google Scholar and Google’s search engine are used for scanning the literature (See Table 3.5).

Search Results

Database Name	Number of hits		Purposive Sampling
EBSCO	43	Google Scholar	

Emerald	3	Google Search Engine	15
Proquest	150		
ScienceDirect	145		
SCOPUS	240		
WebofScience	140		

Table 3. 5: Search Results of Maritime Scenarios

Source: Created by the author, information drawn from the systematic database scan results

The systematic scan by pre-defined search terms in databases has proved insufficient. It is not surprising for two reasons. First, as others also stated similar experiences, a cross-reference check is inevitable following a systematic review. The other reason is that scenario planning and scenario-based studies tended to be applied by consultants and government bodies for strategy and policy making. Therefore, an additional search on Google Scholar and the Google search engine is performed. Endnote 8.2 bibliography software is used for identifying the duplicates (see Figure 3.5). Automatic and manual duplicate scanning have reduced the total number of 736 studies to 293.

Inclusion and exclusion criteria

Inclusion and exclusion criteria are set and applied after discarding the duplicate studies. The inclusion and exclusion criteria applied to the maritime scenarios are presented in Table 3.6. Table 3.7 presents the sampled maritime scenarios.

Study content	Any scenario publications looking at the future of maritime industry that presented scenario narratives
Time frame	Time frame for sampling was 1998-2021
Study Design	No restriction
Language	English

Table 3. 6: Inclusion and exclusion criteria for maritime scenarios

Source: Table created by the author, illustrating the pre-set inclusion and exclusion criteria

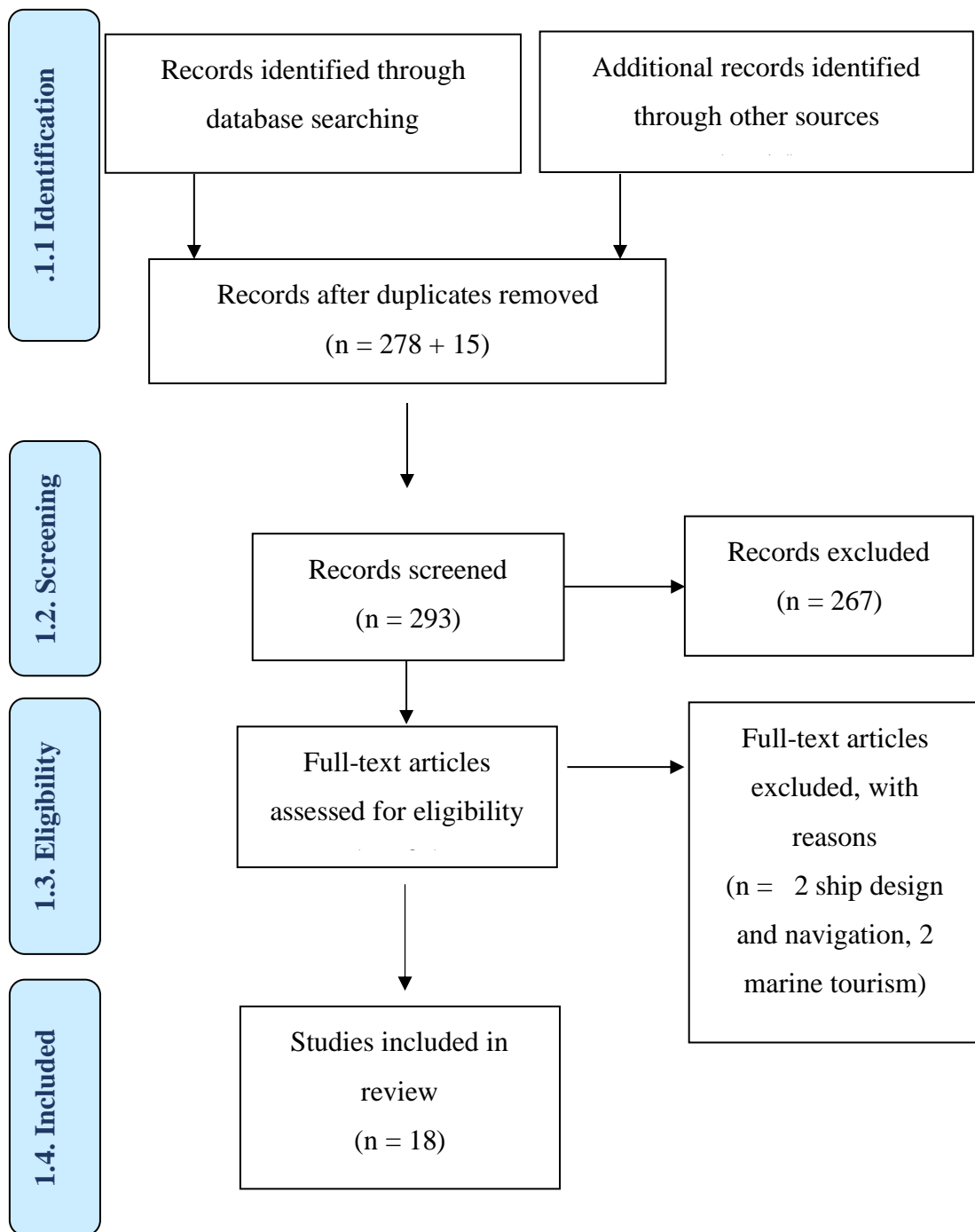


Figure 3. 5: PRISMA systematic review of the maritime scenarios

Source: Adapted from PRISMA (2018)

Case NO	Case Name	Author and Year	Objective	Data Collection - Sources	Scenario Type	Scenario Method	Key drivers/ uncertainties
1	Regional shipping and port development strategies: container traffic forecast	ESCAP and Cooperation (2005)	Providing “planning context for informed decision-making by governments, shipping lines and port authorities”	Desk research: Economics, trade and sectorial data (container)	Quantitative forecast scenarios supported with narratives	Maritime Policy Planning Model (MPPM)	Undisclosed
2	Arctic Marine Shipping Assessment	Arctic Council (2009)	Creating a framework of plausible futures for Arctic marine navigation to 2050	Workshops- Expert knowledge	Scenario Planning – Intuitive Logic	Intuitive Logic scenario steps	Governance, trade and resources
3	Shipping scenarios 2030	Wärtsilä Corporation (2010)	Supporting company strategy making and offering insights to the industry	Desk research, Workshops- Expert knowledge	Scenario Planning – Intuitive Logic	Intuitive Logic scenario steps	Economic growth, energy types

4	Port Vision 2030	Groningen Seaports (2012a)	Establishing port's vision	Desk research, Workshops – Expert knowledge	Scenario planning – Scenario axis	Scenario axis used	Growth, green society
5	Scenarios for the Development of Maritime Safety and Security in the Baltic Sea Region	Storgård <i>et al.</i> (2012)	Informing the EU commission regarding the Baltic Sea Region policy development about maritime safety and security	Desk research, Workshops – Expert knowledge	Scenario planning – undefined type	Identification of factors, grouping of factors, naming meta-stories, brainstorming	Human factors, regulations, safety and security, traffic control, e-navigation
6	Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts	DG Mare (2012)	Informing the EU commission maritime policy development – DG MARE call for tender	Desk research, Workshops, expert knowledge	Scenario planning – Intuitive logic	Intuitive logic scenario process by Van der Heijden (2005)	Demography, economy and market, politics, environment, technology and science

7	Updating the future	Akker <i>et al.</i> (2013)	Informing port of Rotterdam's strategic thinking	Desk Research – Interviews, Expert knowledge	Adaptation and revision of already established scenarios	Running Limits to Growth Model and adaptation	Undisclosed
8	Global Marine Trends 2030 (GMT2030)	Fang <i>et al.</i> (2013)	Understanding how to create industrial strategies to inform maritime stakeholders	Desk Research: IPCC, Scenario developers' own expertise	Scenario planning was not a process, more of a tool	Scenario development followed by a quantitative model	Population, economy, resources, environment
9	Global Marine Fuel Trends	Smith <i>et al.</i> (2014)	Unearthing the future fuel types used by commercial shipping to inform maritime stakeholders	Authors' future fuel type assumptions in combination with GMT 2030 scenarios	Quantitative forecast scenarios	Global Transport Model (GloTraM)	Trade, oil price, gas price, bio energy, economics, regulations

10	Study on the analysis and evolution of international and EU shipping	Artuso <i>et al.</i> (2015)	Supporting policy development - EU DG MOVE call for tender	Desk research: OECD scenarios, sector reports, expert knowledge	Scenario development was not a process, but an end.	Expert judgement on future drivers	Total factor productivity drivers, demographic drivers
11	Analysis of Recent Trends in EU Shipping and Analysis and Policy Support to Improve the Competitiveness of SSS in the EU	European Commission on DG Mobility and Transport (2015)	Informing European Commission on the fuel costs and environmental impacts of short sea shipping, developing policy actions and recommendations	Desk research	Quantitative modelling	Custom forecasting tool developed for the project – a time series deterministic model with modifications	Economics, policies, consolidation, Blue Belt, Directives, Technological developments
12	Low Carbon Pathways 2050	Lloyd's Register (2016)	Informing maritime stakeholders , contributing to policy debate	Desk research: The Third IMO GHG study, IPCC scenarios	Quantitative modelling	Global Transport Model	Regulations, Trade Demand, Tecno-econ.

13	MARITIME TREND REPORT	Danish Ship Finance and Rainmaking (2018)	Understanding what new business models can be introduced in the maritime industry	Desk research: reviewing other capital intensive industries	Single qualitative scenario development	Author's interpretation of data exercising ST	Digitilisation
14	Blue Growth— Drivers and Alternative Scenarios for the Gulf of Finland and the Archipelago Sea: Qualitative Analysis Based on Expert Opinions	Pöntynen and Erkkilä- Välimäki (2018)	Advising Ministry of Environment of Finland on maritime spatial plan for Finland through plausible futures	Desk research, Delphi questionnaire, learning café method, scenario workshops	Delphi and workshop based scenarios through futures table	Participatory process: Delphi surveys outcomes, workshop output, authors' finalised the scenarios	PESTEL factors in detail including: attitudes, global economy, globalisation, energy options

15	AHOY2050- Scenario Study	MAN Energy Solution and Fraunhofer ISI (2019)	Produced as a response to MAN's demand for future scenarios	Desk research, interviews, internal workshop, MATTISE model	Development of scenarios in an internal and external workshops	Influence analysis, scenario development by futures table, finalisation in workshops	Environmental awareness, economics, climate change, technology
16	Scenarios for Maritime Areas 2050 Preparation of scenarios for the future of Finnish maritime areas	Maritime Spatial Planning (2020)	Ministry of Environment of Finland's desire to see the current and plausible futures	Desk research, interviews – expert knowledge, workshops	Scenario development by futures table	Analysis of interviews, futures table and workshops for SP	Energy, fishing and agriculture, tourism, maritime transport
17	Coronavirus, climate change & smart shipping–	Stopford (2020)	Informing maritime stakeholders on post- COVID 19 futures	Desk research	Quantitative modelling	Expert assessment of key drivers	Economics, technology

	Three maritime scenarios 2020–2050					and quantitative analysis	
18	Technological trajectories and scenarios in seaport digitalization	Inkinen, Helminen and Saarikoski (2021)	Supporting research findings with scenario thinking	Desk research	Scenario development by futures table and interviews	Trend and key variable identification, futures table, interview analysis	Collaboration within the industry, logistics and SCM, environmental regulations, technological trajectories

Table 3. 7: Sampled Maritime Scenario Publications

Source: Generic literature review table constructed by the author, illustrating the sampled maritime scenario publications

Case NO	Case Name	Author and Year	Objective	Data Gathering - Sources	Scenario Type	Scenario Method	Key drivers / uncertainties
19	Global Scenarios 1998-2020	Shell (1998)	Assisting Shell leaders, academics, governments and	Interviews, desk research, workshops: expert knowledge,	Shell scenario methodology – IL	Thematic analysis, synthesis of the interviews, map making, scenario outline development, interpreting signals	Undisclosed
20	Shell Energy Scenarios to 2050	Shell (2008)	businesses in exploring ways forward and making better decisions (Shell plc, 2022)	Detailed information undisclosed. Likely to be the same as Global Scenarios 1998-2020.			Choices, prices, efficiency technology, efficiency behaviours, energy types, innovation and technology, environment.

21	New Lens Scenarios: A shift in perspective for a world in transition	Shell (2013)		Semi-disclosed. Desk research: data gathered from The World Bank, Booz & Company, EIA, UN population division and more.	Undisclosed	Undisclosed	Environment, energy technology, resources, and demand; creativity, preservation, relationships, ideologies, and more.
22	Sky, Meeting the goals of the Paris agreement	Shell (2018)		Undisclosed	Undisclosed	Undisclosed	Undisclosed

Table 3. 8: Sampled Shell Scenario Publications

Source: Generic literature review table constructed by the author, illustrating the sampled Shell scenario publication

Identification of Shell Scenarios

The Shell scenarios are identified through consulting the company website and searching for the scenarios on Google search engine. The search resulted in identifying four publications, all of which were sampled. Table 3.8 presents the sampled Shell scenarios.

Data Extraction and Data analysis

After applying the inclusion and exclusion criteria, scenario publications are selected and imported to NVivo 12 CAQDAS software. The author has familiarised himself with the scenario publications by reading and summarising the scenarios. The next phase is running a qualitative content analysis of scenarios to answer research question 3.

3.3.4.2. Assessment of the Scenarios for Creativity Through Qualitative Content Analysis

The scenarios are assessed for creativity following the guidelines in creativity literature. The following research question,

RQ 3: Are maritime scenarios creative?

is aimed to be answered by looking at the ideas in the scenarios that are novel, useful, and surprising. A qualitative content analysis is used following Mayring (2004); Hsieh and Shannon (2005); Elo and Kyngäs (2008); Schreier (2012); Mayring (2015); Neuendorf (2016).

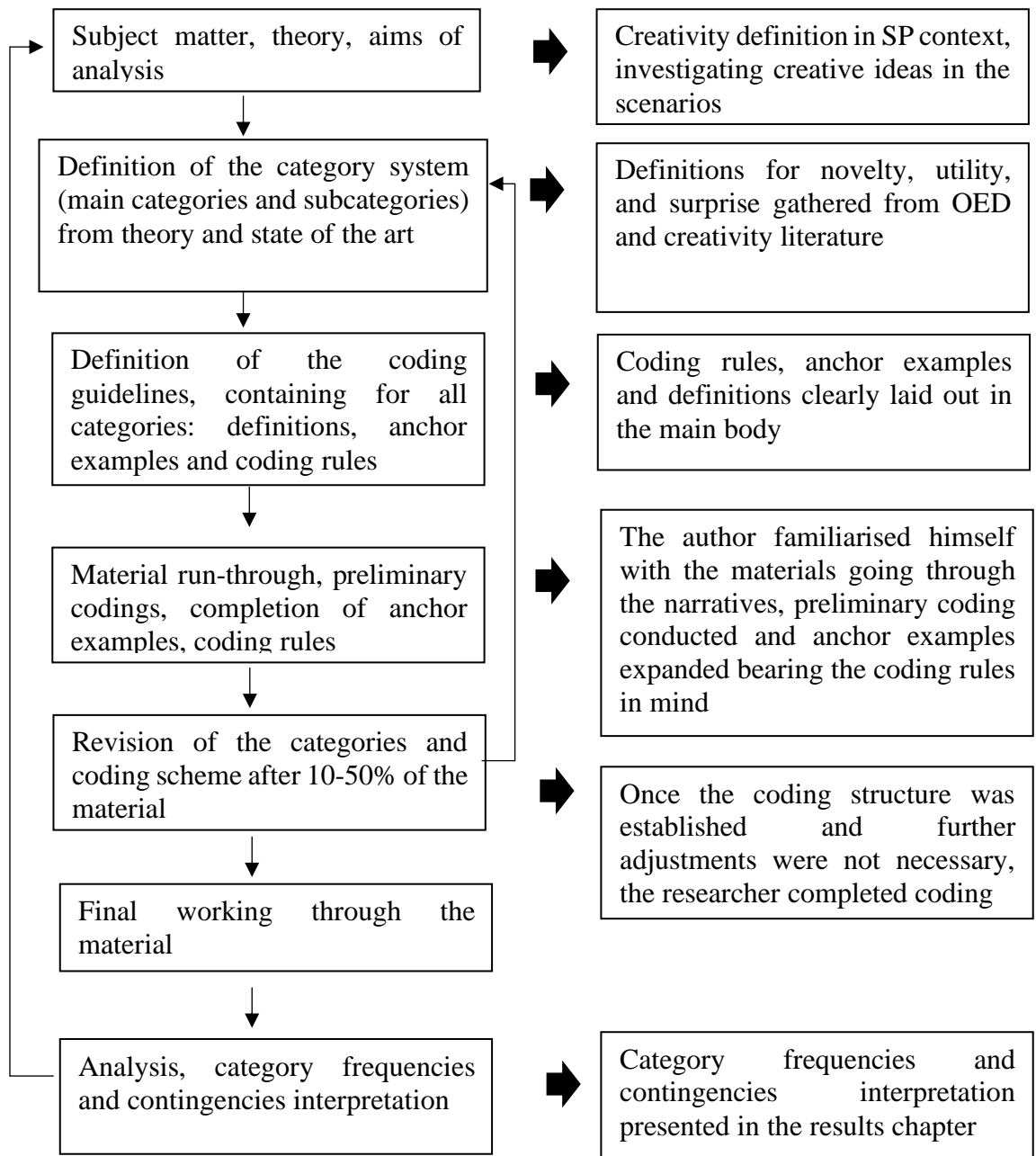


Figure 3. 6: On the left: Process model of deductive category application (structuring) – on the right: application of the model in the work

Source: Reproduced from Mayring (2015, p. 378)

The type of qualitative content analysis chosen for the analysis is deductive. This is due to having a particular structure prior to the analysis. The definition²⁹ that the author has developed guided the structure. The analysis has had the goal of extracting the structure from the material (Mayring, 2015). The main and subcategories are identified and defined before attempting to code the scenario narratives. Schreier (2012, pg. 60) defines main categories, also known as dimensions, as coding frames that are aspects the researchers want to focus on in the analysis, “subcategories specify what is said about the aspects that interest you, i.e., your main categories”. She further explains: “while the aspects function as dimensions or main categories of your coding frame, the specifications serve as your subcategories” (Schreier, 2012, pg. 60).

A process model of deductive category coding application is followed in the work. Figure 3.6 outlines the process. Figure 3.7 presents the initial coding frame – main categories.

The author’s creativity definition in the scenario planning context³⁰ has initiated the analysis. The research question “are maritime scenarios creative?” and the connected research objective “assessing the scenarios for creative ideas” have meant that in the next stage, the definitions for novelty, usefulness and surprise are to be clearly laid and kept in mind throughout the analysis.

²⁹ Creativity is ideas that offer novelty, utility and surprise to the person who is producing it. Such an idea also offers novelty, utility and surprise to a person who has not produced but encountered it.

³⁰ Creative scenarios are the future narratives created through a scenario planning process that have novel, useful, and surprising elements in a single idea and such ideas are present across the scenario narratives.

Initial Coding Frame - Coding rules, anchor examples

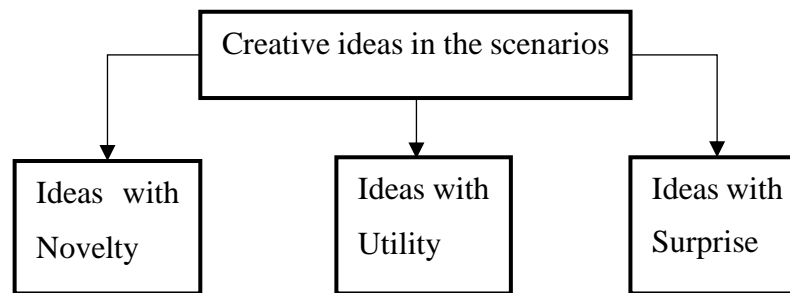


Figure 3. 7: Initial coding frame – main categories

Source: Adapted from Schreier (2012)

The scenarios are coded in rounds. The first round is for novelty, the second is for utility, and the third is for surprise. It has meant generating a sub-category definition for each category: novelty, utility and surprise. Cross-matrix function in Nvivo 12 later has allowed for identifying the codes that are coded for all three dimensions. It is explained further in the following sections. Examples for each category coding are provided later in this section.

Due to the iterative nature of the qualitative content analysis, the rules that have emerged throughout the analysis are later applied to data already analysed. This process recurred until no further rules were necessary, and all data were analysed comprehensively, taking the latest emerged rules into account. It was necessary to ensure consistency across coding. The following rules are developed and applied during the coding stage:

- Minimum effort to connect the logical chains of events/ explanations/ descriptions should be made to something to be coded as ‘novel’. Such antecedent explanations should be plausible. At a minimum, one example should be given on the novel future idea/event/thing that may come out of.
- Response to future uncertainty through unclear/ vague/ undetailed ideas is insufficient.
- The scenarios are not coded considering the year of publication. Instead, a timeline approach is to phase out the repeated ideas across the scenario sample.

For example, in cases where there are two same novel ideas in two different publications with different years, the earliest occurrence of a novel coded idea remains, and the latter is discarded from the results.

- In cases where novelty is explicitly made clear (manifest) through relevant expressions, for instance, unique opportunity, for the first time in history, new discoveries, the author’s p-novelty lens and a supporting example in the text are minimum criteria for eligibility.
- In cases where novelty is potentially present (latent meaning), the previous rules entirely apply.
- The first round of coding: “Is this fairly new to me?” (If not, discard) (Identification of potential novel ideas, even though loosely, retained for further analysis)
- The second iteration of coding - controlling: “have they met the criteria that the author has set?” (If not, discard)
- Revision of coding (Timeline approach – phasing out the excerpts based on their occurrences in the scenarios by years)

Category definition and anchor examples for novelty and examples of included ideas are presented in Table 3.9 and Table 3.10.

Category definition and anchor examples for novelty and an example initially considered to be potentially novel but later discarded are presented in Table 3.11.

Data	New, digital offshore aquaculture technologies are used, for example, independent, floating aquaculture units.
Description	New aquaculture technologies, e.g., floating aquaculture units
Category formulation (main category – subcategory)	N - New technologies (including aquaculture technology)
Revised category	Novel – Novel technologies
Content type/ meaning	Manifest

Table 3. 9: Example of included extracts from the scenarios and the categorisation

Source: Table constructed by the author, compiling from Schreier (2012) and Mayring (2014), illustrative data comes from the author’s data collection

Data	Faster changes in consumer behaviour may only follow major negative, even catastrophic, changes in environmental conditions or climate. "We will need strong environment-based policy instruments, maybe due to an aftermath of a catastrophe."
Description	Radical change in consumer behaviour will follow a catastrophe
Category formulation	N - Radical change in consumer behaviour
Revised category	Novelty - Change in consumer behaviour
Content type/meaning	Manifest

Table 3. 10: Example of included extracts from the scenarios and the categorisation

Source: Table constructed by the author, compiling from Schreier (2012) and Mayring (2014), illustrative data comes from the author’s data collection

Data	Japan built the world’s first fully autonomous factory making consumer products. Service robots are produced for domestic use and commercial use. In domestic settings, widespread use of the technology leverages manpower; disrupts unskilled labour markets and immigration patterns, and changes care for a growing elderly population.
Description	Service robots built-in fully autonomous factories
Category formulation	Robots built by robots
Revised category	New era with service robots
Content type/ meaning	Manifest

Table 3. 11: Example of discarded extracts

Source: Table constructed by the author, compiling from Schreier (2012) and Mayring (2014), illustrative data comes from the author’s data collection

Final working through the material and results

Having established the rules, the author has finalised the analysis after multiple iterations of coding cycles. Finally, category frequencies and the interpretation of the analysis are presented in the results chapter.

3.3.4.3. Continuation of the Multiple Case Study

The rationale for using the case study strategy initially has been to aid in answering research question 3; are maritime scenarios creative? The scenarios are assessed for creativity by the author. After that, the author compares the maritime scenarios against Shell scenarios for creative ideas. Comparative qualitative content analysis is conducted for that purpose. The same research question is asked in the continuation of the work interviewing the maritime scenarios' developers, which triangulates the author's qualitative content analysis. Additionally, the author has sought the scenario developers' definition of creativity in the scenario planning context. Finally, the last research question:

RQ 4: What is the role of creativity in scenario planning effectiveness on scenario users?

is answered. RQ 4 is associated with the quintain of the case study. As previously explained, quintain is a central concept in Stake's (2013) approach. It deals with targeting the phenomenon or an object to be studied. Stake's approach is interested in a collective target, "not a bull's eye" (Stake, 2006, p. 6). It "replaces and expands on the term phenomenon" that is too tight to describe a multi-case study's relatively broader research target (Fearon, Hughes and Brearley, 2021, p. 3).

Foreshadowed Issues

Foreshadowed issues provide an alternative way to frame the cases at the beginning of the research (Simons, 2009) and are considered an essential part of multiple case study analysis (Stake, 2006). The concept was framed by Smith and Pohland (1974 in Simons, 2009, p. 6) and offered a "guide as to what to explore but do not constrain the research process to these problems only".

Foreshadowed issues or problems – used interchangeably in the literature (Simons, 2009; Fearon, Hughes and Brearley, 2021; Stake, 2006) – are decided *a priori* through reviewing the literature and personal experience (Simons, 2009; Fearon, Hughes and Brearley, 2021; Stake, 2006). They function as a “framework for the case study by maintaining its boundaries and feasibility (Fearon, Hughes and Brearley, 2021, p. 3).

The CIS findings have predominantly contributed to developing the foreshadowed issues because the CIS has provided a theoretical framework for scenario planning effectiveness. The author has also reviewed the creativity literature and assessed the scenarios for creativity before conducting the case study interviews. A broader screening is also applied to the interviews based on the CIS findings.

The following foreshadowed issues were developed before conducting the interviews::

Practitioners should be able to make their voices heard for creativity to impact scenario planning positively.

Creativity’s role is questionable in making any desired impact on policymaking scenarios considering the lack of creative ideas in the policymaking scenarios and previously reported ineffectiveness of SP in policymaking.

At the end of scenario planning, a scenario team is less likely to be surprised by the outcome of the scenarios in which the author did not identify any surprising ideas. It is also because scenario planning was also found ineffective for the degree of surprise in the literature.

The cases where the author has not identified creative ideas are unlikely to challenge the scenario users’ status quo thinking. There is little evidence supporting the “breaking free from normal thinking” phenomenon in the literature.

The scenario teams are vigilant of creativity. It is caused by the fear that it can lead to dysfunction in the scenario development process, and the bias against creativity contributes to it.

Plausibility and consistency concerns and the novelty and usefulness trade-off lead to an overemphasis on plausibility, usefulness and consistency, leaving novel ideas aside for omission.

The foreshadowed issues have gone through iterations throughout the multiple case study. The author's notes during the interviews and the memos he created during the interview transcripts analysis revealed additional foreshadowed issues. The modification process continued during the interview stage and is finalised after the cross-case analysis. Stake (2006) calls them multicase assertions (Fearon, Hughes and Brearley, 2021), which supports cross-case analysis to interpret the quintain. Stake (2013, p. 10) states:

Quintains are often better understood by looking at the way problems are handled than by looking at efficiency or productivity outcomes. Starting with a topical concern, case researchers consider the *foreshadowed problems*, concentrate on issue-related observations, interpret patterns of data, and reformulate the issues as findings or assertions.

The modified foreshadowed issues – multicase assertions – have made an in-depth understanding of the thematic findings of the quintain possible. The multicase assertions are presented in Chapter 6.

Method

According to Stake, the choice of methods is made by the researcher and “case intuition”; several data collection and analysis methods are embraced, “shaped by context and emergent data” to advance the understanding and the development of the case (Hyett, Kenny and Dickson-Swift, 2014, p. 2)

Interviewing the scenario teams is planned to gather further information from them to answer RQ 3 – are maritime scenarios creative? – and finally, investigate the quintain. The associated research question to quintain is RQ 4 – what is the role of creativity in scenario planning effectiveness on scenario users? Answering the final research questions has meant checking the sampled scenario publications for authors and

creating a list of potential interviewees. Therefore, the sampling for this part of the work relies on the selected cases in two sets: maritime and Shell scenarios' scenario teams.

Some of the scenario publications are authored by the same group of people. Therefore, out of 24 scenario publications that are sampled and analysed for creativity, 17 groups of authors are aimed to be reached out and invited for an interview.

The method of analysis is iterative and reflexive in the work. Stake's (2013) data analysis approaches are complemented with deductive and inductive qualitative content analysis (Mayring, 2004; Hsieh and Shannon, 2005; Elo and Kyngäs, 2008; Schreier, 2012; Mayring, 2015; Neuendorf, 2016) and thematic analysis (Braun and Clarke, 2006; Braun and Clarke, 2012; Braun and Clarke, 2019). The data analysis methods are chosen due to their flexibility and suitability to the research. Thematic analysis welcomes "reflexivity, theoretical engagement and creative scholarship" so long as they are done "deliberately and thoughtfully" (Braun and Clarke, 2019, p. 589). Furthermore, the author has previously used the methods in this work and gained a sufficient understanding and experience. Nvivo 12 is chosen for both qualitative content analysis and thematic analysis.

Selecting cases

The cases are selected based on their relevance to the research questions. Stake (2006, pg. 23) suggests three main criteria for selecting cases:

- 1- Is the case relevant to the quintain?
- 2- Do the cases provide diversity across contexts?
- 3- Do the cases provide the opportunity to learn about complexity and context?

All eleven cases are relevant to the quintain. The author has assigned the quintain as *the role of creativity in maritime scenarios' effectiveness on scenario users* in this work.

The cases have provided diversity across contexts. Each scenario publication has made up a case. Each case has unique contextual differences, such as motivation in

exercising scenario planning and the scenario teams' and practitioners' backgrounds. All cases come from European entities, e.g., companies and governmental organisations. However, there are geographical differences. Furthermore, the participants' subjective creativity assessment has revealed various creative ideas across the cases – the scenarios.

The cases have provided an opportunity to learn since the participants have brought knowledge to the research that was not previously available through reviewing the literature and the author's subjective assessment of the scenarios for creativity. In addition, one participant has shared internal documents that are not accessible to the public.

Identification of the interview participants

The scenario teams of the cases are clearly stated in most scenario publications; however, there are instances where the scenario team members' names are not mentioned. The author has reached out to the organisations or publishers whenever that was the case. One study's³¹ scenario team is not accessible since the publisher of the scenarios - United Nations Economic and Social Commission For Asia And The Pacific – has not provided any means of communication. The remaining sixteen scenario teams are invited to the study by email or phone, whichever is available to the author (see Table 3.12). When the author has not heard back from the potential participants by email, reaching them by phone is also attempted. Given the travel restrictions due to the COVID-19 pandemic, visiting the scenario projects' scenario teams in person is impossible.

³¹ United Nations (2005) 'Regional Shipping and Port Development Strategies'.

NO	Name of the Publication	Publisher/ Author(s)
1	Analysis Of Recent Trends in EU Shipping And Analysis And Policy Support To Improve The Competitiveness Of Short Sea Shipping In The EU	European Commission Dg Mobility And Transport
2	Arctic Marine Shipping Assessment	Arctic Council
3	Blue Growth – Drivers and Alternative Scenarios for the Gulf of Finland and the Archipelago Sea~ Qualitative Analysis Based On Expert Opinions	The Centre For Maritime Studies Brahea Centre At The University Of Turku
4	Blue Growth~ Scenarios And Drivers For Sustainable Growth From The Oceans, Seas And Coasts / Scenarios For Selected Maritime Economic Functions	Ecorys, Deltares, Oceanic Development
5	Coronavirus, Climate Change & Smart Shipping Three Maritime Scenarios 2020 – 2050	Martin Stopford
6	Global Marine Fuel Trends 2030	UMAS
7	Global Marine Trends 2030	UMAS
8	Global Scenarios 1998–2020	UMAS
9	Low Carbon Pathways 2050	UMAS
10	Maritime Trend Report Observations And Perspectives On The Future Of The Maritime Industry	Danish Ship Finance - Rainmaking
11	New Lens Scenarios~ A Shift In Perspective For A World In Transition	Shell
12	Regional Shipping And Port Development Strategies	United Nations Economic and Social Commission For Asia And The Pacific

13	Scenarios for Maritime Areas 2050 Preparation Of Scenarios For The Future Of Finnish Maritime Areas	Maritime Spatial Planning Finland
14	Scenarios For The Development Of Maritime Safety And Security In The Baltic Sea Region	The Centre for Maritime Studies University Of Turku
15	Shell Energy Scenarios To 2050	Shell
16	Shipping Scenarios 2030	Wartsila
17	Sky, Meeting The Goals Of The Paris Agreement	Shell
18	Global Scenarios 1998–2020	Shell
19	Study On The Analysis And Evolution Of International And EU Shipping	University of Antwerp - Maritim-Insight - Panteia - Significance - Pwc
20	Updating The Future	Port of Rotterdam - Club of Rome Climate Programme
21	Groningen Seaports	Groningen Seaports
22	AHOY2050 - MAN	Fraunhofer
23	Technological Trajectories And Scenarios In Seaport Digitalisation	University of Turku

Table 3. 12: List of scenario publications' names and the publishers/ scenario teams who are invited for an interview

Source: Author's systematic review

Staffing

The author is the sole researcher responsible for conducting this research. No other researchers are involved at any point during the research process.

Access and Permissions

Most data gathering activities for case study research require at least some invasion of personal privacy (Stake, 1995). The University of Strathclyde's ethical approval was sought and received according to the relevant regulations. Additionally, before conducting the interviews, data protection-related procedures, such as GDPR and data management, were followed, completed, and approved by the University of Strathclyde's Ethics Committee – University Ethics Committee (UEC). The lawful basis for processing data in this work is public task.

The procedure involved preparing an introductory letter to send to the potential participants. The letter, in essence, introduced the author and his supervisor, the nature of the research and further information on data processing law and the ethical approval of the research. An access proposal is prepared to formally invite the potential participants to the study. It can be found in Appendix 3.

Data Collection: Crafting an Interview Procedure

According to Jones (1985, in Easterby-Smith, 2018), the first problem the researchers should tackle is deciding how much structure to put in the interviews. Unstructured, semi-structured, and structured interview techniques are the three main interview types available to the researchers (Easterby-Smith, 2018; Bell, Bryman and Harley, 2018).

Semi-structured interview type is chosen for data collection. During the interview questionnaire formulation, recommendations given by Payne (1965) are taken into consideration. The interview questionnaire can be found in Appendix 4. A pilot interview application is conducted with three doctoral students familiar with scenario planning. The pilot interviews were based on a scenario planning project outside the scenarios sampled in this doctoral work. Two of the pilot study participants were involved in that scenario project. Therefore the pilot interview application has imitated the application of the interviews in terms of the scenario team's involvement in an actual scenario project. The third pilot interview participant was familiar with scenario planning projects but was not involved in the chosen scenario project. Nevertheless, his contribution to the pilot interview gave the researcher valuable insights. Based on the feedback from the pilot interviewees and the author's observations on the following elements:

- Do the interviewees clearly understand the questions?
- Is the flow of the questions logical, and do the interviewees remain focused on the questionnaire?
- Does the questionnaire probe into the aspects of scenario planning as expected by the author?

The questionnaire was updated and finalised based on the pilot interviews. In addition, the pilot interview participants also provided the author with useful tips and suggestions. For instance, one participant stated that the interview should emphasise the scenario teams' *experience* in the scenario planning project.

Table 3.13 presents the participating interviewees' roles in SP, the project names and interview types and durations.

Data Analysis

Before conducting a qualitative coding analysis of the interviews, the guidelines provided by Stake (2006) are followed. The author has also familiarised himself further by reading Stakian case study applications published in peer-reviewed journals, such as Fearon, Hughes and Brearley (2021); Greenwood and Suddaby (2006). Figure 3.8 illustrates the steps of data analysis in detail.

Case level analysis

After completing the interviews, the author has prepared an individual case report using a worksheet provided by Stake (2006). The worksheet is applied for each case, eleven cases in total. Figure 3.9 illustrates the graphic design of a case study worksheet application for the study "Scenarios for the Selected Maritime Economic Functions – Blue Growth" study (Wolters *et al.*, 2013).

The worksheets have later allowed for standardising the generated individual case reports. Participant interviews, scenario publications and detailed scenario planning reports are consulted throughout the process.

	Study Name	Scenario Type	Interviewee Role	Interviewee Role	Interviewee Role	Duration	Duration	Duration
1	Blue Growth – Drivers and Alternative Scenarios For the Gulf of Finland	Policy Intuitive Logics (similar to)	Scenario Team (1/2) Facilitators (1/3) (Group Interview)	Scenario Team (2/2) Facilitators (2/3) (Group Interview)	N/A	148 Minutes (Group Interview)	N/A	N/A
2	Blue growth- Scenarios and drivers for sustainable growth from the oceans, seas and coasts	Policy Intuitive Logics	Scenario Team Member 1 Facilitator 1	Scenario Team Member 2 Facilitator 2	N/A	STM, Facilitator 1 63 Minutes	STM, Facilitator 2 55 Minutes 25 Minutes add on	N/A

3	Maritime Trend Report Observations and perspectives on the future of the maritime industry	Future Innovation Discovery Single Scenario Development Based on Desk Research	Senario Team Member 1	N/A	N/A	59 Minutes	N/A	N/A
4	Scenarios For Maritime Areas 2050	Policy Intuitive Logic (similar to)	Scenario Team Member (STM), Facilitator	Practitioner/ Scenario user (SU)	N/A	STM, Facilitator 58 Minutes 70 Minutes	Practitioner/ SU 1 Hour 25 Minutes	N/A

5	Shipping scenarios 2030	Corporate Strategy Intuitive Logics (similar to)	Scenario Team Member (STM), Facilitator	Practitioner, Scenario User	Internal Expert Contributed by interview to the scenarios	STM, Facilitator 80 Minutes	Practitioner/ SU 57+21 Minutes add on	Internal Expert 46 Minutes
6	Study on the analysis and evolution of international and EU shipping	Policy	Scenario Team Member	N/A	N/A	33 Minutes	N/A	N/A
7	Groningen seaports	Corporate Strategy	Practitioner/ Scenario user	N/A	N/A	55 Minutes + 25 Minutes add on	N/A	N/A

8	AHOY2050 - MAN	Corporate Strategy	Scenario Team Member/ Facilitator	N/A	N/A	60 minutes	N/A	N/A
9	Technological trajectories and scenarios in seaport digitalisation	Academic Research – Scenario complemented	Scenario Team Member 1	Scenario Team Member 1	N/A	82 Minutes group interview	N/A	N/A
10	Port of Rotterdam	Corporate Strategy Scenario implications based on Club of Rome	Scenario Team Member	N/A	N/A	51 Minutes	N/A	N/A

11	GMT 2030	Scenario Thinking	Scenario Team Member, Scenario User	Overseeing scenario development team, Scenario User	N/A	STM, SU 55 minutes	55 minutes	N/A
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Table 3. 13: List of participating interviewees, interview durations, projects and number of participants

Source: Generic case study participant table created by the author, illustrating the relevant data collection

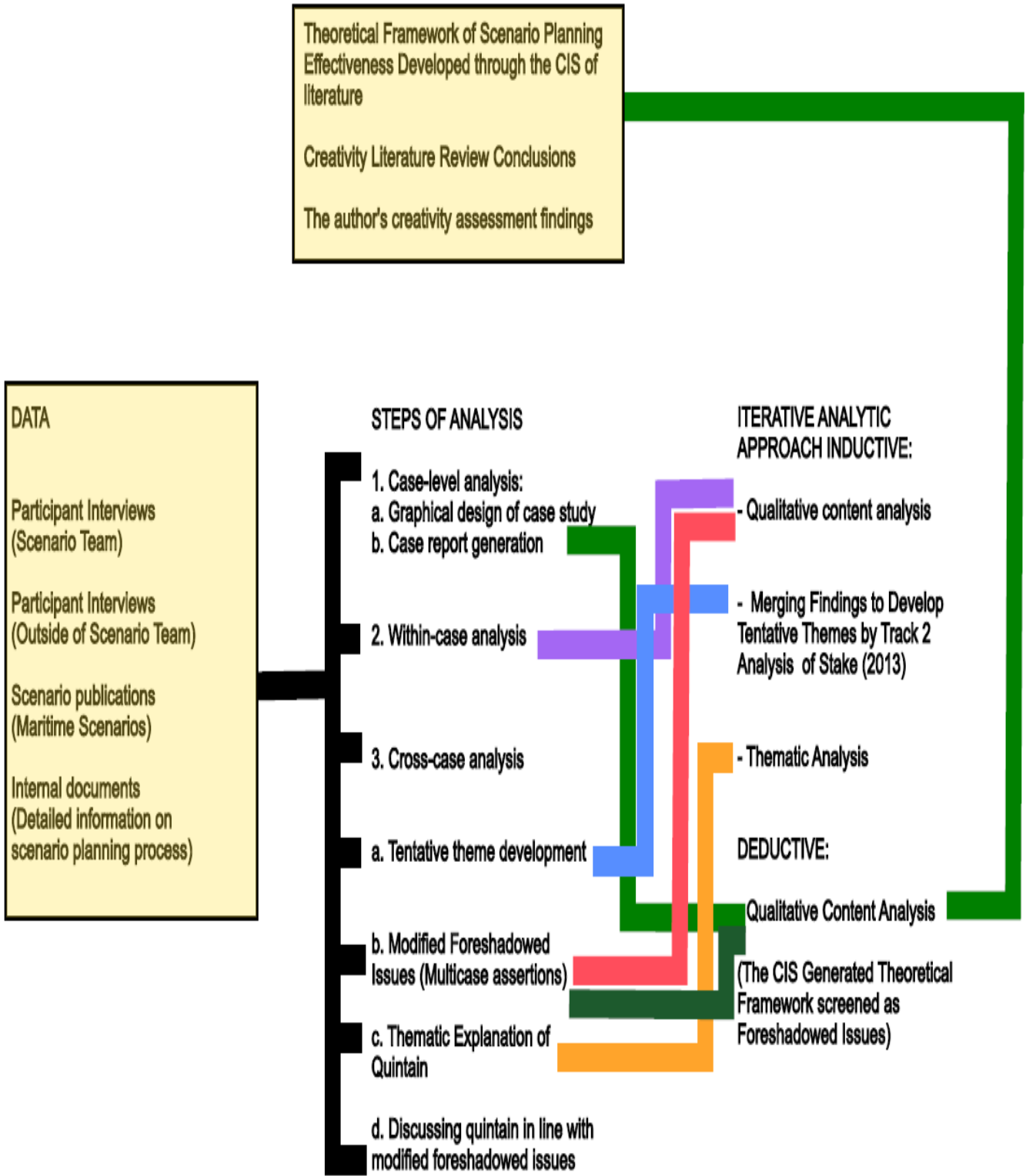


Figure 3. 8: Data analysis illustration

Source: Author's creative approach to data analysis in the multiple case study stage

The case reports consist of background information on the scenario publication; the pseudonymised names of the scenario team members, the implemented scenario planning approach³², e.g., IL, LP, and the context, e.g., timing of the SP, any extraordinary occurrence of an event in the world, e.g., financial crisis, the culture, e.g., organisational culture, the national culture.

The scenario development process is later explained in as much detail as the author has been provided.

The reports demonstrate the objective of scenario planning projects and the scenario team's perception of achieving the objectives. The issues the scenario team members have experienced in scenario planning are listed in all cases. The author also noted the scenario type, e.g., normative, exploratory, based on his interpretation of the data. The stages of scenario planning, participants being interviewed, and secondary sources contributing to the case study are illustrated in a simplified version of Stake' (2013, p.5) Worksheet 1. A worked example of the worksheet is presented in Figure 3.9. Other worked examples and case reports can be found in Appendix 8.

Within-case analysis

Research question 3 is answered by within-case analysis. The scenario team members' creativity assessment is revealed at this stage. Stake (1995, p. 39) explains that establishing "an empathetic understanding for the reader" is what qualitative research tries to accomplish sometimes through "thick description, conveying to the reader what experience itself would convey". Multiple perceptions of different actors, their attributes, relationships, and multiple realities can be demonstrated by thick descriptions (Stake, 2006, p. 83).

³² Not every scenario team had a clear idea on the type of scenario planning approach they followed. In those instances, the author reported the scenario school that he thought the scenario planning project appeared to be the closest.

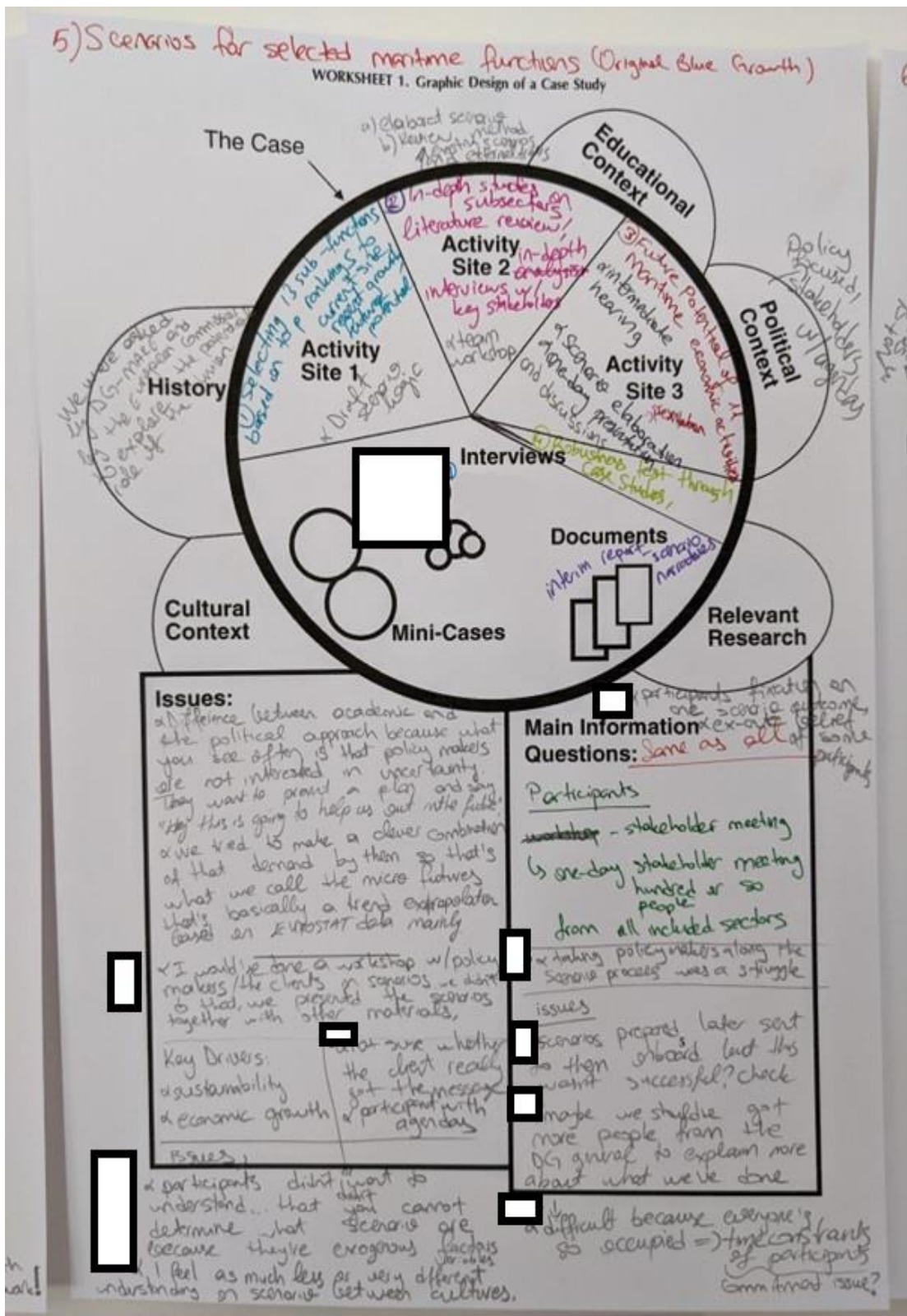


Figure 3. 9: Application of Worksheet 1 for case 6

Source: Reproduced from Stake (2006, p. 5)

Inductive qualitative content analysis is applied to the scenario teams' responses to the question inquiring into the creativity of the scenario narratives. The analysis has functioned to capture the participants' statements on the questions, and the excerpts contain their answers and explanations. The author has followed the format of Case [Number], [participant name], creative idea [name], and participant explanation. The format emerged during the analysis.

The same analysis method further has allowed for investigating the participant input on creativity outside the scenario narrative, e.g., scenario development process. A similar inductive coding approach has allowed for capturing the participants' responses. The author has followed the format of Case [Number], [participant name], [aspect of creativity], and participant explanation.

The findings are written up and presented case-by-base, drawing information from the case reports and the qualitative content analysis. The author's creativity assessment is then brought up and compared and discussed with the scenario team members' answers.

Triangulation within cases

Triangulation in multiple case research is the process of keeping misunderstandings to a minimum (Stake, 2006). In constructivist research, data collection is concerned with gathering diverse points of view, enabling a more profound understanding of a phenomenon. Triangulation should be an enabler of the "deeper understanding of a phenomenon (Fearon, Hughes and Brearley, 2021).

In this work, triangulation is achieved by choosing different data collection methods and data sources (Easterby-Smith, 2018). The creativity assessment of the author and the scenario teams' creativity assessment has led to a methodological triangulation. Different data sources, e.g., scenario publications, internal reports, mini-cases, and interviews, have led to data source triangulation. Additionally, the author has transcribed the interview scripts and sent them to the respondents for review. Most participants reviewed and made corrections to the interview scripts whenever necessary. Participants also had the opportunity to clarify some points they felt needed

further explanation. Those participants left notes in the interview transcripts, elaborating on points that they deemed possibly confusing or insufficiently clear.

Stake's (2013) viewpoint on triangulation follows the recommendations given by Denzin (1978)³³. The followings are achieved in the work:

- Using multiple observers on the same thing,
- Using multiple research methods, e.g., interview and document review, and
- Carefully examine to decide if the total descriptions lead to a prominent overview (Fearon, Hughes and Brearley, 2021; Stake, 2006)

Cross-case analysis

Cross-case analyses are conducted to discover and understand the quintain (Fearon, Hughes and Brearley, 2021). Several cross-case analyses are conducted in this work.

The first cross-case analysis is conducted on the within-case findings derived through applying the qualitative content analysis and individual case reports. The within-case findings focus on the scenario team's creativity assessment of the scenario narratives and the scenario development process. The first has led to concluding the exploration of the creativity of the scenario narratives. The latter has fed into the quintain – the role of creativity in scenario planning effectiveness.

Stake (2006) suggests three tracks for producing cross-case analysis, and the author has preferred Track 2 since the merged findings are more important than individual case findings. Worksheet 5B focuses more on the findings across cases rather than emphasising the individual case findings. Completing the worksheets for individual

³³ The author has not had access to the 2nd edition of the publication Robert Stake cited in his book, but an earlier and later edition are consulted, see Denzin, N.K. (1978) *The research act : a theoretical introduction to sociological methods*. New York: McGraw-Hill, Denzin, N.K. (2017) *The research act: A theoretical introduction to sociological methods*. Transaction publishers.

cases has further allowed for developing tentative assertions. The merged findings are written up and presented in Chapter 5, called tentative Assertions. The merged findings are bounded to the scenario teams' experience in the sampled maritime scenarios at this stage.

The second cross-case analysis has systematically allowed the author to modify the foreshadowed issues. Inductive and deductive qualitative content analyses are chosen for the analysis. Firstly, the author has looked for evidence deductively using the CIS theoretical framework and consequently captured the initial foreshadowed issues in the data. Secondly, inductive coding is pursued to identify phenomena that *a priori* framework has not captured. Similar categories derived from both approaches are collapsed into higher categories (Azungah, 2018, [no pagination]). The categories that have not shared similarities also are retained. The author has assessed the findings for relevance to the initial foreshadowed issues, their relationship to the quintain, and the utility of explaining the quintain. Finally, the author has finalised the modified foreshadowed issues that he has seen the most value in their explanation of the quintain.

The third cross-case analysis aims to develop a definition of creativity in the scenario planning context. Again, inductive qualitative content analysis is performed on the participants' responses to the relevant interview question, categorising responses systematically. Finally, the author interprets the findings and fleshes out a definition.

The last cross-analysis conducted in this work is an inductive thematic analysis. Unlike Stake's (2013) suggestions, the author has not developed the themes to answer the quintain based on his recommendations. Instead, the merged findings of within-case analysis have laid the grounds for the author to familiarise himself with the study's emergent narrative. Like Fearon, Hughes and Brearley (2021), the author has conducted a thematic analysis to answer the quintain. This analysis has utilised the parts of interview data in which the participants share their other scenario planning experiences. In the previous analyses, the author has only used the interview data in which the participants provided input exclusively on the scenario projects they were part of.

Data analysed in this stage involves the scenario team participants' other scenario planning experiences, allowing for a richer picture. All analyses are performed on Nvivo 12 following the interview transcription and the participants' corrections.

Triangulation across cases

The researcher has not found the recommendations given by Stake (2006) clear enough and mainly referred to other sources. Fearon, Hughes and Brearley (2021, pg. 4) interpret cross-case triangulation as “the broad, sceptical exploration of different perspectives and experiences of the quintain. It includes the author discussing the quintain with others, peers and critical persons inside and outside the case study.”

In this work, cross-case triangulation is achieved through interviews with the scenario teams and discussing the initial research findings with other researchers specialised in scenario planning.

The report

The results are reported according to the chosen research strategy in their designated chapters.

3.3.5. Quality Criteria for the Work

The author's research design choice has implications for the research quality. Positivist research is concerned with validity, reliability and generalisability. In this work, the constructionist interpretation of validity, reliability and generalisability (Easterby-Smith, 2018) is appropriate. Accordingly, the author is concerned with asking “have a sufficient number of perspectives been included?”(Easterby-Smith, 2018, p. 135), “will similar observations be reached by other observers?” (Easterby-Smith, 2018, p. 135), and is the sample sufficient regarding its ability to make inferences to other contexts (Easterby-Smith, 2018). The terms validity, reliability and generalisability are used in this section to accommodate the readers familiar with positivist research but not necessarily with constructionism.

First, the author conducts a modified systematic review for sampling research evidence and the CIS process of evidence synthesis in this doctoral work. CIS was questioned for validity, credibility, and generalisability. Accordingly, Dixon-Woods *et al.* (2006a, p. 39) state:

One of the distinguishing features of a CIS is its acknowledgement of the authorial voice: it does not claim to be a set of techniques that allows a 'reproducible' synthesis; instead, it recognizes the interpretive work required to produce an account of disparate forms of evidence and is explicit about this. It recognizes that alternative accounts of the same evidence might be possible using different authorial voices, but emphasizes that all accounts should be grounded in the evidence, verifiable and plausible, and that reflexivity will be a paramount requirement.

The author lays out the systematic sampling process in this doctoral work clearly. The data analysis and findings are also presented in a step-by-step fashion. Therefore, transparency is maintained by demonstrating the research process.

In qualitative research, "the researcher is the instrument" which means that "the credibility of qualitative methods" relates to the "skill, competence, and rigor of the person doing the fieldwork" (Patton, 2014, p. 67). The author previously conducted qualitative research and had experience in conducting interviews and thematic analysis. He also completed several general and qualitative specific research methods courses before attempting to collect and analyse data in this doctoral work. Additionally, the CIS of evidence is a highly iterative and sophisticated process. Therefore, the author gained further experience in qualitative research before the pilot and multiple case studies.

A generic qualitative research methodology is chosen for the exploratory pilot study. Researchers doing such research are concerned with presenting an accurate representation that "most people (including researchers and participants) observing the same event would agree is accurate" and an accurate representation of events that "participants would agree is accurate" (Sandelowski, 2000, pg. 336).

Similar to the CIS of research evidence, the author uses transparency in this part of the work to ensure that the research lends itself to scrutiny. Thick descriptions are used in this stage to allow the reader to form their own opinions and compare them with the author's interpretation of data. The author conducts TA to analyse the interview data and presents the findings thematically. Several scholars previously suggested reliability and validity assessment in the thematic analysis through "additional, independent reviewers to validate themes to indicate level of reliability of feedback across reviewers", however, this approach to TA is not commonly taken by researchers and is related to positivism (Neuendorf, 2018, p. 220). Instead, the author follows the approach of Braun and Clarke (2012) to TA. A step-by-step analysis approach to TA was presented earlier in this chapter. A snapshot of the thematic coding process was also provided in this chapter.

Finally, a multiple case study approach is chosen for the work. Stake offers different terminology for his approach to case study research, different from the positivist construct validity, external validity and reliability terms (Fearon, Hughes and Brearley, 2021).

Stake (2006) emphasises the importance of triangulation within cases and across cases to

- ensure the collected information and the interpretation is right,
- identify different realities,
- member checking, keep misunderstandings to a minimum,
- aiding the researcher to recognise that the case study might be far more complicated than it was initially thought to be, and
- satisfying the researcher's responsibility for ensuring the reader interprets the findings as intended – the validity of the interpretations of the readers.

Stake (2006) views within-case triangulation as related to validity and across-case triangulation as related to validity and credibility. Accordingly, validity is sustained in multiple case studies by following the suggestions made by Stake (2006). He suggests documentation and storage tips that are adopted in the research process. These are

briefly keeping a research diary, backing-up data, document versioning, keeping a clear list of participants, linking gathered data and writing to document storage such as notes, analyses, and sketches. The author has adopted a data management process and submitted it to the university as part of the ethical approval process. The produced analyses, drafts and notes were versioned and stored in their designated folders.

Triangulation is also a process of data gathering (Stake, 2006). The author triangulates secondary data, e.g. scenario publications and internal reports, with primary data. The primary data in this work is the interview with the scenario teams. Mini-cases also support the case studies.

Furthermore, the author of the multiple case study report is responsible for conveying the study findings accurately and bears responsibility for “the validity of the readers’ interpretations” (Stake, 2006, pg. 35). It is achieved by repeating the primary and critical findings and assertions in different ways. The author repeats the findings several times throughout the doctoral work, maintaining a logical chain between the within-case and cross-case findings and summarising the findings. The author also uses a metaphor to demonstrate the quintain findings supporting the readers’ understanding of the research findings.

Other means of triangulation are also employed. The followings are achieved in the work:

- Using multiple observers on the same thing,
- Using multiple research methods, e.g., interview and document review, and
- Carefully examine to decide if the total descriptions lead to a prominent overview (Fearon, Hughes and Brearley, 2021; Stake, 2006).

The author’s creativity assessment is triangulated with the scenario teams’ to achieve triangulation. Doing so allows for multiple perspectives on the same issue and enriches the findings in context and different understandings, drawing from experience.

Member checking (Leavy, 2014; Stake, 2006) is also utilised. It is applied by sending the interview transcriptions to the interviewees.

Validity in cross-case triangulation is related to “seeing whether the new views are consistent with what is already well known about the case” and the quintain (Stake, 2006, pg. 77). The process of triangulation is undertaken by interviewing the scenario teams and discussing the initial research findings with other doctoral researchers specialising in scenario planning.

Credibility is offered for qualitative inquiry by several researchers (Leavy, 2014; Denzin and Lincoln, 2017; Jenner *et al.*, 2004). However, it also “has proved harder to pin down and operationalise” (Flick, 2013, p. 498). Stake (2006, pg. 85) relates credibility to the case study researcher. He offers “even-handed treatment” and avoiding favouritism as two solutions. Accordingly, the researcher is responsible for presenting the findings of what is said and demonstrating “the negative side of the picture”. His suggestions are rooted in the idea that “there is no value-free science in this world” (Stake, 2006, pg. 85).

Following Stake’s suggestions, the author strives for even-handed treatment of the cases. Every case is constructed with at least one scenario project and, on average, two members of the scenario teams. The author follows a constructivist approach to this doctoral work. One of its implications is that each participant’s experience is equally valuable and worthy of consideration. The author also avoids any means of vested interest in the potential research findings. He maintains mental flexibility throughout the work, acknowledging that his previous understanding of a given issue or problem is constructed based on his desk research and experience in the social world, all of which are subject to revision throughout the data collection and analysis. His understanding of the issues evolves by conducting the research, and he sees value in utilising an iterative data analysis approach. The author also avoids hiding data and findings that do not map onto the research questions. Instead, he utilises unexpected findings to enhance the work. As a result, the reader receives an almost complete account of the case findings.

3.3.6. Conclusion

The chapter aimed to demonstrate an overview of management research, presenting the philosophical foundations of social science, competing methodologies and

methods in social research and revealed the philosophical stance of the work. The research was also discussed regarding quality. The work is grounded in constructivism. Therefore, the choice of methodologies, methods and research quality criteria adhered to constructivism.

The chapter presented the competing methodologies and methods in three concurrent stages of the research. Firstly, competing methodologies for reviewing the literature were presented. A systematic approach to reviewing the literature was chosen. The reason for the choice was the methodology's ability to review the literature in a systematised fashion. The systematic review was further enhanced by populating the literature review sample with purposive sampling. Finally, several methods of evidence synthesis were also considered for adoption. They were meta-ethnography, thematic analysis, CIS, framework synthesis, realist synthesis, (fs)QCA, Miles and Huberman's cross-case method. After reviewing the methods, the author decided to utilise CIS for evidence synthesis. The reason for choosing the method was its ability to critically synthesise a diverse range of evidence, e.g., qualitative and quantitative research evidence, and generate a theoretical framework to guide the doctoral work. Developing a theoretical framework would also lay the foundation for developing a middle-range theory.

For the pilot study, a generic qualitative methodology was chosen. The reason for the decision was its ability to investigate a new field of study and adhere to the philosophical underpinnings of the work related to qualitative research methodology. A generic approach also meant that theories did not encumber the investigation.

Competing methodologies and methods for the main research were presented and discussed in the chapter. Phenomenological, grounded theory, ethnographic, and case study research and their constructivist variants were evaluated for their fitness for the work. The author chose the case study approach as it was found to be flexible enough to facilitate the emergent design of the research, supporting the work in terms of answering the research questions, following a constructivist position.

Finally, the research design was discussed in terms of research quality. The terms validity, reliability and generalisability are usually used in positivism. Therefore, the

author has used their constructivist variants while assessing the work. The next section reveals the structure of the work before presenting the findings.

3.3.6.1. The Structure of the Work

The pilot study that was conducted before the creativity assessment of the scenarios is not presented in the main body. The reason for doing the study was to discover the relevance of conducting scenario planning research in the shipping industry, identifying a research gap that is not only relevant to the scenario planning literature but the maritime literature, too. Additionally, the author realised the strategy-making practices of the shipping stakeholders were not sufficiently reported. The findings are not revealed in the main body to sustain the focus of the work on the core issues, scenario planning effectiveness and the role of creativity in scenario planning effectiveness on scenario users. The reader can find the pilot study findings answering RQ 2:

How do shipping stakeholders make strategy?

in Appendix 2.

The study explored the shipping stakeholders' forward-looking practices, establishing that scenario planning was actively used in the industry and is a relevant research area to pursue from the industry's point of view. The research agenda developed following the CIS of the scenario planning effectiveness literature and the qualitative pilot study pointed out the necessity of inquiring into creativity. The author finally decided that investigating creativity in the scenario planning effectiveness context was a worthy research area to pursue.

Chapter 4 – the next chapter – presents the creativity assessment findings of the scenarios followed by the interpretation and discussion of the findings, answering RQ 3:

Are maritime scenarios creative?

Having presented the author's creativity assessment by applying deductive qualitative content analysis and discussing the findings, the work moves on to the remaining multi-case study findings.

Chapter 5 starts with presenting the within-case analysis findings answering the last research question – RQ 3 – from the scenario teams' perspective. The scenario team members assess their scenarios for creativity, giving examples of creative ideas in their scenarios. The within-case analysis findings also reveal another aspect of creativity in scenario planning: process creativity. The chapter later moves on to receiving the scenario team members' creativity definition and builds a definition of creativity in the scenario planning context. Finally, the chapter presents the cross-case findings answering RQ 4 – quintain – that is:

What is the role of creativity in scenario planning effectiveness on scenario users?

Chapter 4: Comparative Qualitative Content Analysis Findings

This chapter presents the author's creativity assessment of the sampled maritime and Shell scenarios. RQ 3:

Are maritime scenarios creative?

is answered based on the author's subjective creativity assessment. Two sets of future scenarios; the maritime and Shell scenarios are compared. The results of the analysis are presented in the next section. The author later lays out the findings which are then followed by interpretation and discussions.

4.1. Results of Qualitative Content Analysis of Creative Ideas

This section presents the results of QCA and begins by describing the categories, informing the reader about the category formation and their presence in two sets of cases (maritime and Shell). Therefore, the reader should first expect the presentation of results by categories and then by cases. This structure is chosen to provide a logical understanding of the nature of creativity dimensions as they appeared in the cases. In the continuation of this section, the focus is later turned to presenting the findings by cases. Following the guidelines offered by Schreier (2012, p.220) on presenting QCA findings, a combination of strategies is chosen. They are using continuous text, text matrices and additional data exploration, e.g. quantitative analysis findings.

Deductive content analysis is conducted to identify ideas with novelty, utility, and surprise – the three dimensions of creativity formed the categories. Following the guidelines, subcategories are developed throughout the coding stage. Content analysis has resulted in five subcategories for novelty, and three for utility and surprise. Subcategories do not differ across the two sets, but their frequencies do. The results are presented below. Figure 4.1 illustrates the categories and subcategories of the qualitative content analysis.

Category: Novelty

Sub-categories established for novelty in Set 1 Cases (Maritime Scenarios)

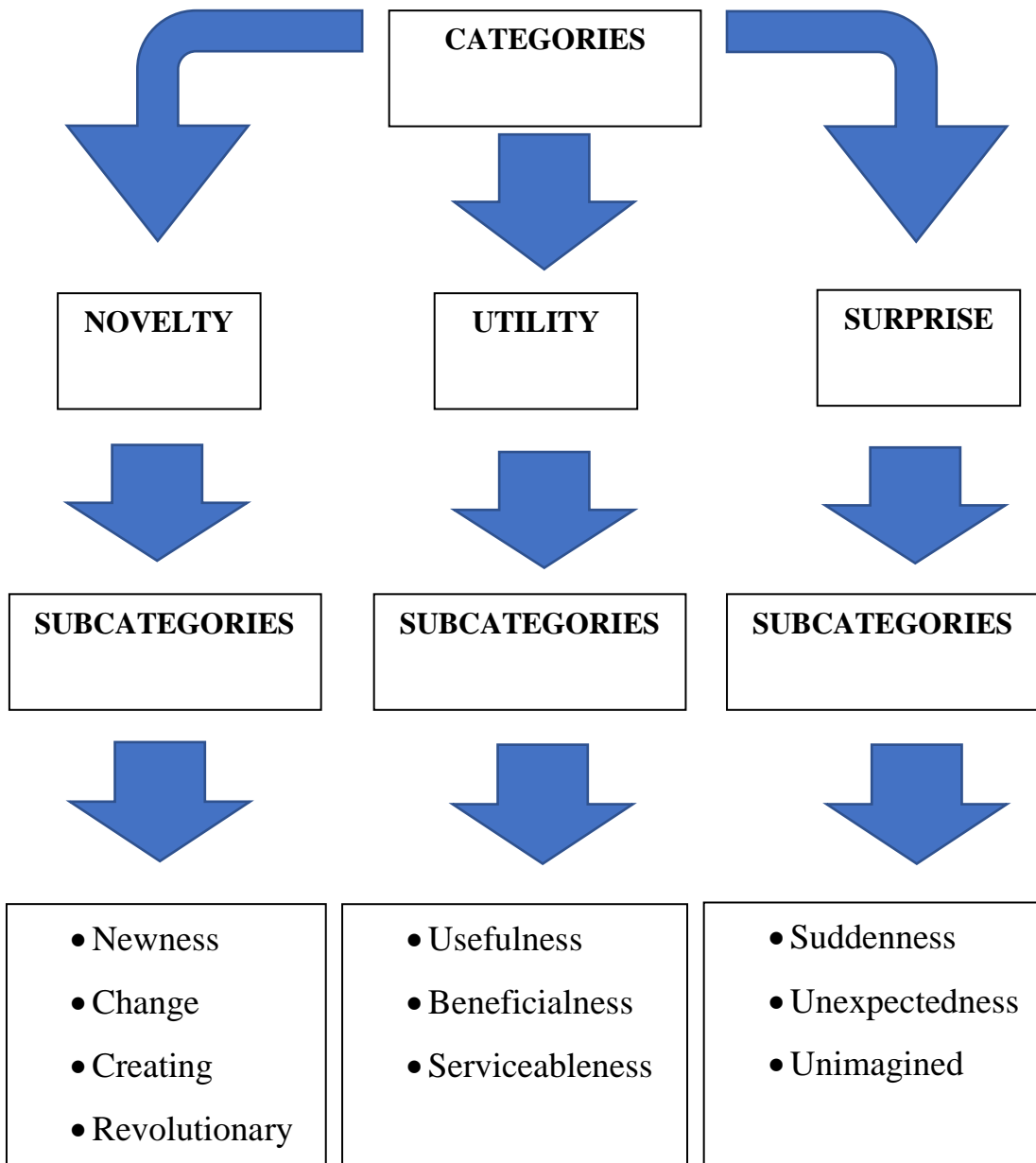


Figure 4. 1: Illustration of subcategories and their connected categories

Source: Author's data analysis of two sets of scenarios: the maritime and Shell scenarios

Newness contributed the highest to the category. Newness in the maritime scenarios was observed in the form of business models, vessel designs, cargo types, legislation and policies, products and services, tourism, energy types, technologies, safety threats, and competitors. The analysis also revealed a strong emphasis on energy types and their implication in the maritime industry. For instance, bioenergy farming, e.g. algae farming, hydrogen, LNG, wind energy use in vessels, Saharan solar to EU, synthetic natural gas and synthetic carbon-free fuels were presented. This was followed by the sub-category ‘**change**’. Scenario developers envisioned changes in behaviours, e.g. life-style, transport, tourism, culture, immigration patterns, legislations, and use of materials.

This sub-category also included “radical” changes and transformation. These were radical changes to the tax system, people’s approach to environmental issues and world order, and transformative clean coal technologies.

Two unfinalised sub-categories “creating” and “emerging” were initially considered separate and distinct. However, further articulation of the codes after iterations revealed that they were better suited together.

Finally, “**creating**” sub-category remained, encompassing previously labelled ‘emerging’ codes. Creating was constructed from subjects such as protected areas, digital eco-systems, political and economic unions, creation of the future of tourism by tourists and LCF infrastructures. “Revolutions” and “breakthroughs” were initially constructed as three separate sub-categories. The two were later merged together, creating revolutionary. **Revolutionary** futures in the scenarios were envisioned for ship energy and design, tax system in the form of new legislation, people’s approach to environmental issues, world order and energy exploitation. “Introduction” and “first time” were also two distinct sub-categories at the early stages of analysis. However, similar to the previous sub-category formation experience, “introduction” and “first time” were later merged together, and the sub-category “**First-time**” was kept. This sub-category was formed around intelligent cargo handling, China’s top-tier gas producer role, the decline of liquid fuels and 3D auto part printing. Table 4.1 summarises the results for Set 1 cases regarding the novelty category.

Category	Novelty				
Sub-category	Newness	Creating	Changing	Revolutionary	First-time
Topics	<ul style="list-style-type: none"> • Energy era • Policies and legislations • Business models • Tourism • Safety threats • Ship design and material use • Cargo types • Technologies 	<ul style="list-style-type: none"> • Protection areas • Digital eco-systems • Political economic union • Future of tourism by tourists • LCF infrastructure • New institutions • Connected logistics including shipping 	<ul style="list-style-type: none"> • Life style • Transport • Tourism • Consumer behaviour • Work-life balance • Environment and sustainability • Attitudes of politicians and citizens • Immigration Patterns • Tax system, Legislations • World order 	<ul style="list-style-type: none"> • Onboard systems • Ship energy • Zero carbon propulsion • Tax systems • World order • Energy exploitation • Approach to environmental issues 	<ul style="list-style-type: none"> • Decline of liquid fuels • Top tier gas producer (China) • Intelligent cargo handling • 3D auto part printing

Table 4. 1: A summary of the sub-categories forming novelty and associated topics in Set 1 Cases maritime scenario

Source: Author's data analysis of the scenarios in Set 1

Sub-categories established for novelty in Set 2 (Shell Scenarios)

The same sub-categories as in set 1 captured novelty in Shell scenarios.

Newness contributed the highest to the category. Newness in Shell scenarios was observed predominantly in energy sources and use. For instance, hydrogen use for aviation, an LNG dominant future such as LNG trucks, second gen biofuels, new energy storage systems, and integration of hydrogen with electricity systems were envisioned. Newness also appeared in policies, vehicles, resource extraction capabilities, business models and revenue generation sources, governing models, and empowered societies through digitalisation.

Newness was followed by **creating**. The sub-category creating was constructed including two initial sub-categories ‘emerging/emergence’ and ‘formation’. The latter two appeared to fit in under ‘creating’ and included in, rather than forming their own individual sub-categories. “Creating” covered topics such as such fresh political positions, European Renaissance, political mechanisms, global energy institutions, leaders, markets, response to energy security, a gas backbone, and a transnational, cosmopolitan elite.

The next sub-category was **change**. Changes were envisioned in behaviours, international debates, economic ambitions, perceptions towards human resources, and the role of corporate leaders. The **first time** sub-category was created after recognising the first time occurrence of events in the scenarios. This sub-category included ‘introducing/ introduction’ which was initially considered as a standalone sub-category but later included in “first time”. First time included the decline of liquid fuels and China being the top tier gas producer, local energy production, and Co2 pricing.

The last sub-category was **revolution**. Revolution was envisioned in energy efficiency, institutions, and energy industry policies. Table 4.2 summarises the results for Set 2 cases regarding the novelty category.

Category	Novelty				
Sub-category	Newness	Changing	Creating	Revolutionary	First-time
Topics	<ul style="list-style-type: none"> • New energy era • First and second gen bio fuels • LNG dominant future, e.g. LNG trucks • Integration of hydrogen • Methane hydrates • Hydrogen electrolysis • Policies • Energy Storage • Vehicles • Resource extraction capabilities • Business models/ Revenue generation models • Empowered societies 	<ul style="list-style-type: none"> • Behaviours • International debates • Economic ambitions • Perceptions to human resources • Corporate leaders' roles • Through emphasis on diversity • Shift in perception (we're in this together) 	<ul style="list-style-type: none"> • European Renaissance through Reformed Politics • Mechanisms • Fresh Political Positions • Global Energy Institutions • New type of Leaders • Minilateralism • Markets • Political Response to Energy security • Transnational cosmopolitan elite • Gas backbone 	<ul style="list-style-type: none"> • Radical policies for energy efficiency • Reforms in institutions • Transforming energy industry 	<ul style="list-style-type: none"> • Decline of liquid fuels • China top tier gas producer • Co2 pricing • Local energy production

Table 4. 2: A summary of the sub-categories forming Novelty and associated topics in Set 2 Cases maritime scenario

Source: Author's data analysis of the scenarios in Set 2

Category: Utility

Utility was observed the highest number in both sets of scenarios. The sub-categories for utility were usefulness, beneficialness and serviceableness. 223 excerpts in utility dimension were formed with the word “lead/led”. This was not an expected observation before conducting the analysis. Another word functioning in a similar way to “lead/led” in coding was “make/made” with 18 occurrences. The researcher did not have a preconception of how utility might manifest itself in the scenarios. However, during the coding stage, logical connections in the scenarios that functioned as a link to cause and effect, e.g., an event leading to another, an idea leading to another, were observed repetitively and in high numbers, which contributed to subcategory formation.

Sub-categories established for utility in set 1: maritime scenarios

The sub-category **usefulness** contributed the highest to utility, covering fundamental, practical, and pragmatic ideas for the future where there was no specific focus on serviceableness or beneficialness. Usefulness was present in the form policy support, technological advancements, increased spending on R&D for innovation, behavioural changes, efficiency orientedness, collaboration and cooperation, digitalisation, establishments and improvements of infrastructures and superstructures. These led to reduced costs, profitability, an improved outlook on sustainability, climate change and the maritime industry. It is also worth mentioning that not all useful elements in the scenarios came from genuine interests in the common good. Scenario developers envisioned pragmatic and self-interest seeking players in the industry. These players’ actions were self-serving. For instance, the use of LNG was anticipated to be adopted in a scenario mostly because its lower fuel and maintenance costs, not for its eco-friendliness. Another example of this was making a large number of bilateral agreements. The agreements were thought to be made between ‘pragmatic self-interest seeking nations and blocks’.

The sub-category **beneficialness** was initially named fitness for desirable end following the definition of utility. This sub-category captured desired future actions and events. The emphasis on desired futures and how those futures were thought to be

achieved were apparent and abundant in the scenarios. The name change was later decided due to convenience. In this sub-category, opportunities for people and businesses were pictured. Developments and improvements in various aspects such as inter-modal transportation, marine tourism, marine aquaculture, creation of jobs, new business models, peoples' well-being and climate change were imagined.

The last sub-category, **serviceability**, was constructed around statements where future actions were noticeably capable of being applied to their resulting events. Scenario extracts such as:

- “through permit availability, Co2 offset purchasing is to be made available”,
- “shipping companies use old ships to reduce costs” and,
- “easy storage and usability of fossil fuels makes them advantageous over other fuel types”

formed this sub-category.

Overall, serviceability included future visions about alternative energy sources and their production; energy policies and advancements in cleantech; behavioural changes and their supporting role on climate change and energy security; openness in data sharing, borders and closer collaboration leading to improved learning and trade among countries.

Sub-categories established for Utility in set 2: Shell scenarios

Utility in Shell scenarios were analysed, and the three sub-categories; usefulness, beneficialness and serviceability, captured various future ideas and events.

Usefulness consisted of fundamental, practical, and future pragmatic behaviours such as making decisions about societal and inter-country integration for the common good and politicians' pragmatic approach to local and international affairs. Examples for the latter were:

- “pragmatic inter-state engagements when there is benefit rather than globalisation”, and,

- “pragmatic policies of governments not only protect the jobs but also vested interests”.

This sub-category included the development of new institutions to solve issues such as domestic and international markets and setting standards. Technological advancements in energy exploitation and production offered different pathways for the future. Alternative energy types such as bioenergy and solar power saw an uptake in some scenarios. In contrast, fuel and gas remained on top of energy types in others. Price surge, policy support and behavioural changes were the main trend changes. In some scenarios, steep traditional energy prices led the transitioning process to alternative energy types. However, an opposite situation was also envisioned. Fuel and gas remained vastly available and cheaper than alternative energy types and continued to be used. Policy support was envisioned for sustainability, economic growth and the future of energy development and consumption. Co2 pricing was mentioned several times and considered a solution for Co2 emission. Technological advancements such as carbon capture storage paved the way for future electrification, and EVs got more common.

Beneficialness in Shell scenarios were framed around service and product differentiation to reach out to customers; valuing diversity and creativity in human resources for problem-solving, growing businesses as well as empowering entrepreneurs for the establishment of new and successful companies; societal and political influence on policies to achieve GHG targets, sustaining the status quo, protecting jobs; transitioning factors such as customer acceptance and commercial demand increasing bioplastic production; reforms that led to what was deemed desirable, e.g. unlocking productivity in broader sectors, and promoting fast, inexpensive and effective learning.

Serviceability in Shell scenarios was constructed around statements where future actions were capable of being applied to their resulting events. Extracts such as:

- “social media assists local issues by supporting them”,
- “new gas grids are upgradable to hydrogen”,

- “success in carbon capture storage enables coal to be reintroduced later”

formed this sub-category. Overall, serviceability included:

- future visions about changing governance styles, e.g., centralisation of power for agile action taking and unilateralism for efficient management,
- establishment of infrastructures and superstructures, e.g. hub and spoke centres to assist energy transition in transportation and,
- advancements in science and technology leading to a gas-dominant energy future.

Improvements in gas production, capture and storage and consumption were also envisioned. These allowed for reintroducing coal at a later stage and constructing an appropriate backbone for hydrogen use.

Category: Surprise

Surprise was the rarest dimension of creativity in both sets. Three sub-categories were created: suddenness, unexpectedness and unimagined.

Subcategories established for surprise in set 1 (Maritime Scenarios)

Suddenness emerged in the analysis after recognising the patterns that indicated a sudden occurrence of events. The scenario extracts coded as sudden were not surprising because they were unexpected or unimagined before. However, the timing of their occurrence was surprising. Examples of suddenness are:

- the progression of climate change faster than predicted,
- the recession of Arctic ice being slower than predicted, and
- service robots disrupting unskilled labour and taking their jobs. Nine codes contributed to this sub-category.

Twenty-two extracts formed the second sub-category: **unexpected**. This sub-category was formed around a general sense of unexpectedness of an idea and more specific conditions such as future events leading to unexpected consequences. Some examples are extreme weather, rain reducing salt content and hindering living conditions, deep

water explorations causing tankers to suffer heavy losses, loss of shipping revenues, and over-regulation of maritime safety causing frustration and compliance issues.

Unimagined was the last-category forming surprise. This subcategory was identified ten times in the data. Ideas that were not previously imagined before and turned out to be actionable possibilities formed ‘unimagined’. For example, the following extracts were included:

- Wind propulsion for vessels - because the reintroduction of wind power to modern vessels was considered impossible from a feasibility point of view by the researcher-
- the establishment of an Islamic Economic Region resulting in massive turmoil,
- the establishment of a global currency regime, and
- Russia joins NATO.

Subcategories established for surprise in set 2 (Shell Scenarios)

The same three sub-categories that formed surprise in maritime scenarios also captured the surprising ideas in Shell scenarios.

Suddenness was observed in only two cases: the sudden imposition of energy standards and transnational elites getting wealthier and influential despite the tension. The latter code was considered sudden given the time horizon of the scenario; the researcher did not expect it to happen as soon.

Unexpected was the most common sub-category in Shell scenarios. Fourteen unexpected ideas contributed. Some examples were:

- despite the anticipation, gas growth remains modest, leading to coal maintaining its strong role,
- despite several adverse events and decisions, there is shining strength,
- reforms turn into vested interests and paralyse further reform,
- expansion of core minilateral groups leads to an explosive collision.

Two extracts were labelled **unimagined** and formed the sub-category. Although global gas producers increase their share, new resources create a new world order of gas producers; and extraordinary warming potential of new gasses.

Findings of matrix coding query

As presented so far, qualitative content analysis of set 1 and set 2 scenarios revealed ideas that have three dimensions of creativity. The next stage was identifying the extracts with all three dimensions. Firstly, a matrix coding query was run in Nvivo, looking for matches in the extracts that were both labelled novelty and utility. After this, the next step was hand searching for matches between ‘novelty and utility’ and surprise.

This step identified seven out of eighteen maritime scenario publications and two out of four Shell scenario publications that had creativity.

In set 1, 123 extracts indicated novelty, 683 utility and 43 surprise. 44 had both novelty and utility. This number went down to 13 when surprise was also sought after. 11 scenarios did not produce any creative ideas (See Table 4.3)

In set 2, 47 codes had novelty and utility. This number went down to 3 with surprise. 2 scenario publications did not produce any creative ideas (See Table 4.4).

NO	Name	Author and Year	Word count	Author and Year				
				N ³⁴	U ³⁵	S ³⁶	NXU ³⁷	NXUXS ³⁸
1	Regional shipping and port development strategies: container traffic forecast	ESCAP and Cooperation (2005)	973	0	4	0	0	0
2	Arctic Marine Shipping Assessment	Arctic Council (2009)	733	1	12	2	1	0
3	Shipping scenarios 2030	Wärtsilä Corporation (2010)	965	8	30	0	3	0

³⁴ Novelty

³⁵ Utility

³⁶ Surprise

³⁷ Both novelty and utility identified

³⁸ Novelty, utility and surprise observed: creative

4	Port Vision 2030	Groningen Seaports (2012a)	637	6	4	1	2	1
5	Scenarios for the Development of Maritime Safety and Security in the Baltic Sea Region	Storgård <i>et al.</i> (2012)	1274	0	25	4	0	0
6	Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts	DG Mare (2012)	2,052	1	26	0	0	0
7	Updating the future	Akker <i>et al.</i> (2013)	670	0	9	0	0	0
8	Global Marine Trends	Fang <i>et al.</i> (2013)	7,645	12	27	11	9	6
9	Global marine Fuel Trends	Smith <i>et al.</i> (2014)	1,949	3	23	1	2	1
10	Study on the analysis and evolution of international and EU shipping	Artuso <i>et al.</i> (2015)	4,242	4	46	0	2	0
11	Analysis of Recent Trends in EU Shipping and Analysis and Policy Support to Improve the	European Commission DG Mobility and Transport (2015)	4,575	0	12	0	0	0

	Competitiveness of Short Sea Shipping in the EU							
12	Low Carbon Pathways 2050	Lloyd's Register (2016)	2,483	5	16	0	0	0
13	MARITIME TREND REPORT	Danish Ship Finance and Rainmaking (2018)	2,046	15	7	1	1	1
14	Blue Growth—Drivers and Alternative Scenarios for the Gulf of Finland and the Archipelago Sea: Qualitative Analysis Based on Expert Opinions	Pöntynen and Erkkilä-Välimäki (2018)	4,101	22	129	5	10	2
15	AHOY2050- Scenario Study	MAN Energy Solution and Fraunhofer ISI (2019)	3,939	15	35	1	4	1

16	SCENARIOS FOR MARITIME AREAS 2050 Preparation of scenarios for the future of Finnish maritime areas	Maritime Spatial Planning (2020)	16,605	17	235	16	9	0
17	Coronavirus, climate change & smart shipping– Three maritime scenarios 2020–2050	Stopford (2020)	1,860	10	33	0	0	0
18	Technological trajectories and scenarios in seaport digitalization	Inkinen, Helminen and Saarikoski (2021)	3,549	4	10	1	1	1
SUM				123	683	43	44	13

Table 4. 3: Set 1 Cases – Breakdown of ideas with novelty, utility and surprise, N stands for novelty, U for utility and S for surprise. NXU indicates an idea being both novel and with utility, NXUXS indicates an idea being novel, with utility, and surprising.

Source: Author’s data analysis findings of the Set 1 Cases-Scenarios

No	NAME	Author and Year	Word count						N X U X S
				N	U	S	N X U	S	
1	Global Scenarios 1998-2020	Shell (1998)	2,680	15	22	2	7	0	
2	Shell Energy Scenarios to 2050	Shell (2008)	4,564	17	58	6	15	1	
3	New Lens Scenarios: A shift in perspective for a world in transition	Shell (2013)	14,832	37	118	13	22	2	
4	Sky, Meeting the goals of the Paris agreement	Shell (2018)	4,674	11	33	1	3	0	
SUM			26,750	80	231	22	47	3	

Table 4. 4: Set 2 Cases – Breakdown of ideas with novelty, utility and surprise, N stands for novelty, U for utility and S for surprise. NXU indicates an idea being both novel and with utility, NXUXS indicates an idea being novel, with utility, and surprising.

Source: Author’s data analysis findings of the Set 2 Cases-Scenarios

Analysis further revealed that utility was the most common dimension of creativity in set 2. 231 extracts in Shell scenarios indicated usefulness, and 80 codes indicated novelty. The surprise dimension of creativity was fewer with 22. 47 codes had both novelty and utility. When surprise was factored in, the number further decreased to 3.

Phasing out Creative Ideas Through Timeline Construction

Seven maritime and two Shell scenario publications and their associated creative ideas were listed in a table chronologically and searched for overlaps. All creative ideas were distinct from each other. Three creative ideas focused on wind energy, however, the researcher did not evaluate the ideas the same. Two creative ideas were about the wind turbines and the envisioned creative changes in the technology. The researcher perceived the changes as distinct from each other. The third creative idea was about wind-powered vessels.

Descriptive Statistics of Cases

Two sets of scenario publications were analysed for creative ideas. In set 1, 18 maritime scenario publications produced 58 scenarios in total. In set 2, 4 Shell scenario publication developed 7 scenarios.

In set 1, updating the future study (Akker *et al.*, 2013) was the shortest with 670 words. In contrast, the most extended scenarios came from Maritime Spatial Planning (2020) with 16,605 words. The oldest scenario study in the set was published in 2005, and the most recent was in 2021. The majority of the scenario studies in the set offered three to four different scenarios. Maritime Trend Report (Danish Ship Finance and Rainmaking, 2018) was an exception as they produced only one scenario.

Global Scenarios 1998-2020 (Shell, 1998) was the oldest and shortest in set 2. Over the years, Shell scenarios increased in word count.

	Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Set 1	Word count	18	3349.889	3778.797	637	16605
Set 2	Word count	4	6687.5	5505.25	2680	14832

Table 4. 5: Descriptive statistics of two sets of case studies by word count

Source: Author's data analysis findings of Set1 and Set 2

Descriptive statistics of two sets revealed that set 1 and set 2 case studies had similar maximum word count in terms of scenario length. However, minimum numbers differed vastly. Lower standard deviation of set 1 case studies indicated that the scenarios in set 1 were closer to the mean than in set 2 (See Table 4.5).

Cross case and cross set comparisons

So far, a subjective evaluation of creativity in two sets of future scenarios through qualitative content analysis established its presence in the scenarios. Overall, utility was the most common creativity dimension. This was followed by novelty and surprise. However, only a few extracts were coded with both novelty and utility. The number decreased further when surprise was added into the equation.

Although creativity assessment is made following the NXUXS approach (Simonton, 2012), NXU results are also provided to the reader. This is because the researcher is aware of the presence of different creativity definitions in the literature, and considered that presenting NXU formula results can be useful for those who follow the two dimensional definition.

Table 4.6 illustrates the distribution of creativity dimensions and creative ideas between cases in each set and a cross-comparison of the two sets. Calculations were made to reveal which cases in the sets produced the highest and lowest creativity dimensions and creative ideas. The table was formed by merging the results for both sets, following the same logic in the calculation. Minimum value 0 indicates that novelty and surprise during the coding stage was not identified. As a result, some cases did not produce any creative ideas based on the researcher's subjective assessment. Mean, and standard deviation were calculated to identify the sets' closeness to the mean values of creativity and creativity dimensions.

	Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Set 1	Novelty	18	6.83333	6.836322	0	22
Set 2	Novelty	4	20	11.6046	11	37
Set 1	Utility	18	37.94444	56.69575	4	235
Set 2	Utility	4	57.75	42.89814	22	118
Set 1	Surprise	18	2.38889	4.367512	0	16
Set 2	Surprise	4	5.5	5.446712	1	13
Set 1	Novelty	18	2.44444	3.381998	0	10
Set 2	X Utility	4	11.75	8.460693	3	22
Set 1	Novelty	18	.722222	1.447332	0	6
Set 2	X Utility X Surprise = Creativity	4	.75	.9574271	0	2

Table 4. 6: Breakdown of novelty, utility, surprise and creativity results between and across two sets

Source: Author's data analysis findings of Set1 and Set 2

Cross-case comparison results

The following cross-case-comparison results are obtained for set 1:

- The highest novelty generating case was number 14 (Pöntynen and Erkkilä-Välimäki, 2018) with 22 novel ideas. Novelty was not identified in four cases: No:1 (ESCAP and Cooperation, 2005), No:5 (Storgård *et al.*, 2012), No: 7 (Akker *et al.*, 2013) (European Commission DG Mobility and Transport, 2015) and No: 11 (European Commission DG Mobility and Transport, 2015).

- The highest utility generating case was number 16 (Maritime Spatial Planning, 2020) with 235 excerpts, and only 4 excerpts were associated with utility in case 4 (Groningen Seaports, 2012a).
- Surprise was observed again highest in case 16 (Maritime Spatial Planning, 2020) with 16 codes. However, the analysis also revealed no identification of surprise in 8 cases. These were: No:1 (ESCAP and Cooperation, 2005), No: 3 (Wärtsilä Corporation, 2010), No:6 (DG Mare, 2012), No:7 (Akker *et al.*, 2013), No:10 (Artuso *et al.*, 2015), No:11 (European Commission DG Mobility and Transport, 2015), No:12 (Lloyd's Register, 2016), and No: 17 (Stopford, 2020).
- Highest number of NXU result came from case 14 (Pöntynen and Erkkilä-Välimäki, 2018). Expectedly, based on zero novelty and surprise scores of several cases in the set, NXU was not identified in 7 cases (DG Mare, 2012; ESCAP and Cooperation, 2005; European Commission DG Mobility and Transport, 2015; Lloyd's Register, 2016; Storgård *et al.*, 2012; Akker *et al.*, 2013; Stopford, 2020).
- Finally, case 7 (Fang *et al.*, 2013) had the highest number of creative ideas following the NXUS formula. It was an unexpected outcome since the trend toward the final calculation was pointing out case 16 and case 14.

Cross case comparison results for set 2 are as follows:

- Highest novelty generating case was number 21 (Shell, 2013) with 37 excerpts, and the lowest was case number 22 (Shell, 2018) with 11.
- Highest number of utility was found in case number 21 (Shell, 2013) and the lowest was case number 19 (Shell, 1998).
- Case number 21 (Shell, 2013) had 13 excerpts that caused surprise - the highest number in its set – and the lowest number of surprise was found in case 22 (Shell, 2018) with only one excerpt.
- NXU calculations resulted in positive digits for all cases in set2. Case number 21 (Shell, 2013) produced the highest number of excerpts with novelty and utility. For case number 22 (Shell, 2018), this number was 3.
- Finally, NXUS calculations resulted with 0 at minimum - Case number 19 (Shell, 1998), and 22 (Shell, 2018) - and 2 at maximum number (Shell, 2013) of excerpts that were found creative.

The surprise dimensions played a steering role in the calculation of creativity. Two reasons were observed for this: firstly, its rarity in most cases led to lower creativity scores. Secondly, despite the presence of surprise in some cases, e.g. case number 22 (Shell, 2018). not every excerpt associated with surprise overlapped with novelty and utility excerpts.

Cross-set comparison results

Despite the higher number of cases in set 1, novelty was not found in 4 cases (22%) and surprise in 8 cases (44%). Conversely, set 2 cases all had novelty and surprise. The sets differed concerning the novelty subcategory distribution except for newness, which was the highest subcategory in both sets (see Table 4.7). Notable findings were:

- while maritime scenarios emphasised the changes they envisioned for the future, Shell scenarios focused on creations,
- ideas identified through the sub-category ‘revolutionary’ were more common in maritime scenarios whereas in Shell scenarios it was almost non-existent, and
- no meaningful difference concerning utility and surprise subcategories was found between the two sets. Finally, 11 out of 18 cases (61.1%) in set 1 scored 0 in creativity. This number was 2 in set 2 (50%).

Density of subcategories (1 highest – 5 lowest)	Set 1 Cases	Number of excerpts contributed	Set 2 Cases	Number of excerpts contributed
1	Newness	56	Newness	44
2	Change	27	Creating	16
3	Creating	17	Change	14
4	Revolutionary	16	First time	4
5	First time	7	Revolution	2

Table 4. 7: Cross-set comparison of subcategories for novelty

Source: Author’s data analysis findings of Set1 and Set 2

4.2. Conclusion and interpretation of findings

Reviewing the literature and conducting interviews with maritime stakeholders led to the identification of the research question: “what is the role of creativity in scenario planning effectiveness on scenario users?”. However, before targeting the question in a scientific inquiry, another question first needed to be answered. Therefore, this chapter aimed to answer RQ 3 “*Are maritime scenarios creative?*” The reason for asking a seemingly simpler question first is to establish a foundational layer for the rest of the research. This way, assumptions about the scenarios’ creativity are tackled, the scenarios are intensively analysed, assessed for creativity, and the author is familiarised with the scenarios. The process has also laid the groundwork for the next research stage.

In this chapter, RQ 3 is answered from the author’s perspective by assessing two sets of scenario publications using qualitative content analysis (QCA). Shell scenarios were chosen for comparison against maritime scenarios due to their high reputation and long tradition of scenario planning applications (Chermack, Lynham and Ruona, 2001; Schoemaker and van der Heijden, 1992; Tessun, 1997; Tourki, Keisler and Linkov, 2013).

QCA was chosen for analysis because it is a highly reiterative (Mayring, 2004, p.269; Mayring, 2014; Schreier, 2012, p.41) and flexible (Hsieh and Shannon, 2005) form of qualitative data analysis. Types of content analysis were also previously used to identify creative ideas (Amoroso and Eriksson, 2000), aesthetic success (Simonton, 1990), and integrative complexity (Suedfeld, 1985) which is positively associated with exceptional creativity (Simonton, 2010, p.184) in textual data. Despite the method’s soundness, the analysis is conducted by the author only, which can be considered a limitation. The limitation is addressed in the continuation of this doctoral work in the next section by triangulating the creativity assessment with the scenario teams’ input.

Are maritime scenarios creative? From the creative idea point of view, the answer is yes, but not all of them are. Based on the author’s subjective assessment, the maritime scenarios did not score consistently high across three dimensions of creativity. In contrast, Shell scenarios scored consistently high in three dimensions of creativity and

produced some creative ideas. Novelty, utility and surprise were identified in every Shell scenario publication. The maritime scenarios' creativity assessment results wavered. The lack of novelty and surprise in some maritime scenarios publications resulted in zero creative ideas. Utility was the most frequent category and no significant difference was observed.

The findings are in line with creativity literature. Much lower numbers of novelty and surprise in the scenarios meant that utility was not a decisive factor in the creativity assessment. Creativity literature shares similar results; a negative correlation between novelty and utility has previously been reported (Runco and Charles, 1993; Diedrich *et al.*, 2015; Mueller, Melwani and Goncalo, 2012; Ward, 2008; Manske and Davis, 1968). Novelty has also been assessed as the main predictor and a prerequisite to creativity (Runco and Charles, 1993). Surprise has been subject to discussion in terms of its role in creativity assessment. Acar, Burnett and Cabra (2017) have recently stated that the predictive value of surprise is closer to originality. Their findings also supported the three-dimensional creativity assessment of Simonton (2012) (also see Simonton (2013)). However, they used "value" as a third dimension in the assessment -instead of utility or usefulness- which might have affected their findings. The presence of novelty and utility trade-off is not possible to claim based on the QCA findings. Nevertheless, the findings bear a resemblance to a recent discussion given by McCarthy, Chen and McNamee (2018). It is further discussed in the following sections of this chapter.

The researcher noticed logical connections in the scenarios throughout the coding stage of QCA. They were recognised during the second coding stage when the scenarios were analysed for utility and its subcategories. The logical connections in scenarios functioned as links to cause and effect, such as an event leading to another, an idea leading to another. 223 extracts in utility dimension had the word 'lead/led'. It was an unexpected observation as it was not anticipated before conducting the analysis. Another word that functioned similarly to lead was 'make/made' with 18 occurrences.

SP researchers repeatedly brought up plausibility, coherency, and relevancy as part of scenario validation criteria (Amer, Daim and Jetter, 2013; Crawford, 2019). Scenarios should be:

- plausible (Wright *et al.*, 2019, p.2; Wodak and Neale, 2015; Vervoort *et al.*, 2015; McKiernan, 2015),
- coherent (McKiernan, 2015, p.2),
- relevant (Spaniol and Rowland, 2019) and,
- consistent (Wodak and Neale, 2015; Vervoort *et al.*, 2015; MacKay and McKiernan, 2018, p.35)

among others.

However, there is no literature about whether these criteria should be reflected in scenario writing and, if so, how. The excerpts that were associated with utility in the scenarios functioned to reflect the logical chain in the scenarios, giving a sense of coherency, relevancy and consistency.

Recently, Spaniol and Rowland (2019) summarised some notable scenario practitioners' and researchers' interpretations of scenario narratives. Spaniol and Rowland (2019) concluded, "The proper form of a scenario is, this, a narrative description or story wherein the scenarist 'paint[s] a vivid picture of a future state in words'" (Neilson and Stouffer, 2004, cited in Spaniol and Rowland, 2019, p.8). How a scenarist paints a vivid picture that is also plausible, coherent, relevant and consistent is not described. Additionally, from a scenario's desired impact point of view, they are expected to support their users in "understanding the connections, causal processes and logical sequences which determine how events may unfold to create different futures" (Wright, Bradfield and Cairns, 2013, p.634).

Although novelty and surprise were found in lower quantities and played a predictive role in the creativity assessment, utility was also essential. Connections, causal processes, and logical sequences were captured in the scenarios through utility and its subcategories. Usefulness primarily captured the logical chains, and serviceableness

played an identifying role in ideas' functionality. An overlap between utility findings and the scenario teams' expectations from the future through the scenarios is apparent.

Utility functions differently from novelty and surprise in the scenarios and its function in creativity assessment should not be undermined. Utility - or other constructs that are used in creativity research instead of: usefulness, relevance, workability (Douglas *et al.*, 2006), value (Acar, Tarakci and van Knippenberg, 2019), practicality (Mueller, Melwani and Goncalo, 2012), ensures that ideas that are assessed as creative are not simply novel or surprising. Flaherty's striking explanation of novelty without utility is given below as it captures the essence of this discussion:

A creative idea will be defined simply as one that is both novel and useful (or influential) in a particular social setting The definition captures the cultural relativity of creativity (using a lever to move a rock might be judged novel in a Cro-Magnon civilization, but not in a modern one), and it also captures the distinction between the creative and the merely eccentric or mentally ill (novelty without utility) (Flaherty, 2005, p.1).

Concerns about excess creativity and how it can be detrimental to scenario planning processes were previously raised (MacKay and McKiernan, 2010).

Roubelat (2021) recently articulated his thoughts on scenario planning and creativity in an extensive book chapter, asking a virtually identical question: are scenarios creative? As a scenario scholar and practitioner, his discussions span across philosophy, design thinking, innovation, and history. In addition, he offers the 'moving scenarios' concept as a source of creativity, inviting readers to a paradigm change in scenario design. These are discussed in the next section in relation to the current and previous findings of the work.

4.3. Discussions of Findings in Relation to Past Chapters and Future Research Directions

The author's creativity assessment following the three-dimensional creativity definition was a learning experience. P- level (personal/psychological level) (Boden,

2010, p.71) creativity assessment meant that the ideas he identified as novel and surprising were novel and surprising to him. As a stakeholder in the maritime industry with an academic and professional background, he discovered ideas that he did not know and had not thought about before. “Aha” moments were also experienced by the author. However, novelty, utility and surprise separately were not sufficient to reach those moments; he experienced them with creative ideas. His observation was the following:

Utility functions in different ways; it helps establishing what, why and how an idea, e.g., event, process, is useful for something, other times it demonstrates an ideas’ serviceability, or illustrates why an end is desired in the scenarios. Utility is sometimes also a means of illustrating logical chains of events (The researcher’s note taken during the QCA coding stage).

Novelty and surprise only then led to “aha” moments. For instance, the following was evaluated as creative by the author:

Ports themselves have been able to establish themselves as ‘data-hubs’. Data management is controlled most likely by the port authorities. This is feasible as they are collectives managing holistic port operations and branding and responding directly to port owners (Inkinen, Helminen and Saarikoski, 2021, p.6).

The scenario extract above opened up a new understanding that was also surprising to the author. Despite his knowledge of an already operational port that served as a data hub, he still did not think about the possibility of the concept becoming common. What caught him by surprise was the evolving role of traditional port authorities that were envisioned in the scenarios; port- authorities turning into data management authorities or at least taking up the role in addition to their traditional functions. The idea was feasible because port authorities operate holistically. It means being responsible for different functions and operations happening under their jurisdictions.

Going back to the critical interpretive synthesis (CIS) of scenario planning effectiveness literature, the author could identify some of the reported desired impact

areas of scenario planning as a reader of the scenarios. The desired impact areas of learning, unlearning and thinking were targeted and achieved through reading the scenarios. It brings up a critical cross-road for the research. Before research design and analysis, the author expected to learn from the scenarios, be challenged by them and think about the things about the industry he had not before. The author had an objective and set expectations from the scenarios as a stakeholder in the industry. The objective and expectations were the outcome of exploring the SP literature in general and a systematic review of SP effectiveness. The objective was not to solely learn about megatrends or mundane ideas that are often repeated in shipping magazines and shipping conferences but to gain fresh insights and even experience a paradigm shift about the future state of the industry. The author's desired impact from the scenarios depended on his role as a stakeholder, interests, and expectations. Therefore, his assessment of the scenarios for creativity was based on an assumption. The assumption lied in the development objectives of the scenarios. The author was positioned as part of an audience with whom the scenarios were publicly shared. As part of this audience, he understood the scenarios' public distribution as a means of sharing knowledge and informing the stakeholders. Interviews findings in the previous chapter revealed similar experiences among maritime professionals. However, the analyses and findings presented so far cannot determine the scenarios' effectiveness – their development objective and whether the desired outcomes were achieved. Therefore, it was necessary to reach out to the scenario developers and send these inquiries to them. A series of interviews with the scenario developers are planned to be conducted and the findings are presented in the continuation of the chapter.

Before concluding this chapter, the author would like to discuss several topics that he thinks are necessary for content integrity. The following discussions are made assuming the scenarios, besides other objectives, aim to “think the unthinkable”, generate novel insights, lead to “aha” moments, and challenge conventional thinking. Overall, this doctoral work is of less value to scenario scholars and practitioners who use scenario planning and apply scenario planning techniques to discover only plausible futures or a systematic way of simply illustrating their trend-based expectations from the future without seeking novelty and surprise.

So far, plausibility and consistency/ coherence and how they received the most attention compared to other scenario validity criteria in literature (Amer, Daim and Jetter, 2013) have been brought up repeatedly. In some accounts, plausibility was considered the most important criterion (Crawford, 2019). The author also spotted an issue in the table where Amer, Daim and Jetter (2013) summarised scenario validation criteria; creativity and novelty were bundled together, and relevance and pertinence were placed in another bundle. As presented in the creativity literature review chapter, novelty/originality and utility/relevance is considered to be two essential elements in defining creativity and creativity assessment (Kaufman, Plucker and Baer, 2008, pg.47; Hennessey, Amabile and Mueller, 2011, pg.253; McCarthy, Chen and McNamee, 2018; Diedrich *et al.*, 2015; Runco, 2014, pg.297; Douglas *et al.*, 2006). This confusion about creativity in scenario planning literature might be an indication of the insufficient knowledge of scenario planning researchers about creativity literature. If that is the case, considering the involvement of some scenario planning researchers in SP applications in real-life projects, the issue might have been reflected beyond academic research and occurred in SP applications, e.g. management consultants. Considering the practice based nature of SP, the knowledge and expertise of consultants in creativity also may have implications for SP effectiveness.

Previously, SP effectiveness evidence analysis revealed two instances where surprise was the subject of discussion. Schnaars and Topol (1987) reported that the scenarios had not made unexpected forecasts less surprising. The study included subjects forecasting ahead of six to seven years and scenarios were presented to subjects after two rounds of forecasts. The scenarios used in the experiment averaged three sentences in length. It is a questionable approach to using scenarios. Totin *et al.* (2018) reported scenario workshop participant accounts; one participant said:

After this workshop, I start taking time to look forward to what the future could be and think already about options to cope with future challenges. It helps to not be surprised, but it is not easy to do... (Totin *et al.*, 2018, p.53)

Subjective evaluation of a scenario workshop participant's perception of the scenario planning process and surprise was not provided in further detail.

The challenging conventional thinking aspect of scenario planning effectiveness can derive from creative ideas that participants come up with during the scenario development process. Creativity is often misunderstood (Patston *et al.*, 2018, p.17; Runco, 2010a) so far that it has even been considered “deviant behaviour” by some people (Runco, 2010a, p.236). It is also often mistaken for highly original or novel. However, as it has been established so far, novelty alone does not lead to creativity. Furthermore, there is no single type of creativity. Creativity researchers have approached creativity in several ways. One was from its impact point of view, suggesting a Big C (high level), Small C (low level), and further mini-c and Pro c (Kaufman and Beghetto, 2009) model. Another approach used in this doctoral research was a personal and historical novelty (Boden, 2004, p.71) informed creativity. Although the value of Big C or history level (H- level) novelty catches most people’s attention first, in scenario planning, personal level novelty informed creativity also offers value and contributes to SP effectiveness.

Therefore, the author argues that creativity does not have to be informed by H-level (historical) novelty (Boden, 2004, p.71) in scenario planning processes, and the P-level novelty still serves a purpose. This way, the scenario team members and users still gain novel and surprising insights during the scenario development process, e.g., workshops. Furthermore, one of the purposes of applying SP is discovering the possibility of an event in the future, which was not envisioned before. Therefore, P-level novelty aids in experiencing it during the SP process before the event occurs.

In the case of H- level novelty generation in the SP process, creativity's utility dimension counteracts novelty, preventing creative ideas from being too far-fetched and obsolete. Plausibility in scenario planning works in a similar way to utility.

A mechanism to orchestrate subjective creativity and its value in the scenario development process requires the utmost attention. Embedding a creativity workshop before starting the scenario development process might even help increase the participants’ understanding and potentially remedy the conceptual confusion associated with creativity. It is important because the discussion has suggested that a

potential overemphasis on plausibility and usefulness can deter overall scenario quality and potentially scenario planning effectiveness.

Discussions on creativity and scenario planning lead to this: there is a possibility of overemphasis on plausibility in scenario development processes. It is a worthy discussion point and a future research direction. It is because overemphasis on plausibility can be a limitation to exploring novel ideas and detrimental to other desired impact areas of SP. For instance, SP literature previously discussed how overemphasis on plausibility could limit the extent of exploratory thinking and cause a feedback loop for existing mental models (Wright and Cairns, 2011 in Crawford, 2019), and increase the likelihood of simulation bias and overconfidence (Wright, Bradfield and Cairns, 2013). Similarly, the CIS of literature also identified a relationship between the perceived usefulness of a scenario and the favourability of a decision. Phadnis *et al.* (2015) found that “a changed judgement is likely to become favourable if the investment is found useful in the scenario”. The role usefulness plays in scenario planning has not been researched except for the abovementioned study. Their study begs the question of whether participants in a scenario development process, e.g., workshops, focus on the usefulness aspect of the outcome (scenarios) for their existing ideas and plans. The usefulness of the scenarios appears to be a criterium for the scenario participants who make real-life investment decisions as the experiment discovered. However, the degree of emphasis on usefulness in the development phase and its impact is unknown. What is known so far based on the QCA findings is that ideas with utility were found in an abundant number.

Like the author’s articulations about the overemphasis on plausibility and how it can limit the extent of exploratory thinking in SP, the relationship between novelty and usefulness has been seen as a trade-off in the creativity literature (McCarthy, Chen and McNamee, 2018). Based on the literature review and the QCA findings, the author would like to bring forward that the trade-off between novelty and usefulness might be present in scenario planning. When plausibility is added to the equation, the novelty-usefulness trade-off is further counterbalanced; potentially leading to very low to non-existent novel ideas. If that is the case, the scenarios will lack creative ideas.

McCarthy, Chen and McNamee (2018) explain the novelty usefulness trade-off in four quadrants. Their focus is on highly novel ideas, explaining that previous research showed that highly novel ideas are relatively rare (Huber, 1998; Sharma, 1999 in McCarthy, Chen and McNamee, 2018) and only a small quantity of novel ideas have any practical value (Lonergan et al., 2004 in McCarthy, Chen and McNamee, 2018). Although novelty is reportedly an essential part of scenario planning (Amer, Daim and Jetter, 2013) and necessary for its effectiveness - including surprise (Van der Heijden, 2005, p.145) - there is not enough research on the role of novelty and surprise in SP's effectiveness. Adding to this unclarity, scenario planning scholars sometimes use creativity and novelty interchangeably. On the other hand, creativity researchers have only recently come to a conclusion regarding the definition of creativity, and its operational definition varies based on context (Puryear and Lamb, 2020). Therefore, a logical explanation for the confusion on the SP side is the debates that have gone on about the foundations of creativity and creativity assessment for decades in the creativity literature.

Concerns about excess creativity and how it can be detrimental to scenario planning have been previously raised (MacKay and McKiernan, 2010). One discussion point was how the perception of creativity varied between scenario planning participants. Current debates and recent research papers can guide future research on this aspect. For instance, research on group creativity has grown in recent years (Curşeu, Schruijer and Fodor, 2022; De Dreu *et al.*, 2011; Harvey and Kou, 2013; Oztop, Katsikopoulos and Gummerum, 2018; Paulus and Brown, 2007). Another point made was the uncomfortable impact of surprises and unusual trends on scenario planning process actors:

Perceptions of creativity, as novelty and utility, vary between actors in an SPP. Those exposed frequently to worldly issues, e.g., members of the strategy staff function, will be relatively comfortable with exposure to surprises and unusual trends and their impact. Line managers with a focus on action orientated operational issues, whose presence is essential if the scenarios are to lead to strategy or policy, may fear aspects of the SPP more. A comfort zone influenced by rational–logical and linear thinking may determine their daily

routines. When exposed to the uncertainty, circularity and eclectic nature of worldly issues, orbiting in a system far removed from their conventional space, the comfort zone is challenged seriously (MacKay and McKiernan, 2010, p.278).

The bias against creativity phenomenon can explain their observation. Mueller, Melwani and Goncalo (2012, p.16) have reported that “uncertainty promotes negative associations with creativity relative to practicality...”

Observation of MacKay and McKiernan (2010) in scenario planning and the findings of Mueller, Melwani and Goncalo (2012) share similarities. The latter group of researchers further argue that:

Because there is such a strong social norm to endorse creativity, and people also feel authentic positive attitudes towards creativity, people may be reluctant to admit that they do not want creativity; hence, the bias against creativity may be particularly slippery to diagnose. (Mueller, Melwani and Goncalo, 2012, p.16)

Scenario planning creates uncertainty among participants through exposure to surprising and unusual ideas. Thinking about the future is a challenging endeavour. Adding the tension of expecting novel and surprising ideas from the scenario team will likely result in a bias against creativity. Previously, the CIS chapter suggested that openness in scenario participants could support a creative organisational climate by SP. However, Mueller, Melwani and Goncalo (2012) also factored in participant openness in their experiments and still observed the bias. The final conclusion from their study that is applicable to scenario planning takes us back to the novelty and usefulness trade-off. The difficulty of gaining acceptance for creative ideas was prominent when practical and unoriginal options were available. Therefore, as researchers suggested in creativity literature, future research on scenario planning and creativity should explore ways of retaining creative ideas by reducing the bias against creativity. Although creative idea development research in SP is also a worthy research direction, so long as the bias exists, the desired outcome of creative idea generation would be counteracted by the bias, and the ideas would not be retained in the process.

Roubelat's contribution to the creativity and scenario planning discussion concludes this chapter. Roubelat (2021) offers the 'moving scenarios' concept as a source of creativity, inviting readers to a paradigm change in scenario design. His contribution highlights the epistemological activity nature of thinking ahead into the future and how creativity functions in such activity. He states that what was once considered not creative, could be seen as creative in the future. It is certainly a factor to consider in future creativity and scenario planning research. However, in his book chapter, he has failed to differentiate different levels of creativity. His focus appears to be on creativity informed by H-level novelty, neglecting others in his discussions.

Chapter 5: Scenario Teams' Creativity Assessment and the Quintain Findings

This chapter presents the within-case and cross-case findings of the multi-case study. First, RQ 3 is answered from the scenario teams' perspective. Their creativity assessment of the scenario that they built is sought and the findings are presented. Next, the author presents a definition of creativity in the scenario planning context based on the participants' definition of creativity. Finally, RQ 4 – the quintain – is answered. Tentative assertions concerning the quintain are presented before revealing the thematic analysis findings.

5.1. Within-case Analysis Findings: Scenario Teams' Creativity Assessment

All cases in the previous section were analysed for creativity in two sets; the first set consisted of maritime scenarios and the second set of Shell scenarios. In addition, the author has identified further research areas based on findings and discussions, taking into account past chapters and relevant literature. The author's subjective creativity assessment has generated new insights and answered the research question, "*are maritime scenarios creative*" from his perspective as a stakeholder in the industry. However, it was insufficient to conclude the research question. Four reasons led to that insufficiency:

- 1) The author's subjective creativity analysis was a limitation, and a form of triangulation was necessary,
- 2) Through acknowledging personal level creativity, the author realised he needed to talk to the scenario teams and explore their perception of the scenarios' creativity that they developed,
- 3) Given the contextual nature of creativity, the author has identified the need for developing a creativity definition in the scenario planning context, using the scenario team's input,
- 4) Scenario publications did not always clearly report their objectives for developing the scenarios. The author could not identify what was desired with their development and what was achieved through them. It was important to conclude the doctoral work to sufficiently investigate the role of creativity in scenario planning effectiveness on scenario users.

In this chapter, RQ 3 “*are maritime scenarios creative?*” is answered from the perspective of the scenario teams. A within-case analysis is conducted to identify the case study participants’ subjective creative idea assessment and their perception of creativity in scenario planning. Unlike the previous analysis, the scenario team members assess the scenarios that they develop in this part. In doing so, the author has primarily aimed to triangulate his subjective creativity assessment with the scenario teams’ creativity assessment of their scenarios. The author also developed a definition of creativity in the scenario planning context following the scenario team members’ subjective creativity definition. Consequently, the scenario team members’ definition of creativity in the interviews has allowed establishing a new definition of creativity in the SP context.

18 different groups of researchers/ consultants developed 23 scenario publications. All scenario developers were invited to this part of the doctoral project, and with 61% acceptance rate, the researcher continued the project. Eleven maritime scenarios are retained through their developers' contribution to this project. Unfortunately, Shell scenarios could not be kept as the Shell scenario team did not participate in the work. Table 5.1 lists the cases from the previous chapter that are retained for further investigation in this chapter.

In some instances, accurately identifying the scenario team members was not possible. In addition to the interviews with the members, two interviewees who were practitioners in scenario development processes but were not responsible for creating the scenarios also contributed to the research. Their role in the scenario planning process was unclear until the interview. Nonetheless, their valuable contribution enhanced the depth of the case studies in mini-cases, embedded in their respective cases.

Analysis of perceived creative ideas and other forms of creativity in scenario planning

Sixteen interviews with 18 interviewees were conducted during the data collection stage. All 18 interviewees’ creativity evaluation of the scenarios was sought. Most

participants commented on their scenarios' creativity, giving examples of what specific ideas they thought were creative to them.

Case NO	Case name	Author and year
3	Shipping scenarios 2030	Wärtsilä Corporation (2010)
4	Port Vision 2030	Groningen Seaports (2012a)
6	Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts	DG Mare (2012)
7	Updating the future	Akker <i>et al.</i> (2013)
8	Global Marine Trends 2030 (GMT2030)	Fang <i>et al.</i> (2013)
10	Study on the analysis and evolution of international and EU shipping	Artuso <i>et al.</i> (2015)
13	MARITIME TREND REPORT	Danish Ship Finance and Rainmaking (2018)
14	Blue Growth—Drivers and Alternative Scenarios for the Gulf of Finland and the Archipelago Sea: Qualitative Analysis Based on Expert Opinions	Pöntynen and Erkkilä-Välimäki (2018)
15	AHOY2050- Scenario Study	MAN Energy Solution and Fraunhofer ISI (2019)
16	Scenarios for Maritime Areas 2050 Preparation of scenarios for the future of Finnish maritime areas	Maritime Spatial Planning (2020)
18	Technological trajectories and scenarios in seaport digitalisation	Inkinen, Helminen and Saarikoski (2021)

Table 5. 1: Cases retained for further investigation in this chapter

Source: Chosen among the cases previously presented in Set 1 in Chapter 4

Participants also commented comparatively, stating what scenario was more creative than the other. The author observed a tendency among the participants to explain the reasoning behind their thinking. He encouraged it throughout the interviews. Participants' responses to the interview questions that aimed to answer RQ 3 were often followed by additional comments, including their perception of other forms of creativity in scenario planning even before the researcher guided them with other questions. Participants elaborated their thinking on creativity and scenario planning through their observations and experiences with the scenario planning projects.

One interviewee who participated in a scenario project as an interviewee (internal expert, non-scenario team member) - Case 3 (Wärtsilä Corporation, 2010) - did not comment on the scenarios' creativity. His involvement in the scenario development part of the project was limited to an interview.

Two scenario team members did not find any creative ideas in the scenarios and explained the reasons behind their thinking. One interviewee who co-authored Case 10 scenarios (Artuso *et al.*, 2015) explained that creativity was in the process of scenario development. Another interviewee – Case 7 (Akker *et al.*, 2013) – explained that the scenarios were adapted from Limits to Growth scenarios (Meadows and Randers, 2012). Case 18 scenario developers found some scenarios more creative than others but did not specify which idea was more creative for them. Finally, one interviewee was responsible for overseeing the project and was not directly involved in the scenario development phase, Case 8 (Fang *et al.*, 2013). Therefore, his response is not included in this chapter.

The following section presents the interviewees' creativity evaluation for the scenarios they were part of their development. Every case is presented one by one and interpreted by the author taking his previous subjective creativity assessment findings and relevant literature into account. Additionally, the interviewees' responses to the research question are interpreted within the context they provided, e.g., scenario development objectives. Case reports are consulted during the interpretation of findings, and thick descriptions (Stake, 1995, p.102; Geertz, 2008, p.321; Ponterotto, 2006) illustrate the context, capture, and present the participants' thoughts in rich detail.

The participants' perceptions of the other forms of creativity in scenario planning were also analysed and presented in this chapter. Maintaining a uniform understanding of creativity in the case studies was necessary to grasp the phenomenon. Therefore, the answers to other forms of creativity are presented following the interviewee's creative idea assessment response.

Cases were numbered in the previous chapter, and not every case is continued for further investigation—the cases whose corresponding authors did not participate in the doctoral work. The author maintains the original case numbers to ensure consistency across the thesis. Therefore, the first case presented below is not numbered as one but as three, reflecting its original numbering.

Case 3: Shipping Scenarios 2030

Three interviewees contributed to the case development: Ingrid, Billie and Torin. Billie was the chief consultant – external expert, facilitator – for the scenario project. The consultancy firm he worked at was inspired by Rafael Ramirez, following the scenario school promoted by Kees van der Heijden and Oxford Futures inspired by Shell. Scenario development predominantly included company employees, but external participants – experts – were also involved. Ingrid – internal expert, practitioner, scenario user, was fairly new at the client company and joined the company's strategy team shortly before starting the scenario project. The company employees wrote two scenarios. Billie wrote the third one. The scenarios were developed aiming to:

- support company strategic thinking
- offering insights to the industry
- showing the industry that Wartsila is a 'thought leader', and promoting the brand

In separate interviewees, Ingrid and Billie gave examples of creative ideas. One idea they both found creative was the state of the logistics industry at the time:

In that moment, the idea that cargo could have been traceable, and that ultimately, the consumers... of consumer goods would be able to trace their

goods moving in a container ship and know if it's transported on, under certain environmental standards or not. I think that that was creative to say the least in that moment. The idea of how big companies could have taken control of logistics for example, you know, in a way that we know see, for example, Amazon doing. So that's, that those were things that we were discussing in that moment, big corporations taking this centre... central role on the logistic stage, for example, on redefining how logistics work... (Ingrid)

Ingrid's answer does not merely inform us what specific idea was creative to her. She also brought up the 'in that moment' perspective. The author's creativity assessment could not capture the scenarios' development in terms of temporal context. In other words, at the time of scenario development, how technological, sociological, economic, political and so on affected the world, how was the company operating, and their knowledge of the industry's future.

Billie's explanation of the same idea's creativity revealed another aspect:

What made a big impact was a transformation of the understanding, which probably is kind of a creative process is the scenario where the logistical system was the dominating logic and shipping as such, was not at the forefront. It was the logistic that was at the forefront where a number of big players we didn't know about Amazon at that time. But big players like Amazon, if they would have been there, we would have probably had a big issue to get understanding of it... Shipping what was just one part of it, huge logistical chain, which said, it helped people to see that the power structure is changing. And it's not about building beautiful ships. now we're talking about car cargo and so on. It's not about building beautiful ships. It's about building a very efficient logistical systems where ships are just like a truck or a van or whatever. There's a very few people fall in love with a delivery van, but they fall in love with their ships. (Billie)

An additional point has emerged here besides what idea was creative to him. Billie associated 'a transformation of the understanding' with a creative idea. His explanation

is consistent with the scenario planning effectiveness and creativity literature review and the past findings presented in this doctoral research.

Following Billie and Ingrid's evaluation of creative ideas in the scenarios, another point was that the 'creative process' aspect also came out. The interviewees perceived scenario planning as a process that was creative.

Billie added another idea in the discussion: Chinese dominance. Although he stated that the idea was evident to them at the time, the author interpreted his response as another example of the creative process. Through the scenario development process, the idea became more apparent to them.

...the other aspect is it really reinforced the understanding of the Chinese dominance in the world that they had naturally seen it. It was very obvious at that time. But as we described it in Yellow River, it was called it (inaudible) really made it so clear how Chinese way operating in their sphere of interest would shape a lot of world trade (Billie).

Another construct that came out during the analysis was creative moments. MacKay and McKiernan (2010) previously revealed such creative, fun moments. Creative moments appeared to be a part of the case 3 scenario development process. The researcher's inquiry about an envisioned organisation called CorpWatch in one of the scenarios resulted from a creative moment. The scenario developers imagined an organisation called CorpWatch responsible for auditing fraud and mismanagement. The author later identified the existence of an organisation with the same name and same mission and asked Ingrid whether they were aware of it or was it purely their imagination. Ingrid explained those creative moments and illustrated them with an example. She said:

... there have been creative moments of more if you want to put it fun character like... when you have to start constructing scenarios and putting them in a name and ideate... what could be the future events that could indicate that this is the scenario that is happening and so on. That's the other set of creative moments that I would highlight... No, we weren't aware of that (CorpWatch).

That was a purely fun, creative moment... So this is... what I was trying to explain with there's a moment in which when you... we start... fleshing out the scenarios. Basically you say, okay, like if we put a timeline from here to 2030, what are the kinds of news that we would read in 2025? And just, that was just a moment of creative flow of ideas. Uh, there would be some sort of institution monitoring the 100... you know of biggest corporations in the world? and so on. How would it be called? You have CorpWatch. So no, no awareness (Ingrid).

The CorpWatch example could be considered an innovative idea if CorpWatch and similar organisations did not exist before the scenario development process.

Case No: 4 Port Vision 2030

The aims of the scenario project were several. Previously Port of Rotterdam created its port vision, and the Port of Groningen did not want to stay behind. They also wanted to create jobs and attract investments to the region. A scenario development process was conducted for those reasons. The interviewee of this case was not responsible for the technical aspects of scenario planning. A consultant was hired to lead the scenario development process. The author could not identify and reach out to the consultant who was in charge. However, Adrie's role in the port's strategy-making for over a decade and her inclusion in the scenario planning process contributed to the work profoundly. Adrie was an internal expert and practitioner of the SP project. The scenario development workshop hosted over 150 participants from diverse stakeholders, including governmental bodies, universities, and private companies. Her statement about managing over 150 participants who came to the workshop demonstrated the level of her involvement in the process.

Port Vision2030 scenarios are shorter than most other maritime scenarios sampled in this research. Interviewing Adrie revealed that there was more to the scenarios than they published. Additionally, the narratives were written in Dutch. The author hired a freelance translator to get the scenarios translated into English. Adrie reviewed the translation during the interview and found the translation accurate. A creative idea

example she gave in the interview is not present in the official scenario publication. She told:

... I remember one of the ideas were still and still is in range of objectives... is to facilitate vessels with. What is it shore power? And the philosophy that, if fossils are in power today, they are waiting and using the auxiliary engines because they need power when they are in the port and then when they using the auxiliary engines they also have emissions. And the idea was to provide vessels when they are in a port with onshore connection and the idea was that they should stop using their own engines. This development is still part of the discussion, but has not come through yet. it has proven to be very complicated. Because vessels are divided if you look at short connections, almost each vessel has a different. What is it? Connection to the grid, there is no uniformisation... we are looking at how can we provide vessels with generators power generators which are used out of hydrogen of using hydrogen to produce power. So that was an idea very noble idea to become have no emission, zero emissions in the port, but it's so hard to materialise (Adrie).

The author's interpretation is that the novelty and utility of the idea are there. However, the applicability issue has prevented the port from applying the idea in practice. Depending on the context, the relevance of a creative idea has to do with its practical implementation or how realistic the idea is (McCarthy, Chen and McNamee, 2018). The example of the creative idea also illustrates the temporal aspect of creativity in future scenarios. What was perceived as novel but not applicable at one point in time might be both novel and applicable in the future.

Although innovation is outside of the scope of this doctoral work, creativity is viewed as a necessary part of innovation (Stierand, Dörfler and Macbryde, 2014). Enhancing innovation (Worthington, Collins and Hitt, 2009) and innovation management (von der Gracht, Vennemann and Darkow, 2010) through scenario planning as well as scenario thinking and innovative idea development have been discussed in the literature (Sarpong and Maclean, 2011). The purpose of Port Vision 2030 scenarios' development was not to stay behind the competition. As Adrie reported, they followed

the Port of Rotterdam after seeing their vision development. Being different from their competitors repeatedly came up during the interviews. From Adrie's point of view, the port pursued a robust competitive mindset throughout its journey. However, data solely rely on the interviews with Adrie and their published scenarios in this case. Based on three different interviews with Adrie, it is logical to assert that the port pursued competition and differentiation throughout its journey. However, claiming that only those attributes led to an innovative idea development through scenario planning would be a reductionist evaluation. Nonetheless, the author finds the idea not only creative but also innovative should the port find a way to implement it. Innovation and competition literature has reported a close relationship between the two (Bos, Kolari and van Lamoen, 2013; Tang, 2006; Aghion *et al.*, 2005) and future research can look into this aspect.

Similar to Ingrid and Billie, Adrie also brought up the concept of process creativity. Bringing a diverse and high number of participants to join in the future discussions through scenario planning workshops, according to her, was creative. The outcome of the process also generated a creative vision that the port later pursued. In the interview, she emphasised 'the acceptance' of the green energy-focused future concept; the concept was new to them. Here, the author interprets the acceptance of the idea by participating stakeholders in the SP workshop to demonstrate the idea's utility. If the idea were purely new and not valuable to the stakeholders, it probably would not have made the impact it had made. Adrie shared her memory of the process:

...I think for that time... most creative that we have been able to was to which such a vision to get an acceptance... from your shareholders also government that the area we are in northern part of Netherlands would be very important to become a so-called Energy Province in which we have become. So we started at that time. I think it was very creative to first integrate such a broad group of shareholders, which when they once were apart when they were part (although there were a part of the same industry) because I have become part of the process, they also were very have moved in the expectation order of the developments which were going on because it was their own input... The awareness started that in the northern part of the Netherlands, the energy would

become very important, and if you look back from now 10 years ago and now we can say and that approach... It was created because we have never done this before (Adrie).

Adrie later emphasised that the value she saw in scenario planning was the agreement on an issue through a shared understanding. Practitioners in the scenario planning process took ownership of the ideas “because it was their own input”. The workshop they facilitated served as a platform where a diverse group of practitioners commonly agreed on the desired future for the region and the port, supporting the vision’s actualisation. Adrie also stated that the team would have probably discovered the same vision even if scenario planning was not applied.

Case 6: Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts

Two scenario team members were interviewed separately for the “Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts” scenarios. DG-MARE and the European Commission asked the consultants to explore the potential role of the union in the maritime context. Maheen stated that the scenario development process was a well-defined step-by-step procedure and did not consider the procedure creative. In terms of their study’s research design, they were tasked with providing two types of scenarios in the process. Maheen did not identify any creative ideas in the scenarios.

Unlike Maheen, Lamar found one idea creative and evaluated one of the scenarios as more creative than the others. The way cultural tourism was anticipated to change over the years, according to Lamar, was creative. He elaborated on the logic behind his answers:

...coastal tourism that is it's quite different the way in which cultural tourism would develop you know, we have their first scenarios pursued growth, sustainable growth, fragile recovery and boom and bust... I think. Boom and bust in hindsight, coming back to your question probably more original

scenario ... The thinking was if we continued to rebuild the economy in the same way that it was before the crisis, then we may run into problems again...

Lamar's choice of word to indicate creativity was 'original'. All participants were later asked for their definition of creativity. Their response to the interview question that asked for their creativity definition is analysed and presented later in this chapter.

Although Maheen did not identify any ideas creative in the scenarios, he later added that creativity was there and gave an example of the creative process. Ultimately, he made clear that his perception of creativity was not in the scenario development but lied in the research design. He explained:

... So the procedure is not where the creativity is. Except maybe, that in this particular project, we tried to meet demands of two types of users of scenarios by combining the 4 scenarios with the micro-future scenarios: dealing with inevitable uncertainties about the future, and those considering scenarios as pathways to be followed, a bit similar to hindcasting... Creativity in filling in the 4 scenarios is definitely there, but it is guided (constrained, if you like) by the anchor points as described in the paper. Still, formulate the ways in which such principles as volatility, sustainability etc. can be reflected in the specific trends of the sea-based economic development can be considered a creative process (Maheen).

When the researcher asked Lamar whether he found any of the scenarios more creative than others, he replied "Boom and bust in hindsight, coming back to your question probably more original scenario".

I really like the positioning of this sector.. these activities within the broader macro future, so what I liked was to connect this what I called bottom up thinking, What would be possible development creatures and to position it within the broader framework... and that there is something that led to... I would say creative combinations and creative possible futures (Lamar).

Lamar's "creative combinations" statement resembles the creative process explanation of other interviewees. For example, a creative combination of key drivers, uncertainties, and factors was considered a creative process.

Finally, Lamar mentioned using so-called 'artistic' touches in scenario planning and its relevance to creativity. From Lamar's point of view, the images used in the publication were creative.

Case 7: Updating the future

The CEO of the Port of Rotterdam requested a consultancy firm to adapt Limits to Growth scenarios in the Port of Rotterdam context. This case is an outlier in the multiple-case study as it differed in its construction. The interview with Zi informed the researcher about its objectives and the process. The scenario project was aimed to contribute to the port's upcoming vision update. Zi also evaluated the scenarios for creativity. According to him, the whole Limits to Growth was new. In terms of creative ideas in the scenarios, he did not comment.

However, he later added that The Limits to Growth scenarios were depressing. He and his colleagues needed creativity to "keep a positive note for the future"; otherwise "you very quickly end up looking at things in a doom and gloom". His perception of creativity appears relevant to creative writing in artistic touches.

Case 8: Global Marine Trends 2030 (GMT 2030)

Case 8 Global Marine Trends 2030 scenarios were conducted by Fang *et al.* (2013). Jay and Esmond contributed to the case through interviews. Jay was an internal expert, scenario team member and scenario user. Esmond was a scenario user only. According to them, the scenario project aimed to understand how to create industrial strategies for the maritime sectors and considered brand recognition through the scenarios' publication as another aim for publishing the scenarios. Only one interviewee's response contributed to this part of the research. The second interviewee, Esmond, was responsible for overseeing the project and was not part of scenario development. Jay

responded to the creativity-related questions and found the Black Swan events creative. He explained:

I think different things that might people talk about Black Swan events.. and, we've refined it down to just a few that we thought was worth publishing... so there were quite a lot of possible scenarios that we thought would be that would be of interest, but you couldn't, you couldn't paint them into. They didn't fit on a spectrum very easily. What we were trying to do with the three scenarios was to create a spectrum that people could understand from, you know, from a lot of something to very little of something by way of a bit of something... and the disruptive scenarios, we felt they didn't fit easily onto that spectrum, they were just going to be points in some sort of future, but we couldn't easily pin them to that spectrum (Jay).

The author found some of the disruptive scenarios creative in his creativity assessment. However, as the reader of the scenarios, he was unsure how to integrate them into the main scenarios. The role of disruptive events and black swans in scenario planning will be discussed later in this doctoral research.

Jay further shared his experience with the scenario development process, explaining that concerning the three main scenarios, constructing them was creative. Finally, he concluded this part of the interview by talking about using visuals in the scenarios to illustrate their message, highlighting the illustrations' creativity.

...and I guess the other element that the creativity was in the graphical illustration of all of this. So there was one person who did all of the graphical design for the whole book. And that was massively creative. But we had to work really hard with him, to help him to understand what we meant by the scenarios and how to deal with all of this massive amount of data that we had (Jay).

Case 10: Study on the analysis and evolution of international and EU shipping

Case 10 study on the analysis and evaluation of international and EU shipping study was conducted by Artuso *et al.* (2015). The EU Commission – scenario user – wanted to review and revise its maritime port strategy for the future. The commission aimed to channel the output into policymaking by developing the scenarios. It was seen necessary to identify the uncertainties of the future and the new elements in the future. One interviewee, Sam, contributed to the research for this case. Sam was part of the scenario team. According to him, the process was creative, not necessarily the elements.

Okay, well, maybe the elements as such are not necessarily the most creative thing, but it's the selection and the combination of them. I think everyone, even in the business and in the policy, will somehow know that a certain element will have some impacts on the outcome. But I think the creative thing here is to pick out the ones that have most impact even without having done preliminary forecasting, or mainly, this is based on expert knowledge. And that's why they hire experts, of course, to make that initial selection, and to be quite close to reality, and quite right from the start (Sam).

The researcher further questioned the process creativity, and Sam responded:

Yeah, it's creative, because it doesn't start from a fixed scheme. I mean, you don't take one literature source as a given, let's say, as a main cliff-hanger, but you have out of the existing material, both from the interviews and from literature, you create your own scenarios as you think they should be (Sam).

Sam explains two types of creativity here: choosing the factors that have the highest impact as part of their scenario development process - process creativity - and creativity in research design, such as hiring experts to receive their insights.

Case 13: Maritime Trend Report

The motivation was to understand how other industries used digital technologies to upgrade their business models. Joel, who led the scenario development, contributed to the research and wrote the scenario. Therefore, he was an internal expert, scenario

team member, and user. He said that the scenario was based on an idea in the interview, which he found creative.

I think the whole ship as a service thinking is turning the vast majority of elements defining the shipping industry today on its head, the only thing that it shares with the current is that of course, we are still moving things on ships. They're still sailing from A to B. But everything relating to business models value has changed. So I think that is, to me, this is the most creative, but also for me the most difficult to accept (Joel).

Since the report consists of only one scenario, discussions on creativity were somewhat limited. Joel also stated that he was not knowledgeable about the scenario method and chose to demonstrate their ideas about the industry's future in a scenario. The author previously evaluated the creative idea example Joel gave creative, too. Although the idea had been implemented in other industries, it was novel from the marine transportation point of view. It is an example of transformed understanding for the author. Although Joel did not use the term transformed understanding in the interview, he described envisioning a fundamental change in the business model of shipping companies. He explained that so many entities reached out to them:

So, many different entities reached out ... at the same problems and trying to understand how they can move forward (Joel).

Case No 14: Blue Growth—Drivers and Alternative Scenarios for the Gulf of Finland and the Archipelago Sea: Qualitative Analysis Based on Expert Opinions

The project was done for the maritime spatial planning of Finland. Two researchers were responsible for the entire project. They were external experts, the scenario team and facilitators. Although the project aimed to envisage the future of Finland's maritime spatial planning, practitioners were also collaborating from Estonia. It was because of the cross-border focus of the project. Two interviewees, Dane and Whitney evaluated the scenarios for creativity in a group interview. Table 5.2 illustrates the creative idea examples they provided.

Case NO 14	Idea located in Virtual Reality scenario	Idea located in Virtual Reality scenario	Idea located in Unlimited Growth Scenario	Participant evaluates the overall scenario the most creative
Dane	Virtual glasses and the people sit at their home do not travel anymore because they virtually travel.	We may have electricity shortages: there's not enough electricity anymore, because we all use too much with these virtual elements.	Tense relationship between the countries and that could lead to certain situation where people would travel so much to for example the areas in Finland (as opposed to travelling to other countries)	Virtual Reality
Whitney			The travelling in Baltic Sea was in rapid growth, and tourism was predicted to grow, and the Russian threat was at as it is now, it was threatening the balance in the Baltic Sea	Virtual Reality

Table 5. 2: Case 3 scenario team's creativity assessment of their scenarios

Source: Author's data collection

They found digitalisation related aspects in the scenarios creative, agreeing with each other. They also pointed out the creative elements in their Growth Scenario, which envisioned a challenging future for the Finnish maritime region. Dane and Whitney agreed on the points they raised. The following statement from Whitney explained their observations about the logic behind their creativity evaluation:

... the good one, the business as usual and the bad one, and then the fourth one... and the fourth one was the creative one... the good one is quite easy; it doesn't need a lot of creativity to create very basic type of future image. and business as usual it's a little bit more difficult, but it's business as usual... and the bad one well that's a little bit more creative because you can... You get that people like to discuss about bad things and black swans... but then the fourth one was the most difficult because it was true. It was Virtual Reality scenario. (The Creative one) (Dane agrees) it was about virtual reality and about the... it included the mega trends... mega trends like urbanisation or digitilisation... but it was really difficult... I think that also, the stakeholders and the people who responded... they didn't have much to say about it (Whitney).

Participants further explained the challenges they faced during the construction of Virtual Reality scenario, which they rated the most creative among others. The process required considerable time and effort to finalise the scenario. As Dane and Whitney told the author, case 14 scenarios did not officially contribute to the Finnish maritime spatial planning. They further added that their scenario project was a rehearsal. Case 16 scenarios were later developed by a group of consultants, which the maritime spatial planners then took up for implementation.

Artistic touches and creative moments also came up in the interviews. The example given for creative moments was:

...when the discussions, for example in workshop went on, and there is laughing and and something that is kind of joking, and so on, and it's the creativity (Whitney)

Artistic touches were perceived as a phase by Whitney; she associated it with the scenario narrative writing. The narrative writing was iterative and cross-checked with the questionnaire and workshop findings. The findings were considered a means of decreasing the artistic touch and keeping it under control.

Another example of artistic touch came from Dane. Her example was visualising the scenarios they created with the scenario planning participants. The resulting animation was perceived as creative and effective for assisting discussions about the future among participants. Although in case 14 the animation was presented at the end of the scenario development phase, Dane explained it could have been done before finalising the scenarios during the scenario development process.

Lego serious play was another technique the scenario team utilised during the vision development phase with the project participants but not in the scenario development stage.

Case 15: AHOY 2050- Scenario Study

The project was initiated when MAN – scenario user – approached Fraunhofer – scenario team – to conduct a scenario study for the organisation. Kieran represented the scenario team of the Fraunhofer Society. He took part in the development of AHOY scenarios. He was an external expert, scenario team member and facilitator. According to him, MAN wanted a scientific study to inform them about the industry's future. He also noted that they wanted to be a thought leader in the industry. He identified the following idea creative:

I think, (one part of the creativity) was to show them the things they weren't thinking of the possibility, in particular with wind propulsion so we had one scenario where when technologies had a major part to play that was accepted and in the... that was accepted in the workshop, and so in the official scenarios, but you still don't hear very much about wind, so I think that was quite a creative part so in the official scenarios, but you still don't hear very much about wind, so I think that was quite a creative part (Kieran).

Kieran's explanation of the creative idea have a strong resemblance to one of three roads to surprise description of Boden (2010, p.71): "...one may be surprised because one hadn't realised that the new idea had been a possibility all along..."

Previously, the author of this doctoral work found the wind power idea creative, too.

Kieran identified three aspects of creativity in the scenarios. The first one is the ideas, the second one processes creativity that combines different factors and builds different scenarios, and the third is research design creativity.

Similar to other participants, Kieran brought forward the research design creativity. Computer simulation assisted methodology and how it assisted the development of the scenarios was explained:

... creative thing about the computer simulations is that they showed how different alternative technologies compete through time and so, you cannot say now, in the way the industry is at the moment which technology will take off be dominant there might be a competition period of 15 to 20 years before a winner takes a clear position and maybe even longer even when you've got a very strong policy driver towards zero carbon. So I think that's quite a creative, thing too (Kieran).

Kieran's perception of process creativity below is illustrated:

...I think the other part of the creativity actually was putting together the different factors into these new scenarios, so we have these four scenarios. And they are formed by different All they all consider the same factors, but the fact is change in different ways and that's How the factors right change and In a in a way that makes a consistent scenario where all the factors change in a way that is compatible together that was that's also quite a creative thing it's a standard scenario methodology we have it at Fraunhofer now (Kieran).

Combining different factors has been mentioned by other interviewees so far. The scenario construction process was considered creative despite the differences in

methods across the cases, e.g. scenario axis, futures table, and varied technical terms used, e.g. drivers, factors.

Case 16: Scenarios for Maritime Areas 2050 Preparation of scenarios for the future of Finnish maritime areas

The Scenarios for Maritime Areas 2050: A scenario project for the future of the Finnish maritime area was open to tenders, and a consultant company secured the project. The motivation of the Ministry of Environment of Finland was to understand the situation at the time of the project's development in the regions. The ministry was also interested in learning about the different actors in the scene. Additionally, the ministry aimed to understand the plausible future possibilities. Cassandra, one of the consultants – external expert, scenario team member, facilitator – who developed the Finnish Ministry of Environment scenarios, was the interviewee for this case. She evaluated two ideas creative in the scenarios:

...Well, I think one that came up that also was that we came up with, and from the interviews and such was, kind of small scale logistic, like drones that are part of the logistics chain from the big ports, delivering goods, maybe even persons to archipelago. This was one I think eutopia that one participant said out like that, how great it would be that we didn't need like buses and trains, but you would just have the ship few kilometres from the port. So you would have smaller ports as well. So fewer waste, and then you could just have drones coming from the coming from the ship to the people that ordered the goods. And then one representative from one company, I think she was telling that they are actually like, really considering these kind of futures not in 10 years. But in 20 years or something, so I think that was kind of creative idea.

The creative idea she identified is the second instance where the unique position of creativity and future thinking is revealed. Here, the utility dimension of the idea is under consideration, similar to the Port Vision 2030 case. Although the author did not evaluate the above idea as creative, according to the interviewee's explanation, the idea was found creative by some of the scenario workshop participants. This interview extract gives a glimpse of an instance where workshop participants shared their

knowledge, introducing the ideas to their fellow participants. The others further took up this interaction for discussion. As Cassandra noted, a company representative stated they were already considering the idea in the future. If that person were asked to evaluate the same idea for novelty, creativity and surprise, they probably would not find it novel or surprising.

The final creative idea, according to Cassandra, was about travel restrictions in Finland,

... maybe not that creative, but kind of interesting in a way... when we had that third scenario, we presented the idea that what if travelling stopped, and you wouldn't have any international travellers in the Finnish, especially in south coast, so near Helsinki capital area. And the reason for that in that scenarios were like to avoid political tensions between Russia and the West or Finnish, like, not war, but just like the sense of unsafety would make people stop travelling to Finland, and also travelling from Finland to abroad. So Finnish people would be in Finland, in the archipelago, and travelling inside Finland. So this was kind of what came through, but in the form of pandemic, but you could see the rise in nature, like you have national parks in your Helsinki, for example, they were packed last spring, because no one could go anywhere else. And I think the same is going to happen now. When we presented this idea, no one could imagine like how... there is no... nothing that can come and make it make this scenario true. But I'm happy that we kept it. So now it's kind of another reason, and in another form that it has come through (Cassandra).

There are two points here worthy of discussion. The first one is that the idea Cassandra evaluated creative above was not long ago also included in another scenario publication in Case 14. Just like in this case, Case 14 also aimed to inform the Ministry of Environment of Finland. When asked, Cassandra stated that she did not recognise the scenarios. Her response did not change after the author showed the case 14 publication to her during the interview. Assuming Case 16 scenario developers were

not aware of case 14 scenarios, they still envisioned a similar event in their scenarios. Cassandra also evaluated the idea as creative.

Previously, the author of this doctoral research did not find the idea creative in both scenario publications. He imagined a plausible scenario similar to theirs earlier through reading the maritime news and research papers. Though, he envisioned a travel 'limitation' and not restrictions.

The author has not come across this type of observation in the literature before; a different and disconnected group of researchers/consultants envision a similar event through scenario planning and the future event actualises. However, the author is incredibly tentative with his observation of the cases. Case 14 interviewees informed him that, although their scenarios were not officially accepted for use, they were "hinted that their scenarios might be used as a kind of background material in official processes" (Whitney). Cassandra did not recognise their scenarios, but that does not guarantee that the scenarios were unknown to her colleagues. Nonetheless, this is an interesting occurrence.

Assuming the Case 16 scenarios were developed unaware of Case 14 scenarios, there is a second discussion point. Travel restrictions and people's changing travel patterns were envisioned by at least three groups of people who used scenario thinking in one form or another, e.g. two different scenario methodologies as observed in the cases and the author's intellectual process. In Case 16, the logical chain leading to travel restrictions was political conflicts and war. In Case 14, it was the popularisation of virtual reality and political conflicts, e.g. Russia and the Baltic Sea tension, similar to case 16. The author's logic behind the travel limitations was a combination of the melting Arctic region, environmental sustainability issues and energy shortages. For instance, the likelihood of novel viruses emergence with the melting Arctic ice (Vanwormer et al., 2019) combined with the new deep-sea shipping routes in the Arctic region (Bennett, 2019) due to cost and time efficiency. Despite varied logical and causal links, various groups of people envisioned similar creative futures. Neither of the reasons caused the lockdowns and travel restrictions in their scenarios. However, from a pragmatic business point of view, the end event was experienced globally,

which matters for most businesses. The causal links indeed are required for plausibility, coherence and consistency. However, scenario planning can still be considered effective in leading people to think about travel restrictions and lockdowns. They were unimaginable to most people before the COVID-19 pandemic. The author raises a half point before moving on to the other findings: scenario development might include a reverse causal process after completing an inductive process. This way, deductive and inductive thinking from the future event to the present back and forth might help thinking about the other factors and events that could lead to the event. However, this means investing more time, money and human resources in the process.

A final point to include in this section is her observation as it relates to two other interviewees' input. Similar to Case 14 scenarios' authors, Cassandra talked about "threatening bad futures" and the "easiness of thinking about them":

It's easier to think of dystopian like these very bad, bad futures and see the threat in everything. So I think in that scenario 2, we were able to see a lot of possibilities in there. In maritime and in kind of sustainable development, and how the technology might enhance some possibilities, for example, living in archipelago or something like these. So I think that's what I think was our most creative new way.

Cassandra also observed creative and playful moments. Playfulness through multiple scenario development was perceived as a way of conflict resolution:

...But when it was... we have these three different scenarios, it allowed the participants to think maybe a bit more widely, and it was more playful, obviously, serious, but it allowed it's like an aspect of playfulness and, so the conflict between for example, the energy sector and environmental activists, if you would have just been like, okay, talk about the future. The one, the possible future that you promote, most believe in, it would have created more conflict. But when we created these... the three different scenarios, I think it allowed more truthful discussion to begin with (Cassandra, Case 16).

Ashanti – practitioner, scenario user – is a mini-case to case 16. As a participant in the scenario planning workshops and one of the maritime spatial planners responsible for the vision implementation, her perception of creativity in creative idea assessment and other elements of creativity were inquired about. Ashanti did not find the scenarios creative, explaining that what was envisioned in the scenarios was already happening. She further explained that the Finnish Defence Forces’ feedback was the same as hers. She interpreted their response as a sign of the scenarios’ lack of creativity. According to her, creativity would manifest in the scenarios if the black swan events were captured. She continued explaining:

...it seems impossible to miss this kind of thing when we have an... I'm a biology ecologist as my background. So I've heard for 25 years that there is possibility for this kind of situation, what we have now and you know, we have had Ebola and SARS and all this kind of stuff, and still waited and think about this kind of possibility. So maybe it wasn't so creative. No. (Ashanti).

When she was asked, “if the pandemic was included in the scenarios, would spatial planners do something about it?”, her response was “maybe”.

... So maybe it might have some influence on our plan. Yeah, I'd say I'm not sure if... I mean, it might even be (an) important one. Maybe we have only one map marking for special area that it covers the Helsinki area because there's so many people and so many aspects to kind of avoid conflicts. And whenever you do the more detailed planning, but maybe after Coronavirus, we could identify also other special areas.

Case 18: Technological trajectories and scenarios in seaport digitalisation

The reason for creating the scenarios was to indicate the future development of digitalisation in the port environment in a scientific inquiry. Two participants, Mylie and Rae, who co-authored the research paper, were interviewed together. They were the scenario team. They compared the scenarios for creativity and rated the scenario with digitalisation with higher creativity. Mylie’s comparison was similar to Case 14 since both scenario developers considered business as usual scenarios not creative. Rae

and Mylie both agreed that moving away from business as usual thinking would potentially allow for creativity:

... I think... this business as usual is the least creative and I feel that the failure and supremacy... they sort of gave more room for creativity and a little bit like, I have not called it a fantasy, it's a fantasy but in a way that you can sort of write something that is let's say, less foreseeable or so in that sense, these two scenarios, which are kind of extremes from the business as usual. I feel that they are more creative (Mylie)

Rae supported Mylie's comment, explaining:

... it came to my mind also that, that the farther you... are away from the business as usual also the more unlikely scenarios. No, not scenarios but more unlikely elements you can include into this. And of course, they give more room to creativity (Rae).

However, they did not identify an idea creative. The author found one of the ideas in this case creative: the transformation of ports into data hubs and port authorities' changing role in a digitalised world. Scenarios that included digitalisation created more creative ideas than those that did not.

The researchers, Mylie and Rae, further talked about other aspects of creativity in scenario planning. One of them was about the translation of the scenarios. Mylie's explanation begs the question, "can creativity get lost in translation in the scenarios?" He explained:

...we did this reports in two reports in the project they were written in Finnish, the original names... I don't find the right word. But I explained like the original name was for digital supremacy was the digital explosion in Finnish. And this digital failure was a digital pancake. So I don't know if it works in English, but this pancake means that its result became flatter than you expected, or not so good. So... a little bit more like let's say, creative. (Mylie).

Finally, Rae talked about process creativity, similar to other interviewees. He observed creativity in connecting the key drivers and events leading to the future events:

In the process, because we already decided that these will be the three scenarios. Okay, originally there were four but I didn't make this fourth scenario work. So, there were three and then thinking what are the really the key variables which change in the context of poor digitalisation in the future so, so in some for some variables, it was easy to see what would be the let's say optimal or the most positive outcome within 10 years, and then maybe also the business as usual, but then maybe this failure, it was maybe difficult to work out how to word or phrase, this outcome. So that was maybe the that part of the process that I with hindsight, I feel that was creative (Rae).

Conclusion

In this section, the author has reported the participants' creative idea evaluation and their input on other means of creativity in scenario planning. All interviewees were asked to do the task for their scenarios. Most participants have identified at least one creative idea. Several aspects of creativity in scenario planning other than creative ideas also came out in the interviews. The author has recognised a natural shift from a creative product to a creative process perspective in the analysis. Most participants had an answer to the author's creative idea evaluation question. However, scenario planning as a creative process was highly prominent in their experience. As a result, the within-case findings have reflected their response.

5.2. Defining creativity in the scenario planning context

Participants' general and scenario planning-specific creativity definitions were sought during the interviews, and this section presents the findings. A generic creativity definition and another definition of creativity in the SP context were developed.

Initially, the author aimed to gather only the case study participants' creativity definition in the scenario planning context. However, the pilot interviews with three participants revealed the difficulty of answering the question in the scenario planning

context. It appeared that starting to talk about creativity in a general sense and then moving on to scenario planning was more convenient for the participants. Therefore, the interview questionnaire was tweaked to address the issue.

All participants in the multiple case study were asked for their creativity definition first. Their creativity definition in the general sense was sought, which was followed by asking for their definition of creativity in the scenario planning context. The interviews were coded in Nvivo 12 categorically through QCA.

The author avoided deductive analysis to accommodate inductively emerging categories and subcategories. However, his previous understanding of creativity inevitably guided the interpretation of participant input. The categories capturing the general creativity definition were: attributes, ways of creativity, novelty, usefulness, combining and requirement (see Table 5.3).

The following definition of creativity was created by the author based on the QCA findings:

Creativity is an important, difficult, unpleasant and slippery ability that can be tapped into following different approaches, e.g. thinking business school way, thinking in extremes. It is generating new thinking, new ideas that have not been thought of before, which are also useful; they work and turn into value. Creativity is a process of connecting dots, making unexpected connections through combining knowledge from different fields, including new and old insights, to have a novel perspective on the issue. It requires being open-minded and questioning taken-for-granted assumptions.

Category	Sub-category	Instances	Interpretation
Attributes	Ability	2	An important, difficult, unpleasant and a slippery ability.
	Slippery	1	
	Difficult/unpleasant	1	
	Important	2	

Ways of creativity	Business school thinking	1	It can be tapped into following different approaches, e.g. business school, thinking in extremes.
	Extremes	1	
Novelty	Looking at it first time	1	It is generating new thinking, new ideas, imagining ways never imagined before.
	Construction of something novel	1	
	Thinking/ imagining a new way never thought before	2	
	New ideas, thinking	2	
Utility	Problem solving through applying new thinking	1	It is useful: it works, solves problems, turns into value.
	Ideas that turn into value	2	
	Changing blank sheet into something useful	1	
Combining	New insights through combining knowledge from different fields	6	It is a process of connecting dots, making unexpected connections, combining knowledge from different fields both including new insights to have a
	Connecting dots, making unexpected connections	3	
	Use of different inputs	1	

			novel perspective on the issue.
Requirement	Being open minded	4	It requires being open minded and questioning taken for granted assumptions.
	Question taken for granted assumptions	1	

Table 5. 3: Interpretation of participants' creativity definition through QCA

Source: Author's data collection

Creativity in the scenario planning context emerged similar to the above definition with few differences (see Table 5.4). Combining, openness, novelty and requirements were the emerging categories in the analysis. Combining came out strongly in both definitions with similar emphasis on it across two definitions. Openness formed its independent category in the latter definition. Novelty is present in both definitions. The utility category in the first definition disappeared in the second definition. Usefulness was observed under requirements in the second definition due to participants' emphasis on it turning into a requirement.

Category	Sub-category	Instances	Interpretation
Combining	Combining knowledge from different fields	6	It is combining knowledge from different fields, looking out for industry examples, bringing new and known knowledge and insights to come up with new insights.
	Grasping wide range of knowledge	1	
	Looking out for industry examples	1	
	New insights through combining knowledge	3	

Openness	Letting yourself get out of professional roles	2	It happens through being open to questioning taken for granted assumptions, letting yourself think wider, getting out of your professional roles, exploring well-beyond traditional industry topics and even to think unrealistic and impractical ideas.
	Exploring beyond the known and traditional	1	
	Letting humour and trust happen	1	
	Letting yourself think wider	2	
	Openness to signals so that you combine them	3	
Novelty	New ideas, thinking	7	It is bringing new and known knowledge and insights to come up with novel insights.
	Seeing what you have not seen	1	
	Out of the box thinking	1	
Requirements	Ideas that work	3	It should be useful that works and turn into value rather than just seeing something is coming. It also should be supported by hard and subjective facts, lead to surprise and stretch thinking.
	Making something out of it	1	
	Should have hard and subjective facts	1	
	Should lead to surprise	1	
	Should stretch thinking	1	

Table 5. 4: Interpretation of participants' creativity in SP context definition through QCA

Source: Author's data collection

Following the analysis of participants' creativity in SP context definition, the following definition was created:

Creativity in scenario planning can be achieved by combining knowledge from different fields, looking out for industry examples, and bringing new and old knowledge and insights to come up with new insights.

Such insights fundamentally allow one to see what is coming through by being open to questioning the taken-for-granted assumptions, letting oneself think broader, getting out of professional roles, exploring well beyond traditional industry topics and even thinking about unrealistic and impractical ideas.

Creative ideas should be useful; they work and turn into value. They lead to doing something of that rather than just seeing something coming at. Scenarios should lead to surprise and stretch thinking but should not be pure creativity as it is only one element next to hard facts and subjective facts.

Conclusion

This section presented the scenario teams' creativity definitions in the general sense and specific to scenario planning. The author presents the findings answering the quintain in the next section.

The emphasis on the cases moves towards the quintain – the role of creativity in scenario planning effectiveness – in the following sections. Theme-based assertions (Stake, 2006) that the author has developed through cross-case analysis are presented. However, the themes are tentative since the author later conducted a thematic analysis (Braun and Clarke, 2012) to answer the final research question, "*what is the role of creativity in scenario planning effectiveness on scenario users?*".

The theme-based assertions are presented next to demonstrate the author's logical train of thought. Doing so, the author believes, provides the reader with a clearer understanding of the data analysis and transparency.

5.3. Tentative Assertions

This section reveals the tentative assertions developed by applying Stake's (2005, p. 5) "generating theme-based assertions from merged findings" procedure. The interviewees' input was analysed, and the findings constructed the theme-based assertions. The focus of the analysis started to shift to the cross-case findings at this stage and laid the groundwork for answering the quintain. Table 5.5 presents the theme-based assertions. The themes were tentative because a thematic analysis was later conducted, including the foreshadowed issues, case reports, and theme-based assertion findings.

Creative Process

The tentative theme creative process was developed based on the findings revealing:

- SP as a creative process, and
- SP part of creative research design.

SP as a creative process directly informs scenario planning and offers richer insights. SP part of creative research design appeared to be relevant to the consultants' and researchers' methodological triangulation. Therefore, the latter aspect of the creative process was discontinued in the analysis.

Several participants from multiple cases shared their experience in the scenario development process. Regardless of the method used to build the scenarios, e.g., scenario axis, futures table, and custom methods, they all worked with the ideas, e.g., key drivers, factors, uncertainties. They explained that the process where the scenario developers were tasked with combining the ideas with another – different languages were used, such as factors, drivers, uncertainty – was creative.

		Themes (Tentative)					
Merged Findings	From which cases?	Creative process	Creative ideas spectrum	Transformed understanding	Added value	Innovation, competition and preparedness	Creativity and shared understanding
Merged Finding I: Creative Combination of ideas in scenario development	Case 3 Case 6 Case 8 Case 10 Case 15 Case 18	X					
Merged Finding II Shared understanding of a	Case 4	X		X			X

goal through a creative process							
Merged Finding III	Case 3				X		
Creative moments	Case 14						
	Case16						
Merged Finding IV	Case 6				X		
Artistic Touches	Case 8						
Merged Finding V	Case 18				X		
Creativity lost in translation							
Merged Finding VI	Case 4					X	
Innovative idea generation							
Merged Finding V	Case 4					X	

Competitiveness and creativity							
Merged Finding VI Preparing for black swans	Case 16					X	
Merged Finding VII Black swans are creative	Case 8 Case 14 Case 16		X				
Merged Finding VII Changing degrees of creativity in positive, negative and BAU scenarios	Case 14 Case 15 Case 18		X				
Merged Finding VIII	Case 14 Case 16		X				

Negative scenarios are easier to think about							
Merged Finding IX Creativity can cause dysfunction	Case 18		X				
Merged Findings X Artistic touches through creativity	Case 6 Case 7 Case 8 Case 16				X		
Merged Findings XI Impact of creative ideas on understanding	Case 3 Case 13 Case 15			X			

Table 5. 5: Theme-based assertion findings in six themes to explain the role of creativity in scenario planning

Other participants focused on the choice of drivers in the scenario development process. For instance, Kieran criticised the client company for not focusing on digitalisation in the scenario development process. Case 13, on the other hand, was mainly informed by digitalisation and created a focus of attention in the industry according to Joel's experience.

Both Kieran and Joel identified the maritime industry as conservative and slow-moving. When the maritime stakeholders are invited to the scenario development workshops, the industry stakeholders' traditional and conservative perception of the industry appears to limit the process's outcome. Another case in the multiple case study that included digitalisation was number 14. The scenario developers stated that the fourth scenario – “the creative one” – they created did not receive much response from the participants, “the stakeholders and those people who responded they didn't have much to say about it”. The scenario came out mainly due to the scenario developers' desk research and brainstorming. Case 18 is a research article that focuses on digitalisation in seaports. Although the scenario developers did not identify an idea creative, they compared the scenarios for creativity. They said that the positive and negative scenarios were more creative than the BAU scenarios. The research assessed an idea in one of the scenarios, “digital supremacy”, creative. Similarly, case 8 disruptive technology scenario was evaluated as creative by the researcher and the scenario developer. Considering the maritime industry's traditional, slow-moving and conservative nature, digital elements in the scenario development phase and their inclusion in the scenarios resulted in creativity because the industry's digital elements appear to be often undermined. One reason for digitalisation not being at the forefront of the discussion might be that it is considered irrelevant or not useful to the industry. The novelty of digitalisation in the industry is probably apparent to the stakeholders. However, not seeing it as relevant and useful might lead the stakeholders to discard the digital elements in their future thinking.

Creativity and shared understanding

In case 4, various stakeholders evaluated the future scenarios after they were fully developed. The common agreement on one of the scenarios supported the vision

development. The support it has received was perceived as creative. It is also associated with the creative process tentative-theme since the interviewee also perceived the vision development process as creative.

Added value

The tentative-theme added value included creative moments, artistic touches, and lost in translation. Creative moments were also experienced, as reported by the interviewees. The CorpWatch example was given as a result of a creative moment. However, the issue with translation and the loss of creativity was also brought up in another case.

Three interviewees mentioned creativity through artistic touches in two different cases. Visual illustrations and inviting storytellers in the scenario development stage were considered art and found to be related to creativity in scenario planning.

Creative idea spectrum

The tentative-theme creative ideas spectrum was developed based on the findings of

- black swan events and scenarios are creative;
- positive, negative and business-as-usual scenarios are not often creative;
- negative scenarios are easier to think about, and
- creativity can cause dysfunction.

The highest number of creative ideas came from case 8 – Global Marine Trends scenarios (Fang *et al.*, 2013) based on the author's and the scenario developer's assessment. However, the creative ideas were found in the black swan scenarios and not the main ones. This is because the black swan scenarios were separate from the three main scenarios and were presented as supplementary ideas in the publication. Black swan events (Taleb, 2007) have the potential to cause extreme impact (Wright and Cairns, 2011, p.171; MacKay and McKiernan, 2018, p.37; Wright *et al.*, 2019; Ansell and Boin, 2019), but are considered low probability (Burrows and Gnad, 2018). Furthermore, they may come out of the blue (Derbyshire and Wright, 2014) and are

associated with being unthinkable (MacKay and McKiernan, 2018, p.37; Burrows and Gnad, 2018). The interviewee also noted that embedding the black swan events in the main scenarios proved challenging; therefore, they were presented separately. For the most part, scenario planning literature does not offer a guideline for accommodating such events.

Burrows and Gnad (2018) used the exploratory and normative scenario categorisation to explain the use of black swan events in scenario planning. They stated that black swans, Unknown Unknowns, and disruptive changes were inappropriate for normative scenarios and better fit for exploratory scenarios. Case 8 scenarios were developed to “understand how to create industrial strategies for the maritime sectors”, and “scenario planning was not a process, more of a tool” (Jay). They also “did not work out the full definition of the scenarios” (Jay). Interviewee response indicates a sense of exploratory scenario building effort without fully applying a scenario planning methodology. The three main scenarios they developed made up a large part of the report. Although they were exploratory in nature, two scenarios were formed around the BAU scenario. Applying two different degrees of probability-impact spectrum is likely to be why the black swan events could not be integrated into the main scenarios. A pragmatic approach to sensemaking suggested by Ansell and Boin (2019) can be helpful to the case 8 authors in the future, should they develop scenarios again.

Case 14 authors evaluated the virtual scenario as a black swan. The scenario envisioned a future people do not travel anymore for two reasons: the popularisation of VR and the tense political situation in the Baltic Sea caused by Russia. Cassandra of case 16 also found the idea creative but did not call it a black swan scenario or event. An interesting observation came from Whitney about black swans; she said that “people like to discuss about bad things and black swans”. A similar observation was expressed by Cassandra, a consultant for Case 16. Rozin and Royzman (2001) called this phenomenon negativity bias, explaining that negative entities are more contagious than positive entities due to various factors. One factor was negative differentiation. “Negative entities are more varied, yield more complex conceptual representations, and engage a wider response repertoire” (Rozin and Royzman, 2001, p.296). Negative differentiation especially bears a resemblance to Whitney and Cassandra’s statements.

Loss aversion is a typical example of negativity bias in the shape of potency (Rozin and Royzman, 2001) and discussed under black swan events (Taleb, 2008, cited in Cairns and Wright, 2017, p. 171). According to Ashanti from case 16, a maritime spatial planner and participant in the scenario development workshop, including black swan events, would be creative. However, she did not find the scenarios creative, saying that the scenarios were already happening.

Business as usual (BAU) scenarios were not perceived as creative by any of the participants. In the cases where positive, negative and BAU scenario development logic was followed, the negative and positive scenarios reportedly had more potential for creativity. However, the creativity assessment of the scenarios for ideas also revealed that only one of the scenarios that were developed following the positive, negative and BAU structure had one creative idea, according to the researcher's assessment. The scenario developers did not identify any creative ideas in the cases. The cases that employed such structure fully or partially were Case 8 (Fang *et al.*, 2013), 10 (Artuso *et al.*, 2015), 14 (Pöntynen and Erkkilä-Välimäki, 2018), and 18 (Inkinen, Helminen and Saarikoski, 2021). For instance, case 14 developed four scenarios; three of them were positive, negative and BAU scenarios. The fourth scenario was an outlier, and the scenario developers evaluated it as creative.

Transformed Understanding

Case 3 followed Kees van der Heijden and Oxford scenario school for scenario development. The idea that they found creative at the time was reportedly transformational to their understanding. Two participants in separate interviews brought up the idea, evaluating it as creative. A similar experience was reported by the case 13 author. The creative idea he identified on which the scenario was built was transformational. However, as the author stated, scenario methodology was not applied in any form except that scenario thinking was utilised. It is hard to give credit to SP if a credit is due. Lamar's response about case 6 scenarios can be loosely included in transformed understanding. He made a point about the change that was envisioned for cultural tourism over the years.

The final creative idea in this category came from case 15. Kieran stated that the participants realised they were not thinking of the possibility of wind energy. Wind energy was an interesting element in the scenarios as it was the standard way to sail the vessels about a century ago. Creativity appears in this case in the form of a forgotten practice. Its come back was not expected yet it is possible.

Creative idea and innovation, competition, and preparedness

Adrie of case 4 illustrated a creative idea that the port is still considering for implementation. The creative idea links scenario planning to innovative idea generation. However, the author was not able to identify other examples of this aspect in the multiple case study. Case 16 illustrated an unintentional attempt at innovative idea development with the drone example. It was unintentional because they did not aim to develop innovative ideas through scenario planning. Using drones to transport items to remote places was brought up by some participants. However, it is already being applied in other geographies. Wind energy use on the ships was a creative idea example that came from case 15. However, the innovativeness of the idea is difficult to claim. There have been alternative energy fuelled vessel design concepts past decades. The example appears to be more of a reminder of a potential clean energy direction the shipping may take in the future than an innovative idea generation.

The relationship between a competition-oriented scenario planning practising company and creative ideas also came up in the analysis. Based on the interviewee's input, a deliberate effort to develop a vision different from the port's competitors might have led to identifying the green growth scenario as early as 2011, four years before the Paris Climate Agreement. However, discussions around green ports were already happening before 2011 around the globe. For instance, the Port of Long Beach, in California, United States, initiated a green port policy as early as 2005 (Berg, 2020; Port of Long Beach, 2022). However, their strategy development did not include green energy until 2011 (The Port of Long Beach and Los Angeles, 2011) Another example of green energy use in the ports dates back to 2010. Chaebang Port in Thailand introduced a Green Port Program to focus on its carbon monoxide (CO) emissions. The port agreed to launch a Wind Farm Power Pilot Project to increase the amount of

green energy to the port's total electricity consumption (Cardinal and Factuar, 2018, p.431). Case 3 is an example of P- level creativity where the scenario team responsible for vision development came across the green growth concept first time through discussions in the scenario planning workshop. A large number of stakeholders agreed on the utility of the idea. As Adrie stated, the port might eventually realise the trend towards green energy use in the sector. However, the scenario planning workshop facilitated a shared understanding of the issue. It supported the port's decision to implement the scenario through a vision.

The last finding that contributed to the tentative theme was preparedness. The mini-case in case 16 revealed that including a pandemic scenario as a black swan event might lead maritime spatial planners to focus on a pandemic scenario and prepare them for their spatial planning. Unfortunately, the scenario developer interviewee in case 16 was not able to explain why a pandemic was not included in the scenarios. Case 14 and 16 were conducted for the maritime spatial planning of Finland, and both scenario projects envisioned changes in the maritime spatial area use accompanied by travel restrictions.

Conclusion

Assessment of creative products receives much less attention... yet...the "ability to measure a product's creativity is among the most important aspects of creativity assessment" (Kaufman and Sternberg, 2010, p.58). Scenarios were considered a product in the work and evaluated for creative ideas by the author and their developers. The findings answered RQ 3 from the scenario teams' perspective. Their and the author's creativity assessment of the scenarios aimed to reveal whether the maritime scenarios were creative or not.

Ultimately, triangulation of the creativity assessment findings suggests that the maritime scenarios are creative. Despite the exceptions, most of the scenarios were perceived as creative in their ideas. However, the number of creative ideas in the scenarios wavered. The author does not advocate for a high number of creative ideas in the scenario, but scenario publications lacking any creative ideas were observed.

The relationship between creativity and SP effectiveness is investigated further, and the findings are presented later in this chapter.

The findings also revealed another side of the creativity and scenario planning relationship. The interviewees reported additional insights and perspectives on the forms of creativity in scenario planning. Their perspective focused on creativity as a process.

The final part of the chapter presents the findings answering the quintain through a thematic analysis. Previously reported foreshadowed issues, within-case analysis, and the tentative-thematic assertions contributed to answering the quintain. The participants' past scenario planning experiences were not included in the within-case analysis. The next section that is answering the quintain also integrates them into the analysis, tapping into richer data and expanding beyond the scenario teams' maritime-related SP project experience.

5.4. The Quintain Findings

This chapter presents the perceived role of creativity in scenario planning effectiveness through the foreshadowed issues and cross-case analysis findings. The final research question:

RQ 4: What is the role of creativity in scenario planning effectiveness on scenario users?

is answered in this section.

Within-case analysis findings also contributed to the author's understanding of the quintain as they provided insights in the cross-case analysis stage. All participants who contributed to the quintain findings, except for one, reported that creativity's role in scenario planning effectiveness was "there". However, their perception of the role creativity played varied. Three themes and eight subthemes were constructed to reflect the participants' perception of creativity in scenario planning effectiveness. The themes and their related subthemes are presented in Table 5.6. Creativity concerning research design was another finding that came out during the within-case analysis.

However, the research design creativity aspect is outside the quintain scope and therefore not included in the thematic analysis.

Theme	Subtheme	Contributing Cases
Transformed Understanding	Discover beyond usual	Case 3, 6, 13, 15, 16, 18
	Choose and combine creatively	Case 6, 8, 10, 14
	Shared understanding and taking ownership	Case 4, 6, 16
Added value	Artistic Touches	Case 6, 7, 8, 14, 16
	Humour, trust, playfulness, and fun moments	Case 3, 4, 14, 16
	Creativity and innovation	Case 4, 15, 16
Issues within and around creativity	Creativity dysfunction	Case 8, 16, 18
	Constrained creativity	Case 3, 4, 8, 13, 18
	Creativity loss	Case 18
	Personality and creativity	Case 8, 16, 18
Requirements for creativity's effectiveness in scenario planning	Creativity depends on project purpose	All cases
	Creativity should be useful, surprising, commonly understood and supported by hard facts	Case 3, 6, 8
	Expectations from SP participants	Case 6, 14, 15, 16

Table 5. 6: Thematic illustration of the quintain findings

Source: Author's data collection

5.4.1. Transformed understanding

The theme transformed understanding was constructed around the participant statements such as “pushing boundaries of thinking”, “seeing what you’ve not seen before through creativity”, “considering only mega trends does not bring anything new to the table”. Additionally, the importance of shared understanding and taking ownership of the ideas were repeatedly emphasised and included in the theme.

The track change metaphor is helpful to illustrate the theme. Organisations being passengers on the train and the train moving forward on their pre-set course, the track; the train aims to reach a place where the passengers – organisation - desire. They are motivated to travel and see what other places might be there – practising scenario planning –. They are willing to explore other possibilities -plausible alternative futures- far ahead. They move forward on a track, perhaps alongside other passengers in other trains – e.g. their competitors - however, the journey has an issue. They need to decide far in advance and change the track. It is an issue because potential destinations are so hard to see from a distance. They do not know whether it is the valley of success or the desert of failure. The passengers look far ahead, trying to make sense of what they see. Different opinions quickly emerge, and discussions begin. One passenger says he sees a mountain on the far right-hand side. Although the view is blurry, somehow it looks promising, perhaps because the path to the mountain is similar to the path they came from or because it is bright and colourful. Another passenger disagrees and points out another direction. She has other reasons to think the direction she points out is where the valley of success is.

The third person spots a route the others do not see. It is surprising because they have not seen the path before, and it is new to them. The passengers mull over what they can see and try to understand where the route may direct them. Distance is far, just like other potential destinations. So, they combine any available evidence and try to make sense of it. Switching track, however, depends on a shared understanding and taking ownership of the mulling over process and a final decision. If two people are responsible for the final answer, the two people need to be “on board” with the

decision. If it is a democratic system, the majority needs to agree on switching the track.

Meanwhile, time is passing, and they need to make a decision. They will either choose the third track or the first or the second or neither and continue their journey. The first and second tracks are familiar to the passengers; probably, they are not as worried about the first and second options. The third track requires the successful implementation of the second step. The decision-maker needs to be on board with the decision. Changing track and choosing the third path requires transformed understanding; not changing the track, choosing the first or the second do not. The road may be long; multiple track changes are likely to be necessary.

The subtheme discover beyond usual is considered an essential part of the relationship between creativity and effective scenario planning. Creativity is perceived as a means of seeing beyond usual thinking and is helpful for the uncertainty identification and combination stage. Shared understanding and taking ownership acts as a mechanism to maintain the creative ideas in the process, leading to actionable outcomes. The three subthemes have contributed to transformed understanding. The subthemes discover beyond usual, choose and combine creatively, and shared understanding and taking ownership are presented below.

5.4.1.1. Discover beyond usual

The subtheme discover beyond usual is constructed primarily by capturing the early stages of scenario planning practices before deciding on the key drivers and uncertainties the scenarios are built upon. Case study participants are interested in seeing what they have not seen before through scenario planning. Creativity is perceived as a way of catching what might escape from attention without it, detecting upcoming futures others have not said out loud, avoiding working with only what was already known and going beyond usual thinking. For instance, optimistic and pessimistic scenario development based on business-as-usual scenarios is considered limited value.

...sorry to say but there were number of scenarios that we see are crap. Maybe because they don't really add anything novel to the thinking they are stating some kind of business as usual... (Billie, Case 3).

Big problem with most of the scenarios; simple solutions of optimistic and pessimistic scenarios. In case of shipping and climate change, it's not to be variations of optimistic and pessimistic, there's going to be a different industry in 30- 40 years, you really need to push the boundaries of your thinking in the case of like this (referring to climate change and shipping) (Kieran, Case 15).

Two participants emphasised the importance of discovering all possibilities and associated doing it with creativity:

....playing with uncertainties and potential ideas, you have a lot of different ideas.... Seeing what you haven't seen before is possible through exposing yourself to a big number of potential states, driving numbers you can see how they might unfold in the future. (Billie, Case 3)

The point of doing scenario planning is to try and look into an uncertain future. To do that, you need to have an idea of what that uncertainty is. To have an idea of what that uncertainty is, you need to look at all different possibilities both likely and unlikely. (Kieran, 15)

Participants explained how creativity could help identify what had not been seen before. Billie and Kieran's examples above are some of them. In addition, examples of thinking about the impossible and unlikely events, thinking in extremes, combining knowledge, and the business school way of thinking were given.

Thinking about the impossible was considered helpful to scenario planning to try and understand what the future brings and associated with surprise. Lamar explained the importance of thinking about the impossible:

...in hindsight many people would've wanted to anticipate this pandemic, and Shell example of oil crisis and referring them lucky (Lamar, Case 6).

A similar approach to thinking in extremes example was given by case 18 authors. Moving away from business-as-usual thinking toward the extremes was perceived as a means of reaching creative ideas. However, the business school way of creative thinking might not be self-exploratory, and therefore the author felt the need to share the example that was given:

...the business school way of looking at things would be to look at what did McKinsey do in a similar situation, what did Goldman Sachs did and so on (Joel, Case 13).

The business school way and thinking in extremes examples came from personal experience as the participant used them in his professional work. The business school way was using case studies, looking at what other companies did for success or in a similar situation to one's own circumstances. Joel's explanation also resonates with other participants' as another source of creative idea generation was considered through combining knowledge. Gathering and combining knowledge from different fields and borrowing concepts from different industries for adaptation were perceived as creative. According to them, the suggested ways support the discovery of new possibilities, developments and insights.

...It is not necessarily getting ideas just out of the blue, but it is combining knowledge from different fields in ways that enable you to do something different that gives new insights (Kieran, Case 15).

The majority of participants thought about originality when they were asked about creativity. However, some participants also brought up the usefulness and surprise dimensions. Therefore, they are presented under the requirement theme as the participant considered them requirements for creativity.

5.4.1.2. Choose and combine creatively

The choose and combine creatively subtheme sounds much like the above findings. However, this subtheme was constructed around participants' scenario building-related input. Choose and combine creatively occurred after discovering beyond usual.

The previous subtheme presented combining ideas and knowledge to produce creative ideas. Despite using various scenario planning processes across the cases, their processes shared similarities. They gathered information early in the process and later analysed and discussed them. Aside from the differences between data sources and collection methods, all scenario planners were tasked with creating the scenarios. The scenario creation processes varied; however, they all worked with future ideas for creating the scenarios. The author uses the word 'idea' to cover a general understanding. Participants called them drivers, factors or elements. The subtheme includes three main findings, all of which were perceived as creative:

- choosing the most impactful factors,
- combining the ideas over a time span, and
- combining the creative ideas over a time span.

According to Sam, choosing the most impactful factor before combining them was creative in the scenario development process. He explains the driver identification stage, choosing the one with the highest impact to construct the scenarios.

Okay, well, maybe the elements as such are not necessarily the most creative thing, but it's the selection and the combination of them. I think everyone, even in the business and in the policy, will somehow know that a certain element will have some impacts on the outcome. But I think the creative thing here is to pick out the ones that have most impact even without having done preliminary forecasting, or mainly, this is based on expert knowledge (Sam, Case 10).

Maheen's explanation has similarities to Sam's. He talks about the driver identification stage and being open to them. The next step is their combination.

... the four scenarios in the cross section, you know the standard more or less the method Shell based, I think. There is a procedure more or less for it. It is written down and that's been there, has been applied in many studies. But still... the creativity, I mean it's not like being an artist, but getting the... being open to the signals that you get and combine them (Maheen, Case 6).

According to other participants, combining the ideas regardless of the ideas' creativity was one way of being creative in the scenario development stage.

...the creative aspect of the three scenarios that we produced, was in trying to understand... I guess that we, we had to figure out what sorts of things would change in a geopolitical sense in... between these scenarios? And so while I was able to start the thing by saying, look, I think geopolitical cooperation, is going to be the thing that really drives the economy. I mean, that was arguably creative in this sense. But it was probably based on knowledge I had from other spheres. But by starting with that spark, then there would be creativity was well, what else do we need to go look at that might be specific to a scenario that would help us to describe it. (Jay, Case 8).

...these activities within the broader macro future, so what I liked was to connect this what I called bottom up thinking, What would be possible development creatures and to position it within the broader framework... and that there is something that led to... I would say creative combinations and creative possible futures (Lamar, Case 6).

Creative ideas were also considered part of the combining process during the scenario development stage.

...thinking about these creative ideas, is that we should also combine them to the time scale of time span of the scenarios... (Dane, Case 14)

...in the context of my work, it means taking pieces of in this context information, but pieces of whatever, and making links between them in a way that creates something that maybe hasn't been said out loud before (Cassandra, Case 16).

5.4.1.3.Shared understanding and taking ownership

The shared understanding and taking ownership subtheme presents how the scenarios result in desired impacts concerning the creativity from scenario practitioners' and users' engagement point of view. A challenge scenario planners faced during the scenario development phase was the scenario planning practitioners' and scenario

users' inclination to prefer one scenario over others. It meant that some scenarios were neglected. Therefore, shared understanding and taking ownership of the resulting scenarios were perceived necessary by the participants. However, it was considered a make-or-break point in the case of creative ideas.

... it may be difficult for let's say policy makers to engage them. ..provided it that you praise it in such a way that the decision makers... because it's policy makers... but also you know, you could also say business leader. If you can take them along. And otherwise if it remains let's say purely academic exercise. Then and if the (inaudible) is a real, this decision makers in the real world is not secured then it may just be a theoretical exercise (Lamar, Case 6).

...So the creativity is OK, but it should work in such a way that it let's say reaches out to the people who were not directly involved in the development of the scenarios and that there's really a risk (Maheen, Case 6).

The issue appears to be more critical, especially when the key actors are not part of the scenario development process. However, this is one side of the experience. Creativity can be highly impactful in a diverse, collaborative scenario building environment. In case 4, the green transformation concept was new to the scenario planning practitioners. The idea received extensive support from various stakeholders and was finally implemented. A member of the scenario team explained:

...I think for that time... most creative that we have been able to was to which such a vision to get an acceptance... from your shareholders also government that the area we are in northern part of Netherlands would be very important to become a so- called Energy Province in which we have become... I have become part of the process, they also were... very have moved in the expectation... order of the developments which were going on because it was their own input...(Adrie, Case 4).

Stakeholders' involvement in the scenario development is a critical issue for accepting or rejecting the ideas, especially for creative ideas.

5.4.2. Added Value

The theme added value was formed around participants' statements on the areas where creativity was perceived valuable in scenario planning but considered secondary importance. It was of secondary importance in comparison to transformed understanding. The researcher's interpretation revealed that the artistic touches, creative moments, and conflict management roles creativity played in scenario planning were considered an added value.

5.4.2.1. Artistic touches

The subtheme artistic was constructed based on the reported positive impact of creativity in scenario planning from creativity and art points of view. Creative writing, use of visuals such as maps and the future state of a place, and employing storytellers were considered impactful on the scenario planning process. Future images reportedly triggered the practitioners to think about the future and assisted the discussions further.

What we also did for... not for this study so much... we try to visualise them. We even employed artists to make drawings... how the world looks like... in an urban environment... you can think of large flats and all sorts of future visions, so there is some creativity involved there of combining things and in such a way that that it triggers people to think (Maheen, Case 6).

I agree that (Agreeing with Riitta) you need to have some professionals to visualise things because it enhances the creativity of a person when you are looking for unwanted future of Gulf of Finland.. Everything, everybody are suffering and it's visualised you know picture, so it enhances (Whitney, Case 14).

However, maps were considered a double-edged sword in the scenario planning development workshop. An issue with fixating on the current state of the world and not being able to visualise other potentials was reported.

...creating scenarios, so the spatial data, the maps. a double-edged sword so they are good and bad they both allow people think more freely and be more

creative. When they see the maps or some kind of visualisation but on the other hand, the maps are also very dangerous in terms of creativity, because then what you put on a map people tend to think that it's the reality it's true, and in this case it's not it's something that you should do (Whitney, Case 14).

The role of creativity in the scenario writing stage was also brought up. The scenarios' accessibility was considered essential and associated with creativity. The accessibility appears to be related to understandability in Jay's statement.

... we had to be creative with the text, too... we weren't just pulling the text from existing material, we had to create all of the ideas in the text and then write it out in a way that was that was accessible. So that was there was a lot of creativity went into I think... the scenarios (Jay, Case 8)

5.4.2.2. Humour, trust, playfulness, and fun moments

Creativity in scenario planning was associated with humour, trust, playfulness, and fun moments. These attributes were perceived as helpful for conflict management, assisting discussions further, and the ideation process.

Discussions about the future of an area's spatial planning are bound to have discussions and conflicts among the SP practitioners in the region under discussion. Humour and playfulness through multiple scenario development was considered helpful for tackling conflicts.

...But when it was... we have these three different scenarios, it allowed the participants to think maybe a bit more widely, and it was more playful, obviously, serious, but it allowed it's like an aspect of playfulness and, so the conflict between for example, the energy sector and environmental activists, if you would have just been like, okay, talk about the future. The one, the possible future that you promote, most believe in, it would have created more conflict. But when we created these... the three different scenarios, I think it allowed more truthful discussion to begin with (Cassandra, Case 16).

When I think about those who respond or answer or participate to the creating part of the process, the creativity means that they allow themselves to think a little bit wider a little bit out of the box and get out of their professional roles, or even in that role. They allow themselves to... I think something that even it's not very realistic or practical but they allow them to discuss and then, when the discussions, for example in workshop went on, and there is laughing and something that is kind of joking, and so on, and it's the creativity, then the people... Creativity is connected to trust, and they are trusting each other if, for example ... even though issues that are needed to be difficult, they are, for example in maritime spatial planning the different stakeholder groups like fishers who are underdogs and then maritime industry, which is very powerful, if you have a good group these people... They dare to speak about these things directly and that feeds the creativity so, it's a complicated issue but it's all those things, trust and... (Whitney, Case 14).

Fun and playful moments were experienced during the scenarios' fleshing out stage, naming the scenarios and envisioning organisations operating in the future. One of them, CorpWatch was previously mentioned.

So I think that those having creative moments then there's have been creative moments of more if you want to put it fun character like you know, when you have to start constructing scenarios and putting them in a name and ideate you know, what could be the future events that could indicate that this is the scenario that is happening and so on. That's, that's the other set of creative moments (Ingrid, Case 3).

However, not every scenario development process was conceived as fun and playful. Scenario developers also reported that the scenario practitioners were bored of using the scenario axis method for scenario building. For instance, futures table was seen as an alternative.

...we needed something, and we are obligated to do something that is more living works, so people are feeling and discussing more freely and those quadrant issues

they are kind of... They are so much used that people are so bored of them I think (Whitney, Case 14).

5.4.2.3. Creativity and innovation

Only one case, number four, revealed a potentially innovative idea generation through scenario planning. The idea was to provide the vessels calling their ports with green energy. Two other cases illustrated similar experiences during the scenario planning process. In case 16, the scenario planning workshop practitioners played around the idea of delivering items by drones to the remote areas in Finland. In case 15, the potential adoption of wind-powered vessels in the future was discussed. However, neither of the two examples can be considered innovative as they have been either actively used or already under development.

5.4.3. Issues within and around creativity

The theme issues within and around creativity was constructed after recognising the participants' perceived issues. These were creativity dysfunction, constrained creativity, and creativity loss. The dysfunction aspect was associated with too much creativity and conceived detrimental to the scenario development process. For instance, two scenario developers reported they planned the fourth scenario but had to abort it. Constrained creativity was associated with the scenario development methods and the constraints that came with them. Finally, creativity loss resulted from the translation process and the environment SP was built in and for.

5.4.3.1. Creativity dysfunction

The subtheme of creativity dysfunction emerged clearly in the analysis. The participants reported their concerns about how having so many creative ideas could be detrimental to the scenario building process. Having too many creative ideas was associated with getting lost and losing control over the scenario building process.

I think there's some creative ideas are useful, or more effective in scenario planning. I think if you have too many creative ideas, you'll just get lost (Jay, Case 8).

... if you have lots of creative ideas, then your scenarios will be all over the place...of course, it depends on the how it might be possible to incorporate number of creative ideas in scenarios but somehow this is just my impression that I have a feeling that if you have more than one then perhaps two or maximum three, but otherwise, it will be all over the place with (Rae, Case 18).

According to its developer, a highly creative scenario idea had to be aborted in one instance as the scenario development proved to be too difficult. The scenario development process was not participative as the researchers created them through desk research and previous research project findings.

And actually, there were a fourth scenario in the beginning, but it's sort of it was, let's say, How to say... surprise scenario, or, really, like, science fiction, or this kind of thing, but I couldn't make this scenario work and have the values for these key variables. So it was then that's why it was discarded. And we kept only the three scenarios. So we kind of tried to make a fourth scenario, but it didn't start flying. So it was discarded (Mylie, Case 18).

The participants also had further discussions on the number of creative ideas and how they affected scenario planning effectiveness. The participants did not accept a linear relationship between the number of creative ideas and scenario planning effectiveness.

...So I disagree. With the simplistic definition that simply more and more creative ideas is good news. I think that you can very quickly come to a conclusion on. I mean, I suppose it's about the Pareto analysis, you get 80% of the information from 20% of the effort. You know, so I think that you don't need a lot of creative ideas, or I certainly don't think that effectiveness and a number of creative ideas is correlated (Jay, Case 8).

So you could like, easily point out the train of thought that has led to these creative ideas. But I don't think it is like, whether you bring table 100 creative ideas and 200 or 300. I don't think more is more in this sense. But you could also focus down a bit from the number of ideas... but I don't think that kind of

effect the scenario planning number of ideas... the curve is linear. All the way into in depth, definitely. (Cassandra, Case 16).

Despite an overwhelming agreement on creative ideas' contribution to scenario planning effectiveness and the dysfunction that comes with a high number of creative ideas, there is no fixed guideline or scheme for their involvement. Quantity over quality appears to be of the highest importance.

5.4.3.2. Constrained creativity

The theme constrained creativity was created based on participant input, where the application of a step-by-step scenario method was perceived as constraining and detrimental to creativity. Compared to the previous subtheme creativity dysfunction, the constrained creativity subtheme reflects the opposite.

... you start to combine those ideas in novel ways. I know that you talk to my colleague ... we have a tool, a scenario building tool, which I don't like, at all, because it does destroy creativity. Yeah, it formalises some kind of causality, which I think hinders you from being creative about that (Billie, Case 3).

... An old saying is that systems kill creativity. So if you have a system, you cannot be creative within the system because it's ruled by its regulations and lost, otherwise, it's not a system. So there is this kind of conceptual way of looking at things. And that also it comes to this kind of methodological, and research philosophy related thing (Rae, Case 18).

Participant's dilemma between being creative but not being too creative while developing the scenarios through a "system" that regulates and formalises the development process is apparent. Especially the combine creatively subtheme relates to the constrained creativity subtheme findings. The scenario developers tried to navigate the ways for being creative in the development process despite the formal step-by-step procedures they used. However, there is one exception in the case studies to the formal scenario development process that contributes to understanding the quintain.

I have been asked many times why I did not (follow the traditional approach). We had a PhD student also from a technical University of Copenhagen and asked me exactly the same way, why I did not follow the traditional approaches. The honest version is because I'm an economist but I'm not skilled in scenario planning and I was not familiar with it. I knew of course four horizons ... is called from McKinsey they have some kind of models but for me it's very out of ambition of trying to understand what have others done so it was... I didn't initiate it as a scenario planning. I initiated it as trying to understand what can be done, so it may be in the wrong end in so to speak but that's it ended up differently than what could have done relatively (Joel, Case 13).

According to the developer, not using a “traditional scenario planning” process resulted in developing a creative scenario. The researcher also previously assessed an idea the scenario was built on creative. However, this finding does not suggest scrapping the commonly used scenario planning methods in favour of non-formal ways of scenario development. If anything, the findings indicate the need for flexibility in choosing an approach to scenario development that directly responds to the scenario development objective.

Case 4 informs the subtheme from the point of using the scenario axis method for scenario development yet developing a set of scenarios that were fairly novel at the time. The green energy transition concept was new to the port and at the time, not many ports around the world were considering it. Adrie from case 4 informed that they were ambitiously looking for new ways to offer unique services and be competitive in the sector. As she stated that the other ports and the scenarios were looking alike, the motivation for being different might have led them to come up with a different outlook through scenario planning.

Case 13 and case 8 were developed to inform the maritime stakeholders about the industry's future. Neither of the cases involved a traditional scenario development process. Further discussion on scenario development aims, chosen process and

creativity, and achieving desired outcomes – effectiveness- is given later in the thematic analysis findings.

5.4.3.3.Creativity loss

The theme creativity loss emerged during the analysis, where the participants reported various ways of losing creativity in the scenario development process. For example, translating the scenarios from one language into another was one way of losing creativity and the fitting into the environment where the scenarios are being built was another.

A group of researchers reported that they struggled during the translation of the scenario names from one language into English. They stated that the original title was more creative but did not make sense in English when translated.

Some participants also reported that the environment where the scenarios were being built affected creativity. Academia was given as an example. The reflection was self-critical, especially considering the authors were researchers in academia.

... in one sense, the whole article itself, I think it's not that creative itself, it's very straightforward and it's data driven as Mylie said.. and it's also that is actually, if you are writing articles, to scientific journals, you will, if you have not yet know this, that they tend to be quite traditional in the format, in which they want the text to be. And it's also something it relates a little bit to creativity in academic world, academic world is not very creative. Very, very traditional (Rae, Case 18).

Their response relates to three points. The first point is the visual structure of the published scenarios, and it is shown in the theme added value. According to the researchers, creativity was not present as an added value due to restrictions on the publication format. The second point is the science-driven nature of academia. Scenario planning was believed to lose creativity due to the emphasis on data-driven research. This discussion point is connected to another subtheme developed in the research. The third point the researcher interpreted is the possibility of producing

scenarios with varied creativity due to the environment they were produced. The scenario team members, e.g. facilitators, and practitioners, might be inclined to fit into the environment and act and speak differently. Points two and three are further explained under the theme requirements of creativity for effective scenario planning.

5.4.3.4. Personality and Creativity

The subtheme personality and creativity came out of participants' perceptions of how their personality and creativity are interrelated. Participants reported personal association and disassociation. Personality was perceived as affecting their approach to coming up with new ideas and even career choices. SP practitioners and visionary people were other interesting findings. Study participants evaluated some of the SP workshop practitioners as more visionary than the others and found visionary people highly contributive to the SP process.

Creativity was perceived as an ability. Participants talked about their creativity skills in the interviews. Their creativity perception appeared to be related to their way of accessing novel ideas, career choices, and even answering the researcher's interview questions. Different approaches to accessing novel ideas were previously presented in the theme of transformed understanding. Combining ideas to reach new insights and ideas were considered the only option for a participant who did not think of himself as creative:

... let's say personality and in relation to creativity and I would say that I'm not a very creative person. I'm more like, like let's say... executing or... this type of personality that I don't have a million of new ideas in the meetings, what we could do or so, but rather how to improve the product, processes little by little. And in that sense, I think that creativity for me is just going through a lot of background material and try to learn from there, what has been done before and then taking bits and... pieces there and put them together and trying to make new in something new in this way, maybe adding a little bit new (Mylie, Case 18).

A contrary self-creativity evaluation came from another participant and stated the relationship between his creative mind and his professional role as a strategist was related as his job was to understand what the future may look like.

Creativity is really important to me... we had a team, psychometric test went on a year or so ago and I found that I was... the highest in the team on creativity. I've got a highly creative mind, I guess... that's what I do. So... my work in strategy is about, it's about understanding what the future looks like, and then creating the possibilities so that we can, we can be part of that future (Jay, Case 8).

A practitioner and scenario user reported that she was not creative at all. She found the creativity-related questions extremely hard and did not respond to the creativity-related questions.

5.4.4. Requirements for creativity in scenario planning effectiveness

The final theme requirements for creativity in effective scenario planning was formed around the needs of scenario developer/facilitators from the scenario planning practitioners, the scenario developer/facilitators' perception of the requirements of including creativity in scenario planning effectively, and their suggestions. The theme also captured more nuanced aspects such as the relationship between creativity, scenario planning purpose and outcomes.

5.4.4.1. Creativity depends on the project's purpose

The subtheme creativity depends on project purpose is established on one main argument: the need for creativity depends on what is aimed with the scenario planning project. Findings revealed that there is a need for creativity for effective scenario planning, though with varying levels and uses.

It depends also the issue... it's good that people are creative they think new ways, show nuances be there, based on the old ones or new ones, but solution for that problem, or why we are... this goes back to the issue that why we are doing the scenario work? In every needs always to be a purpose for scenario

working and then the need, the need to the creativeness is based on that idea of what's the purpose of the scenario work, what kind of creativeness we want? (Whitney, Case 14).

Case reports and within-case analysis findings contributed to the subtheme by revealing the scenario development purposes, the perceived role of creativity, creativity assessment results and the scenario projects' success at fulfilling the desired outcome.

All case studies, including case 14, reported success in accomplishing their desired outcomes. Case 14 scenarios were not used in Finland's official maritime spatial planning process, and a follow-up scenario project, case 16, was conducted. The reason for this was that case 14 was a rehearsal project.

The cases were divided into three categories according to their development purposes. The first category was SP for private company strategy development support. The second one was SP for policy support. The third was informing the maritime industry. In some cases, the third category was also observed in addition to the first and second categories. The categorisation was made based on the primary aims of the case studies, as reported by the interviewees.

Four cases came from the private companies that developed the scenarios to support the strategy development process. Analysis revealed that the case studies that reported scenario development objectives related to transformed understanding perceived the role of creativity as an aid to achieving the desired objectives. The overall theme or only its subthemes, creativity in uncertainty identification, creative combination of ideas, and shared understanding and taking ownership were reported. Scenario development processes were not significantly different among the cases in this category. An exemption in this category was the case study that adapted already built scenarios and revised them. In that case, the analysis revealed that the added value perspective functioned to aid the scenarios' effectiveness. Tables 5.7 and 5.8 summarise the private category 1 cases' objectives, the perceived role of creativity and SP effectiveness areas.

Case NO	Case Name	Author and Year	Objectives	Data Collection - Sources	Scenario development process	Role of creativity in effectiveness	Scenario Planning Effectiveness Area
3	Shipping scenarios 2030	Wärtsilä Corporation (2010)	Supporting company strategy making, aiding decision making in time of high uncertainty, informing the maritime stakeholders through publication	Desk research, Workshops- Expert knowledge	Scenario Planning – Intuitive Logic	Transformed Understanding (includes subthemes)	Some themes were followed up by marketing theme, transformed understanding on a topic was achieved, the scenario publication was received well by the stakeholders, improved company image

Table 5. 7: Summary of the case objectives, perceived role of creativity in SP effectiveness

Source: Author's data collection

Case NO	Case Name	Author and Year	Primary Objective	Data Collection - Sources	Scenario development process	Role of creativity in SP effectiveness	Scenario Planning Effectiveness Area
4	Port Vision 2030	Groningen Seaports (2012a)	Establishing port's vision, discovering the ways to grow as a port	Desk research, Workshops – Expert knowledge	Scenario planning – Scenario axis used	Reaching a common understanding and support on the vision	Port vision was implemented successfully with the aid of SP.
7	Updating the future	Akker et al. (2013)	Informing port of Rotterdam's (PoR) strategic thinking	Desk Research – Interviews, Expert knowledge	Adaptation and revision of already established scenarios	Artistic Touches: positive note on adapted scenarios	Fed into port's strategic thinking, client satisfaction (PoR)
15	AHOY 2050-Scenario Study	MAN Energy Solution and Fraunhofer ISI (2019)	Produced as response to MAN's demand for future scenarios; understanding what changes might happen in the future	Desk research, interviews, internal workshop, MATTISE model	Development of scenarios in an internal and external workshops	Discover beyond usual, Combine creatively, Artistic Touches	Illustrated different possibilities for the future, continue looking into the future, client (MAN) satisfaction

Table 5. 8: Summary of the case objectives, perceived role of creativity in SP effectiveness

Source: Author's data collection

The second category was policy support (see Table 5.9). The case studies in this category aimed to offer plausible alternative futures to the Finnish Ministry of Environment and the EU commission. Almost all case studies employed similar means of scenario development methods. One exception was case 10. The two cases, case 6 and case 10, developed for the EU commission, received limited feedback. The scenario developers deemed SP's effective areas to offer their clients plausible alternative futures scenarios. In both cases, only the "combine creatively" subtheme was considered an element of creativity in the scenario planning effectiveness. The analysis further revealed that the EU commission was more interested in the shorter-term and quantitative research. The scenario developers explained the policy makers' uncertainty avoidance tendency and interest in shorter-term actionable plans. Case 6 includes two methodologies: one is short-term quantitative projections, and the second one is future scenarios developed following the intuitive logic school of scenarios. In terms of the latter part, the developers' intentions of:

- revealing multiple plausible futures,
- having the scenario participants understand and grasp the alternative futures,
- and take ownership of the scenarios

were not fully achieved. Although the scenarios revealed alternative futures and the maritime industry's range of activities, the developers observed a tendency among the participants to focus on one future and discard the others.

Case 10, another scenario planning project conducted for the EU commission, revealed similar findings to case 6. There was no detailed feedback from the EU commission side regarding its effectiveness. The developers' perceived SP effectiveness area was the scenarios' ability to reveal plausible alternative futures. Analysis revealed that the subtheme combine creatively aided the effectiveness of SP.

Case 14 and 16 were developed for the Ministry of Environment of Finland. Scenario development processes in the two cases shared similarities. Although the feedback about case 14 effectiveness was limited and considered a rehearsal study, the researcher's interpretation of the case is that the common understanding and taking

ownership of the scenarios were poorer in the case. However, there is insufficient evidence to claim that was the reason for commissioning a follow-up project, case 16. On the contrary, the latter offered transformed thinking by discovering beyond usual, combining creatively, reaching a shared understanding, and taking ownership of the scenario outcomes. Furthermore, the mini-case embedded in case 16 revealed detailed information on the elements from the maritime spatial planners' perspective responsible for applying the scenario outcomes in the plan.

The main difference between the two cases is the third subtheme, shared understanding and taking ownership. From the successor case, number 16, point of view, it was explained:

...So we had a lot of channels, we used and... built our networks, and it was a very positive experience... and how it builds the rounds to move... towards the vision phase, kind of you have an understanding that oh, my God, all these things could happen. So we should prepare to the future and choose our... choose the most nicest future we can, and the one that where we have the least conflicts between stakeholders... (Ashanti, Case 16 Mini-case).

Well, if I start with the participation, I think that's the most measurable one, you could easily measure the participation was very good throughout the project... So we continued and use this participation and this shared understanding of what could happen in the future, when we went into the more concrete planning, participation, where we actually showed the maps that the planners were doing. And the same people who were in the scenario workshops, mostly, it was the same participation. So they could now see the actual map. So I think that what the feedback we have gotten from the planners themselves, and then the people who participated, it really shows that scenario, the playful start of the participation project. It really helps each created this shared understanding of what are the future threats and possibilities in the maritime areas... the feedback with what we got from the project was very positive that it really helped the whole process what it was meant to do (Cassandra, Case 16).

Case NO	Case Name	Author and Year	Objective	Data Collection - Sources	Scenario development process	Role of creativity in SP effectiveness	Scenario Planning Effectiveness Area
6	Blue growth: Scenarios and drivers for sustainable growth from the oceans, seas and coasts	DG Mare (2012)	Informing the EU commission maritime policy development – DG MARE call for tender, informing about plausible futures	Desk research, Workshops, expert knowledge	Scenario planning – Intuitive logic	Combine creatively subtheme	Overall success with reservations, SP helpful for showing range of activities in the sea no detailed feedback from the client (EU commission)
10	Study on the analysis and evolution of international and EU shipping	Artuso et al. (2015)	Supporting policy development - EU DG MOVE call for tender, informing about plausible futures	Desk research: OECD scenarios, sector reports, expert knowledge	Scenario development was not a process, but an end. Expert judgement on future drivers	Combine creatively subtheme	Revealing plausible futures, perceived client satisfaction, no detailed feedback from the client (EU commission)

14	Blue Growth— Drivers and Alternative Scenarios for the Gulf of Finland and the Archipelago Sea: Qualitative Analysis Based on Expert Opinions	Pöntynen and Erkkilä- Välimäki (2018)	Ministry of Environment of Finland’s desire to see the current state and plausible futures and have alternative visions e.g. desirable futures	Desk research, Delphi questionnaire, learning café method, scenario workshops	Delphi and workshop based scenarios through futures table	Discover beyond usual Combine creatively Added value: Artistic Touches Humour, playfulness, fun moments	Success with reservations, SP helpful for showing plausible futures for the area, hinted that they could be used as supporting materials for the official planning phase
16	Scenarios for Maritime Areas 2050 Preparation of scenarios for the future of Finnish maritime areas	Maritime Spatial Planning (2020)	Ministry of Environment of Finland’s desire to see the current state and plausible futures	Desk research, interviews – expert knowledge, workshops	Scenario development by futures table	Transformed understanding and Added value themes present	Positive feedback from the client, showed plausible futures and possibilities for the area

Table 5. 9: Summary of the case objectives, perceived role of creativity in SP effectiveness Source: Author’s data collection

The third category of the case studies' development purpose was informing the maritime stakeholders. Three case studies were included in the category. Case 8 and 13 aimed to inform the maritime stakeholders to open the door for new discussions, further studies, and thinking collectively. The participants stated that the objectives were achieved. In terms of the perceived role of creativity in the case studies' success in achieving desired outcomes, the analysis revealed that Case 8 utilised discover beyond usual, combine creatively and artistic touches. Case 13 shared stark similarities to case 8. One single point that differentiated the two cases was the subtheme of artistic touches. The reported accessibility of the publication in case 8 was due to the collaboration with a graphic designer. The researcher personally struggled with understanding the case 13 publication and was not entirely sure until the interview with its developer whether the publication introduced multiple scenarios or only one scenario. It was explained:

... some of the important missions we are trying to send is being blurred in too many details ... I think today I would recommend it to be maybe not two reports, but at least two very separate sections of the report because it is two very different elements. So even though we have few sections, we should have separated that even more... (Joel, Case 13).

Tables 5.10 summarises the policy category 3 cases' objectives, the perceived role of creativity and SP effectiveness areas.

Case NO	Case Name	Author and Year	Objective	Data Collection - Sources	Scenario development process	Perceived role of creativity in SP effectiveness	Scenario Planning Effectiveness Area
8	Global Marine Trends 2030 (GMT2030)	Fang et al. (2013)	Understanding how to create industrial strategies to inform maritime stakeholders	Desk Research: IPCC, Scenario developers' own expertise	Scenario planning was not a process, more of a tool	Discover beyond usual Combine creatively Artistic touches	Opened the doors for new discussions, further studies, and more thinking out loud together, accessibility of the publication
13	MARITIME TREND REPORT	Danish Ship Finance and Rainmaking (2018)	Understanding what new business models can be introduced and informing the maritime industry	Desk research: reviewing other capital intensive industries	Single qualitative scenario development	Discover beyond usual Combine creatively	Opened the doors for new discussions, further studies, and more thinking out loud together

18	Technological trajectories and scenarios in seaport digitalisation	Inkinen, Helminen and Saarikoski (2021)	Supporting research findings with scenario thinking	Desk research	Scenario development by futures table and interviews	Combine creatively	Scenarios functioned as a means of illustrating the study findings
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Table 5. 10: Summary of the case objectives, perceived role of creativity in SP effectiveness

Source: Author's data collection

5.4.4.2. Creativity should be useful, surprising, commonly understood and supported by hard facts

The subtheme creativity should be useful, surprising, commonly understood and supported by hard facts is tautological in the creativity definition sense. However, the subtheme was formed around the participants' understanding and emphasised creativity's utility and surprise dimensions.

I suppose creative ideas that are well thought through well-considered, and relevant. Those are the ones that had the most impact to scenario planning (Jay, Case 8).

The participants repeatedly discussed the importance of having creative ideas commonly understood by the scenario planning practitioners and the scenario users. The issue was perceived as a trade-off.

But there's always a trade, there's a... you have to find a balance. There are many scenarios which were made by a selected group of people not involving the surroundings and then it stays there. So the creativity is OK, but it should work in such a way that it let's say reaches out. To the people who were not directly involved in the development of the scenarios. (Maheen, Case 6).

Creativity makes the desired impact only when the decision-makers understand and accept it. Despite the emphasis on the utility dimension, some participants also reported the importance of surprise in creativity.

I would say that creativity in scenario planning also needs.. it need to lead to some thinking out of the box and some surprise (Lamaar, Case 6).

When we were finalising the report, we had a meeting with the head of marketing looking at the three scenarios that we were finalising. After a while, he said, "Hell Billie", said to us... "Hey, well, what do you mean, have I done something wrong?" "No. But we have only product for one of the scenarios. We will not survive in the two other scenarios. We don't have products..." I'm pretty sure that set of scenarios launched a bit of thinking, probably it had been

already in the pipeline about by but still enforced the R&D activities... (Billie, Case 3).

Last point of this section states, perhaps obvious to the reader, a crucial reminder: creativity is only one part of the scenario planning process. The scenario developers cautioned the author that SP is a data collection, analysis, interpretation and presentation process. Desk research, interviews, application of the Delphi method, and various scenario development tools, e.g. scenario axis, futures table, and more, were observed in the case studies.

...So we've got this broad range of hard facts through two unknowns, known unknowns, which you have to deal with, and you have to deliver a ship that is, you know, the everyday floats and is safe and does its job and is delivered on a date and cost less than, than the price and all that kind of thing. And so, so creativity is one element (Case 8, Joel).

5.4.4.3. Expectations from Scenario Planning Practitioners

The subtheme was developed following the statements around the scenario developers' expectations from the SP practitioners that have general implications for scenario planning effectiveness. Stated expectations were interpreted as necessary in the creativity context by the researcher. Reported expectations were:

- the necessity of deep practitioner involvement in the process,
- understanding the scenario development process,
- trust, openness to share their ideas, and not being afraid to speak their thoughts.

A deep level of practitioner involvement in the SP process was essential. The scenario developers stated that they needed further input from their SP practitioners to understand better the issue they had at hand during the development process and finalising the scenario narratives.

...And that is one thing that I would really like to be able to do that the people tell me which psychological parameters should go in the model, the ones that are based on data. (Case 15, Kieran).

...But when you had we had the first future images then we didn't get much feedback it just change a couple of wordings there (Case 14, Dane).

A deep level of practitioner involvement is required for creativity to impact scenario planning positively. Creativity retention in ideas and imagined events were perceived as connected to SP practitioners, including the decision-makers' good grasp of the scenarios and the process. Scenario users' rejection of any part or the overall scenario results in unaccepted and unused scenarios.

...if you have scenarios which you want people to accept and use themselves, preferably. And you foster that by involving them... preferably during the construction phase, but that is not always possible but for example, if the scenarios are used for calculations... then those results should be used by people then that it really is an important phase where you should explain what scenarios are, and now you are going to use them before you present the data of the results of those exercises, because otherwise it's not going to be used (Case 6, Maheen).

A group of scenario developers also shared a similar experience to Maheen's statement above. SP practitioners had different opinions about the scenarios and scenario planning purpose in their case. The SP practitioners who were experienced or knowledgeable about the probabilistic modelling school of SP had difficulties shifting their paradigm as the SP process they were in was Intuitive Logic. The scenario developers recalled the struggle of communicating the different backgrounds and aims of the scenario planning approach they were using. According to them, some practitioners did not grasp the essence of the process even when it was over.

SP practitioners' involvement appeared to be also related to the trust and openness aspects. For example, a scenario developer talked about the necessity of employing a tool to solve trust and openness issues.

...It would be important to have different kinds of tools and so that people can express their thoughts and you can use them later on, maybe even later on when you're writing and reading the scenarios and then it feedback from the participants but anyway, so that people would have a possibility to express even this kind of crazy ideas (Case 14, Dane).

The fear of losing credibility was one reason why the SP practitioners avoided speaking about their ideas openly. The scenario developers also illustrated their experience with the bias against creativity. The uncertain nature of the future combined with trying to think creatively was considered a difficult endeavour.

They are afraid that they will lose their credibility... so it's very safe to have these three traditional scenarios... I think that (creativity) is something that you really let yourself imagine, something that could be or not could be it and so on, so it's really difficult and it's a little bit unpleasant too, it's not fun to think too creatively because it's difficult to think that in the future we may have (Case 16, Whitney).

Trying to be creative and thinking about alternative futures is an exhausting practice for the practitioners and the scenario developers. At the end of the process, the developers observed that the practitioners seemed fine with the outcome even though they were not. The developers interpreted that as fatigue from thinking about the future for a long time. For the most part, openness and trust were perceived as a cure to some of the abovementioned issues the scenario developers faced. The extent of discussions on the bias against creativity remained limited.

5.4.5. Conclusion

Thematic analysis of cross-case findings illustrated how creativity in scenario planning was experienced in scenario planning and associated with effectiveness. One primary and one supporting area were identified concerning creativity's desired impact on scenario planning. Analysis revealed that the primary area creativity served to achieve was transforming the scenario planning users' understanding. The secondary area was its added value through artistic touches mainly on the scenario finalisation process and

humour, playfulness and fun moments mostly during the scenario development process.

A transformed understanding was achieved in three steps:

- discovering beyond usual,
- combining creatively, and
- taking ownership of the idea through a shared understanding.

All three steps appeared to be necessary to reach a transformed understanding.

Added value areas of creativity played a supporting role during the scenario development phase, narrative writing and publication stage. Artistic touches such as creative writing, visuals and storytellers were perceived to be effective for triggering practitioners' thinking. Innovative idea generation emerged as a potential outcome of scenario planning as an added value. Humour, playfulness and fun moments served different purposes during the development stage. Conflicts were eased through humour and playfulness during the scenario development stage, whereas fun moments were considered to support the scenarios' fleshing out stage.

The scenario developers' dilemma between creativity to excess and being constrained by the systematised scenario building approaches limiting creativity also came out in the findings. Creativity to excess and resulting dysfunction was reported in only one case. The scenario development process was desk research. A similar experience in a participatory scenario planning process was not experienced.

Creativity loss was observed in translations. Some scenario developers also reported personality and creativity associations.

The theme requirements illustrated the relationship between SP objectives and the role of creativity in aiding to achieve them. Policymaking scenarios reported issues with SP effectiveness in general. The role creativity played in the policymaking scenarios was less than the SP practices for private companies. The theme was concluded by highlighting the creativity dimensions of usefulness and surprise and the importance

of supporting creativity with hard facts, and the scenario developers' expectations from the practitioners.

The following foreshadowed issues were initially identified and considered in the research:

Scenario planning practitioners should be able to make their voices heard for creativity to impact scenario planning positively.

Creativity's role is questionable in making any desired impact on policymaking scenarios considering the lack of creative ideas in the scenario policymaking scenarios and previously reported ineffectiveness of SP in policymaking.

At the end of the scenario planning application, the practitioners are less likely to be surprised by the outcome of the scenarios in which the author did not identify any surprising ideas. It is also because scenario planning was also found ineffective for the degree of surprise in the literature.

The cases where the author did not identify creative ideas are unlikely to challenge the scenario planning practitioners' and developers' status quo thinking. The scenario planning literature is already slim in terms of evidence supporting the "breaking free from normal thinking" phenomenon.

The scenario developers are afraid of creativity. It is caused by the fear that it can lead to dysfunction in the scenario development process, and the bias against creativity contributes to it.

Plausibility and consistency concerns as well as the novelty and usefulness trade-off lead to an overemphasis on plausibility, usefulness and consistency, leaving novel ideas aside to be discarded.

The foreshadowed issues went through iterations throughout the multiple case study. The author's notes during the interviews and the memos he created during the analysis of interview transcripts revealed additional foreshadowed issues. The modification process continued during the interview stage and was finalised after the cross-case

analysis. Stake (2006) calls them multicase assertions, which allow for interpreting the foreshadowed issues through cross-case analysis in consideration of the quintain. The process made an in-depth understanding of the thematic findings of quintain possible.

The foreshadowed issues that evolved into multicase assertions are presented below. In addition, the quintain findings and multicase assertions are discussed after introducing the multicase assertions.

Multicase assertions

Reaching a shared understanding is important for effective scenario planning practices but crucial for creativity to aid transformed understanding.

To reach a shared understanding, scenario planning practitioners needed to understand what the scenario planning application aims at. SP practitioners in two categories are perceived as detrimental to reaching a shared understanding:

- 1) SP practitioners do not understand the purpose of scenario planning (practitioners are eager; however, they do not understand it), e.g., a practitioner with PMT school of scenario planning understanding in an Intuitive Logic school-based scenario planning workshop, individual differences, e.g., some people are more visionary than the others.
- 2) SP practitioners do not want to understand the purpose of scenario planning (practitioners are not eager) because:
 - a) practitioners have an already set mind about the future due to various reasons, e.g., previous research on the issue was investigated by another party and their results taken for, practitioners are lobbyists and have their agendas to defend,
 - b) practitioners do not understand that they do not have control over the exogenous factors, and they cannot control the future,
 - c) practitioners do not care about scenario planning, e.g., lack of motivation, the subject is not of interest to them, practitioners do not have sufficient time and overloaded with tasks at work

Conflict management in the scenario planning workshops was the second most important aspect of reaching a shared understanding. The SP facilitators' ability to manage the conflicts and use humour and playfulness supported resolving the conflicts.

Participatory scenario planning practices are preferred over non-participatory designs to reach a shared understanding and legitimise the outcome.

Speaking openly and trust, and creativity feed into each other. The relationship is necessary for reaching a shared understanding and discovering beyond usual.

Scenario planning effectiveness is measured in three ways:

- a) practitioner turn-out rate,
- b) client – scenario user – feedback, and
- c) SP practitioner feedback.

However, clients did not always give feedback on SP effectiveness, and the developers did not always pursue one. In addition, the practitioner turn-out rate is not a healthy indicator of SP effectiveness due to the two types of practitioners listed previously, e.g., a practitioner might be present but not eager to contribute.

Scenario validation criteria for measuring the quality of output are mostly ignored. The criteria were limited to plausibility, consistency, and coherency whenever applied. Plausibility was the highest criterion applied for scenario validation.

The scenarios were not assessed for novelty and surprise. The scenario builders were hesitant to support novel and surprising ideas in the scenario development process and include them in the final scenarios. Scenario builders' had a slightly different understanding of creativity.

Efficiency concerns on budget and time prevented the scenario developers from reiterating the scenario development. Same concerns also lead SP practitioners towards applying a systematised scenario development that is proven to be fast which may hinder the creative process.

No lobbying or stakeholders with agendas were reported in scenario planning practices that were conducted for private companies. However, considering the secondary SP objectives of the private companies included “being thought leader”, “promoting the brand” and “increasing sales”, the companies might have been the lobbying parties with agendas in their scenario development workshops.

5.4.6. Interpretation of Findings and Discussions

The multi-case study findings identified the scenario team members’ experience with creativity and scenario planning in two different facets. First, the primary contribution of creativity to scenario planning is experienced through its impact on transforming the understanding of scenario users. The scenario teams report that through creativity in scenario planning, the scenario users’ boundaries of thinking are pushed and what is not seen before is seen. The findings are in line with the scenario planning literature. Scenario planning scholars often cite Peter Schwartz’s statement, “scenarios are the most powerful vehicles I know for challenging our ‘mental models’ about the world, and lifting the ‘blindness’ that limit our creativity and resourcefulness” (Schwartz, 2012, p. 17). However, the multicase findings indicate a varying degree of emphasis on creativity in scenario planning applications. Added value aspect is constructed after recognising another side of creativity’s role in scenario planning. Despite the secondary importance, artistic touches, humour, play and trust also feed into the transformed understanding at times.

This work does not investigate creativity and its role in SP effectiveness by structuring the analysis based on the scenario planning Schools, e.g., intuitive-logics (IL) and La Prospective (LP). However, intuitive-logics literature predominantly has informed the work since most cases applied the intuitive-logic school. Moreover, IL is also the SP literature's most extensively discussed scenario school (Bradfield, 2012, p. 260). Although the purpose of the work was not to sample the maritime scenarios that adopted the IL school scenario approach, the sampling criteria indirectly influenced the type of scenarios sampled in the research—for example, only including the scenarios with narratives was one of the criteria. The IL scenarios tend to be richer in scenario narratives as opposed to other scenario schools, e.g., LP, PMT, as they are

“highly quantitative, analytical output with minimum narrative” (MacKay and McKiernan, 2018, p. 31).

Since the work investigates the SP effectiveness and creativity, framing the analysis around the case scenarios’ objectives and conducting the analysis accordingly have helped maintain the focus on the research objectives.

Transformed understanding

Transformed understanding relates to Wack’s (1985b) “the world of facts and the world of perceptions” conceptualisation. According to him, scenarios deal with two worlds. Scenarios aim at the decision-makers’ perceptions by collecting and transforming information and the transformation process leads to fresh perceptions. However, Wack (1985b) further states that “this transformation process is not trivial—more often than not it does not happen. When it works, it is a creative experience that generates a heartfelt “Aha!” from your managers and leads to strategic insights beyond the mind’s previous reach.”

The track change metaphor to illustrate transformed understanding was previously presented. By discovering beyond usual possibilities, seeing what was not seen before, combining available evidence, and making sense of it, SP practising people reached a transformed understanding. Shared understanding and reaching an agreement on the track change decision are critical if the option is not one of the usual possibilities.

Wack (1985b) has found that getting the management to the “Aha” moment is particularly challenging but necessary. Decision-makers need to be taken on the scenario planning journey and grasp the process and the outcomes.

Transformed understanding also relates to the “thinking the unthinkable” concept (Kahn, 1962) but differs in terms of the concept of novelty. A well-known example of the unthinkable is thermonuclear wars:

“thermonuclear wars are not only unpleasant events they are, fortunately, unexperienced events, and the crises which threaten such wars are almost equally unexperienced” (Kahn, 1962, pg. 143 in Galison, 2014, p. 39).

The researcher interprets *thinking about the unexperienced for the first time*³⁹ as the h-level novelty. Throughout the data collection and analysis stage, the author has encountered participant statements such as “true creativity” and “real creativity”. What is meant by them is the presence of novelty in the eyes of history. Scenario planning literature also includes similar statements. For instance, a group of researchers mention a “true novelty”:

It has been well documented that diversity is a necessary condition for real creativity; that is, only by bringing together individuals from diverse backgrounds and with diverse views can true novelty emerge (Oliver, Heracleous and Jacobs, 2013, p. 325).

Despite the eagerness of some scenario planning scholars to the “true novelty” and “real creativity” (Heinonen, Ruotsalainen and Karjalainen, 2017, p. 19; Oliver, Heracleous and Jacobs, 2013, p. 325), the contextual differentiation of P- level, H-level, and S-level novelty has not been made in the SP literature with one exception.

The quintain is answered following the case studies’ aims and expectations from the SP application, observed outcomes and the role of creativity with its aid in achieving the outcomes. Some of the cases that aimed for transformed understanding, among other SP objectives, reported its achievement. The transformed understanding was accomplished not because the novel ideas were H level in the SP process. It was because P- level novelty was there.

The contextual differentiation has brought a new perspective to the creativity and scenario planning effectiveness relationship through this doctoral research. However, the theme transformed understanding and its subthemes:

- discover beyond usual,
- choose and combine creatively, and

³⁹ Italicised by the author.

- shared understanding and taking ownership

are not unusual findings in the scenario planning literature.

In terms of the transformed understanding aspect, “scenarios are the most powerful vehicles I know for challenging our ‘mental models’ about the world, and lifting the ‘blindness’ that limit our creativity and resourcefulness” (Schwartz, 2012, p. 17) have received support from other scholars in scenario planning. Rialland and Wold (2009, p. 14) have asserted that “the purpose of using scenarios: to help us envisioning the future and think creatively”.

Others approached creativity as a middle ground between plausibility. A combination of both creativity and hard facts is seen as the constituting components of scenario planning:

Scenario planning involves intuition, creativity, the ability to wonder about the environment and its possibilities, as well as a deep understanding of industry trends, competitor actions and global forces that drive economic, social, and political systems (Bodwell and Chermack, 2010, p. 198).

Scenario development and analysis are considered gateways to thinking through plausible futures and associated “uncertainties in a structured, yet creative manner” (Alcamo and Henrichs, 2008, p. 15). Scenarios are also considered effective means of influencing decision making by integrating more creativity and imagination than other techniques (Szulanski and Amin, 2001, p. 537; Brockmann and Anthony, 2002, p. 449; Rohrbeck, 2011, p. 144).

Discover beyond usual

The subtheme discover beyond usual is developed after identifying the role of creativity in seeing what was not seen before through scenario planning practices. The subtheme is constructed by capturing the role of creativity in the early stages of scenario planning practices – the stage before the key drivers and uncertainties are decided on which the scenarios were built. The cases that invested resources in the discover beyond usual stage are observed in two categories: one is purely done by the

scenario developers' brainstorming meetings either without or with minimal expert input. The first category heavily utilised desk research for data gathering. Interviews with experts are also observed. Scenario workshops are not utilised in this group. In the second category, the scenario developers' brainstorming meetings, desk research and interviews are complemented with scenario workshops where further practitioner input came in. The cases that used only one scenario workshop divided the workshop into two phases. The first phase is aimed at gathering practitioner-expert input. The second phase is deciding on key drivers and uncertainties. In some cases, the two phases are conducted in separate scenario workshops. The subtheme discover beyond usual covers appears to cover the divergent thinking phase that "starts with intuitive, creative or brainstorming activities" (Lindgren and Bandhold, 2003, p. 105) and ends until the phase where the key drivers and uncertainties are chosen for scenario building.

Scenario development with only what is already known and not going beyond the usual thinking is perceived as detrimental to practising SP – whenever discovering beyond usual is part of the SP objectives. When SP is expected to help the scenario users with planning for the unpredictable, the scenarios are useful if they "incorporate imaginative speculations and a wide range of possibilities; those based only on what we currently know about the system have limited power" (Peterson, Cumming and Carpenter, 2003, p. 360). Other SP scholars have also reported the importance of creativity:

- to see outside the anticipated linear change (Lombardo, 2006, in Bengston, 2019), and
- to opening up minds to both mundane ideas and "the surprising 'unthinkable'" for more effective responses (MacKay and McKiernan, 2018, p. 41)

Although scenario planning has been critiqued for its reliance on evidence-based approaches and dependence on rational analysis (Bengston, 2019; Oliver, Heracleous and Jacobs, 2013), multicase findings support the necessity of evidence-based approaches in scenario planning. The author does not assert that creativity is the only ingredient for effective scenario planning. Instead, he emphasises creativity in scenario

planning when SP practice aims to go beyond usual thinking since “there are limits to evidence-based approaches to studying a future that does not exist” (Bengston, 2019, p. 1102).

Previously, Oliver, Heracleous and Jacobs (2013) also identified the issue:

... there have been more recent calls to integrate higher levels of intuition and creativity (van der Heijden et al. 2002). We classify this form of scenario planning as hybrid, as it concludes in a convergent fashion, having begun with divergent thinking (Oliver, Heracleous and Jacobs, 2013, p. 333).

Although this doctoral research does not approach creativity from divergent thinking perspectives, creativity and divergent thinking were presented in the creativity literature review chapter. Starting with divergent thinking at the beginning of SP practice is likely to support creativity since divergent thinking is closely linked to originality which is a creativity dimension (Acar, Burnett and Cabra, 2017; Acar, Runco and Park, 2020; Runco and Acar, 2012; Walia, 2019; Runco and Charles, 1993). The implication of divergent thinking and creativity are discussed under the requirements for creativity’s effectiveness in scenario planning subsection.

Creativity is required to see a wide range of “possible and plausible alternative futures” (Lombardo, 2006 in Bengston, 2019, p. 1101); however, it is also challenging to achieve (Burt, 2007). The multicase findings have identified several ways for scenario developers to get creative with their scenarios. They are:

- thinking about the impossible and unlikely events,
- thinking in extremes,
- combining knowledge, and
- the business school way of thinking.

All of the examples above are essentially brainstorming. The father of brainstorming, Alex F. Osborn (Dhir, 2016; Mongeau and Morr, 1999), developed the technique to aid creative thinking (Osborn, 1953). The findings demonstrate the four approaches to thinking beyond usual to produce ideas prior to scenario construction. Brainstorming

is a common approach in scenario planning, it is used to “produce a list of the forces, factors, and issues the organization is facing” (Mclean and Egan, 2008, p. 246). It is also reported as one of the modes of creative interaction groups (Harvey and Kou, 2013).

Among four rules Osborn (2012) offered for productive group brainstorming sessions, two of them share similarities to the multicase findings. “Free-wheeling is welcomed”, and “combination and improvements are sought” (Osborn, 1953, p. 300) cover the first three bullet points listed.

Rule two, free-wheeling, is about wild ideas and the wilder the ideas, the better (Osborn, 1953). Thinking about the impossible and unlikely events and thinking in extremes are two ways of free-wheeling, leading to wild ideas.

Rule four is combining the ideas to turn them into “better ideas; or how two or more ideas can be jointed into still another” (Osborn, 1953, p. 300). It is also identified in the cases.

Rule two and four are constructed to spark creativity (Mongeau and Morr, 1999). Although the creative spark is ignited through rules two and four, the multicase findings cannot identify the first and the third rule of Osborn (1953). For instance, the third rule is “quantity is wanted” (Osborn, 1953, p. 301). On the contrary, the multicase findings reveal that having many creative ideas is associated with getting lost and losing control over the scenario building process. The first rule, “criticism is ruled out” (Osborn, 1953, p. 300), is not explicitly investigated in the early stages of SP practices in the multicase study. It also has not come up in the interviews. However, the lobbying activities of the scenario workshop practitioners, e.g. stakeholders and their agendas, are captured in the study. The workshop facilitators observed the lobbying activities and stakeholders’ agendas in the scenario construction stage after the divergent thinking – discover beyond usual stage.

The multicase findings also reveal the importance of discovering all possibilities in SP practices. Playing with uncertainties and potential ideas, and looking at all different possibilities, both likely and unlikely, are associated with creativity. The theory of

remote association (TRA) (Mednick, 1962) explains the experience of scenario developers. TRA suggests that “the process of accessing or retrieving a remote associate of a stimulus, rather than a common or prepotent response, is a cognitive event at the heart of truly creative thinking” (Smith and Ward, 2012, p. 465).

Combining more distantly connected ideas or concepts and their unusual combinations may produce novel properties (Smith and Ward, 2012; Zhou and Shalley, 2011; Cogdell-Brooke *et al.*, 2020; Park, Chun and Lee, 2016; Kleinmintz, Ivancovsky and Shamay-Tsoory, 2019), which is a dimension and hallmark of creativity (Smith and Ward, 2012).

The reported business school way of thinking for creativity is related to analogical reasoning and is explained as:

... a kind of reasoning that is based on finding a common relational system between two situations, exemplars, or domains. When such a common system can be found, then what is known about one situation can be used to infer new information about the other (Gentner and Smith, 2012, p. 130).

For instance, Case 13 reveals that looking for similarities between the maritime industry and other transportation industries, e.g. land and air, to identify potential business models derived from the latter industries and implemented in the maritime industry. The scenario developers have recognised the shift in road transportation in their business models and envisioned a future for the maritime industry calling the new business model as ship as a service. It is an example of knowledge transfer achievement through analogy-based reasoning to produce new knowledge (Voskoglou and Salem, 2014). The idea is found creative by the author and one of the scenario developers. Regarding the scenario’s achievement of what is desired by its development, the scenario developer has reported that the scenario publication received attention from industry and non-industry stakeholders and generated discussions around the topic. When brainstorming for creative solutions, analogies can offer knowledge generation, especially when the analogies yield unexpected new inferences (Gentner and Maravilla, 2017).

Analogical reasoning and scenario planning are presented as two distinct means of foresight techniques (Tapinos, 2012; Horowitz, 2020) and strategy-making approaches that are alternatives to one another (Farjoun, 2008) in literature. However, brainstorming is a creativity technique that is used in scenario planning (Konno, Nonaka and Ogilvy, 2014; Lindgren and Bandhold, 2003; Mackay and Stoyanova, 2016; O'Brien, 2004; Ringland and Schwartz, 1998) and analogical reasoning in brainstorming meetings are observed (Ball and Christensen, 2009; Lai, 2005). Additionally, analogical reasoning has previously been demonstrated as a strategic practice through the strategy-as-practice lens. According to Statler, Jacobs and Roos (2008), analogical reasoning may be widespread and an everyday practice whenever people engage in scenario development, competitive analyses or benchmarking studies. The multicase findings support their statement in the SP context.

Han *et al.* (2018) have recently introduced The Retriever, an analogy and ontology-based AI-powered tool. They claim that “an analogical stimulus helps apply the knowledge from a well-known domain to a less-known domain... An ontological stimulus assists the understanding of knowledge in a particular domain” (Han *et al.*, 2018, p. 466). Their approach can be used in scenario planning for creative idea generation. Vecchiato (2020) have also highlighted the future research requirement on scenarios and analogical reasoning. They reckon the research area is fruitful for future competitive advantage and strategic investment subjects.

Another creativity technique used in scenario planning is the future workshop (Oliver Schwarz, 2008) developed by Jungk (1970). However, the future workshops and scenario workshops are not the same activities, and the future workshops are not observed in the case studies—scenario workshops in the case studies utilised brainstorming as a creativity technique.

Scenario planning literature notes various scenario development variants and approaches to creativity. Examples are a tweaked SP process (Wodak and Neale, 2015, p. 179), thinking in new boxes perspective (de Brabandere and Iny, 2010, p. 1507), Lego-based exercise (Wade and Piccinini, 2020, p. 717), among a few. Their effectiveness can be investigated comparatively in future research.

Choose and combine creatively

The subtheme choose and combine creatively is constructed around two different approaches to scenario planning. One approach is to achieve a transformed understanding of an issue through going beyond the usual thinking and choosing and combining ideas creatively to build scenarios. Another approach is being creative at choosing and combining the ideas for scenario development without putting any mentionable effort into the first stage. The latter approach as its own have not resulted in a transformed understanding. The subtheme choose and combine creatively is the stage where convergent thinking starts taking place. It is because the “convergent, analytical thinking to follow up, criticize, analyse, and deepen the material produced during the first phase” (Lindgren and Bandhold, 2003, p. 105) is observed in choosing and combining the ideas. It eventually results in building scenarios based on chosen factors, drivers and uncertainties. The findings are in line with creativity literature. Divergent thinking is closely linked with creativity (Curşeu, Schruijer and Fodor, 2022; Kaufman, Plucker and Baer, 2008, p. 6; Runco, 2010b, p. 413) as well as convergent thinking (Runco, 2010b, p. 418; Kaufman, Plucker and Baer, 2008, p. 16; Park, Chun and Lee, 2016). However, a one-on-one match between the choose and combine creatively subtheme and convergent thinking cannot be made.

Associative interpretation of the creative thinking process (Mednick, 1962) is relevant to the subtheme findings. Mednick’s (1962) associative theory of creative thinking is explained previously. Translation of the theory in practice is “linking and connecting prior knowledge indistinctly new ways and seeing differing human perspectives, including those that a target audience may not have brought into conscious thought” (Penaluna and Penaluna, 2021, p. 476).

As explained in theory, choosing and combining creatively as a stand-alone creative scenario development process deals with putting together identified factors, drivers, and uncertainties for its developers in a novel, useful and surprising way. Divergent thinking likely occurs even when the scenarios are not developed following a more profound idea discovery process. However, the study findings cannot assert that since it is beyond the research scope.

In the cases in which transformed understanding is aimed and achieved, the subtheme illustrates a more evident convergent thinking process. Having gathered information through desk research, interviews and scenario workshops, the scenario developers narrow down the future ideas to build the scenarios.

As illustrated so far, the multicase findings share and reflect the changing emphasis on creativity in SP literature, explaining the role of creativity through the objectives of SP projects and the scenario developers' choice of SP approach to answering the objectives. For example, the scenario planning projects requested by the EU commission required no transformed understanding impact. Even when the scenario developers went above and beyond through the development of the long-term future scenarios following the intuitive-logic school in case 6, the developers reported the commission's lack of interest in the scenarios. The commission's preference for shorter-term probability focused trend extrapolation results was apparent to both scenario developers. Another maritime scenario study, case 10 conducted for the EU commission, was not concerned with being creative with identifying potential uncertainties, drivers and factors. The scenario developer stated that the commission was eager to identify the key variables that would impact the port and other maritime sectors. The OECD scenarios were complemented with expert interviews, and triangulation was achieved through desk research. Despite the existence of creativity according to the scenario developers in both cases, the developers identified creativity at different phases and purposes. For instance, choose and combine creatively subtheme was observed and evaluated as contributive to the SP effectiveness in both cases. However, the developers of the first case aimed to achieve "discover beyond usual" and "reach a shared understanding and take ownership" as well.

Nevertheless, the commission's and the scenario developers' interests on those front did not correspond in case 6. It resulted in the limited role of creativity in scenario planning not contributing beyond the "choose and combine creatively" subtheme despite the case preparing the ground for achieving a complete transformed understanding impact. The intention of the scenarios' end-users and their expectations from the scenarios determined the role of creativity. Furthermore, the type of decisions that were being made might have shaped the EU Commission's expectations from the

scenarios. “Some decisions require a vigilant, analytical information processing style, others call for creativity and novelty” (Chermack and Nimon, 2008, p. 351).

Besides the two policymaking cases discussed so far, multicase findings illuminate the quintain further. Two cases from Finland are the SP applications, developed to contribute to policymaking, supporting the maritime spatial planning of the country. The cases further shed light on creativity, scenario planning effectiveness and the policymaking aspects by distinguishing the varying role of creativity through culture as a foreshadowed issue. The Finnish cases took a participatory and open approach to their scenario planning practices. The Ministry of Environment of Finland supported the approach. As a result, the findings have revealed an increased number of areas of creativity in SP effectiveness than in the cases conducted for the EU commission. Although not explicitly stated, Kees Van der Heijden previously shared similar opinions to the findings:

In practical scenario projects this general aim tends to be particularised in terms of specific contributory tasks. Some scenario projects are undertaken to address a specific problem or question, some are meant to install a permanent capability. Some are intended to open up minds, some to create closure around a strategy. Some aim to make sense of a puzzling situation; some intend to produce ideas for action. Some aim to develop anticipatory skills; others are intended to turn participants into experiential learners. And so on. Many emphasise creativity, expanding mental maps and thinking the unthinkable with only a vague reference to strategy (Van der Heijden, 2005, p. 17).

The findings suggest that scenario projects and the particularised aims determine the emphasis on creativity. Despite the virtually countless aims one can impose on scenario planning, investigating the role of creativity in terms of SP effectiveness proved to be a better approach than relying on the SP typologies. Scenario planning researchers developed categories and typologies over the years to help look at the issue they had at their hands. Although the typologies can help understand the main approaches to scenario planning and specific issues that might interest them, creativity does not easily lend itself to the typologies.

For instance, the dichotomy between the exploratory and the anticipatory design (Crawford, 2019; Ducot and Lubben, 1980; Roubelat, 2021) is the first differentiating factor the researcher looked through the cases.

“In exploratory mode, organizations use scenarios to design prospective futures from past and present processes; while anticipatory scenarios start from imagined or hypothetical views of futures considered as end-states. But is this anticipatory mode, necessarily, a creative way to design scenarios? And do scenarios still reach their promise of bringing novelty to introduce the ‘unthinkable’ (Kahn, 1962) in decision-making processes?” (Roubelat, 2021, p. 98).

Roubelat (2021) differentiates the two designs in terms of creativity and indicates his sceptical curiosity about the anticipatory mode and how creative such scenario designs are. Multicase findings are derived from scenario projects, all in exploratory mode. Therefore, the researcher does not see the need to discuss the anticipatory mode.

The exploratory mode is further divided into descriptive, normative and dynamic types (Ducot and Lubben, 1980; Crawford, 2019). However, the differentiation between the three types still does not significantly contribute to the discussion. The author has identified descriptive, normative and dynamic scenarios in the cases. Descriptive-plausibility scenarios have a moderately higher number of creative ideas than the normative and dynamic scenarios. It is likely because the descriptive scenarios are created without focusing on the desirability of the outcomes (Crawford, 2019). Such scenarios are convenient to prevent any neglect of unconscious preference over the desirability of the possibilities (Ducot and Lubben, 1980).

However, the descriptive – plausible scenario categorisation alone is insufficient to explain the higher number of creative ideas in the cases and aid in achieving the desired outcomes. Three cases are identified in this category. The developer of the case 8 scenarios stated that they did not “work out the full definition of scenario planning”. In another case (no: 13), the scenario developer said he was not knowledgeable about the scenario technique and did not follow a standardised scenario planning process. In contrast, the third case (no: 4) involved a scenario planning consultant in the SP

process. They followed the IL school of scenario planning. The client company - the end-user of the scenarios - was actively involved in the desk research and organisation of the workshop. Like the previous two cases, they aimed to understand the plausible alternative futures. However, the latter case further decided upon a vision following the SP practice.

In case 13, they did not follow a standard SP process which meant “ending up differently than what could have been done relatively”. A similar experience was reported in case no 8⁴⁰. Case 4 is a standard IL school of the scenario planning application which has resulted in s-level novel ideas and helped guide the end-users in establishing a vision and reaching a competitive advantage as they desired. Examples of scenario development above all had discovering plausible alternative futures in common without prioritising the desirability of the outcomes. From that perspective, descriptive, normative and dynamic categorisation helps identify the role of creativity in SP effectiveness. However, the contextuality of the SP processes of the cases also informed us about the constraints that may come with applying a structured SP process. It is further discussed under the subtheme constrained creativity.

Shared understanding and taking ownership

The quintain findings demonstrate that reaching a shared understanding of the scenario development and taking ownership of the final scenarios is necessary. Although reaching a shared understanding is identified as part of SP aims in only some of the case studies, the literature reports several SP practices, including Shell Oil where “the aim of creating a shared understanding” and, in other examples “shared awareness” (Peterson, Cumming and Carpenter, 2003, p. 363). The quintain findings further show that in instances where a shared understanding and taking ownership are not achieved,

⁴⁰ However, the disruptive scenarios created in case 8 were evaluated as creative and not the 3 main scenarios.

the scenarios are neglected entirely or partially—partial rejection results in focusing on one scenario and ignoring the others.

The subtheme is built on the scenario planning practitioners' and non-practitioner scenario users' involvement lack of involvement in the process, predominantly derived from participatory scenario planning (PSP) practices (Flynn *et al.*, 2018; Poskitt, Waylen and Ainslie, 2021). The foreshadowed issues further shed light on the subtheme. Shared understanding is required in two aspects. The first aspect is related to SP practitioners' understanding of the applied scenario method. It is about knowing what SP is, why it is practised, the role of SP practitioners, and what it does for its users. The second aspect is about reaching a shared understanding of issues targeted in the scenario planning process and understanding the logic of the constructed scenarios. The scenarios need to be understood throughout the scenario planning practice, from start to end. When the scenarios are published publicly, the readers of the scenarios who are not involved in the SP process should be able to understand the logical chains of the scenarios. The findings assert that, whenever possible, including the scenarios' end-users promotes reaching a shared understanding, leading them to take ownership of the scenarios. When creative ideas are present in the scenarios, achieving a shared understanding and taking ownership of the scenarios is more than necessary but crucial. Creativity is valuable in SP, but so is being "credible to the user or the recipient of the scenario" (Coates, 2000, p. 117). Taking the scenario end users' along the scenario development process is critical since creative ideas are prone to rejection, e.g., the bias against creativity (Mueller, Melwani and Goncalo, 2012; Lee, Chang and Choi, 2017; Mueller, 2020; Mueller and Yin, 2021). The end-users are more likely to give credibility to scenario planning outcomes and take ownership of them if they are part of the SP process. One implication of the bias against creativity in SP can be intolerance of anomalous information. Bradfield (2012) frames the issue around tolerating unusual information to reach a paradigm shift of mind – shifting perspective – and its relevance with disruptive technologies in the business context. He argues that Pierre Wack's in-depth approach should be emphasised in SP. The solution offered to the issue is the "right mental training"; "a mind accustomed to frequently dealing with anomalous information (which is usually unnoticed or tuned out by the majority) develops an instinct for anomaly" (Bradfield, 2012, p. 298).

The multicase findings assert that participatory scenario planning practices are preferable to non-participatory designs. Through the first approach, reaching a shared understanding and taking ownership of the outcomes are more likely to occur.

SP literature reports participant understanding from numerous points of SP's aid in,

- comprehensive (Zeng, 2018), deeper (Zegras, Sussman and Conklin, 2004) future understanding of participants,
- organisational understanding of the outside world through guiding them to see potential futures (Zegras, Sussman and Conklin, 2004),
- “understanding the forces of change” (Villotti and Brethauer, 2013, p. 2) ,
- “understanding a situation” (Wright, Cairns and Goodwin, 2009, p. 2),
- “understanding causal processes” (Wright, Bradfield and Cairns, 2013, p. 635)
- “creating time and space” for SP practising managers to understand “the limitations of their own pre-conceptualisations... opening new business opportunities” (Wright *et al.*, 2020, p. 1), and
- “understanding others’ perspectives” (Johnson *et al.*, 2012, p. 1).

SP practitioners’ understanding and assumptions are also discussed from the perspective of their world views and the knowledge they bring to the scenario planning practice (Zegras, Sussman and Conklin, 2004, p. 10)

Despite the literature’s richness on scenario planning and practitioners’ understanding of various aspects, the author has identified only two accounts where the SP practitioners’ understanding of the applied SP technique is considered a potential issue. Wright *et al.* (2019) have recently articulated their ideas on SP workshop orientation and the possibility of practitioners’ lack of complete understanding of the IL technique. They have stated:

Where there is a time delay or changes in the personnel involved between scenario development and use, the detailed understanding of the scenarios and the motivation for their development may be missing, forgotten or not be equally understood by all participants. All this leads to a decrement in both decision making and subsequent action (Wright *et al.*, 2019, p. 14).

The multicase findings demonstrate that a time delay or changing personnel who are involved in the process are not the only reasons. Two types of practitioners in the foreshadowed issues are identified. In the first type, the practitioners are eager but do not understand SP. In the second type, practitioners are not eager and do not understand SP.

The assertions of Soste *et al.* (2015) are closely related to the foreshadowed issues. They state:

...if practitioners and researchers wish to achieve stakeholder ownership within a participatory planning process, they need a clear understanding of its characteristics (or attributes), the philosophy underlying its achievement and the implications for project governance, engagement processes, staffing, time and budget (Soste *et al.*, 2015, p. 251).

Getting across the purpose and logic of chosen scenario method to SP practitioners is critical to prevent any misunderstandings. The scenarios are expected to be developed in a transparent fashion where the users understand the logic of scenario construction, grasp the step-by-step process which leads to the creation of the scenarios and finally allow for tracing back. Only then do the scenarios have the credibility for an organisation to consider a significant change (Coates, 2000). Credibility in SP is not explicitly investigated in this doctoral project. However, the findings support its necessity as found in the SP literature:

One way to shift people's conceptual anchors is to provide powerful alternative scenarios that supplant the past as the dominant starting point. To enhance the psychological impact of scenarios, it is important to understand better what determines their acceptance. The latter is influenced by source credibility (i.e., who developed them), content credibility (i.e., what they say), and channel credibility (i.e., by whom and how they are presented) (Schoemaker, 1993, p. 201).

The multicase findings touch upon source and content credibility. However, channel credibility has not come up in the research. There is room for research on the channels of credibility in SP and their role in SP effectiveness.

Being familiar with one SP school of thought and participating in another is reportedly problematic since the practitioners experience difficulties shifting their thinking. Thinking creatively about the future is an already challenging endeavour (Wodak and Neale, 2015; Wade and Piccinini, 2020). Furthermore, the multicase findings demonstrate that not every SP practitioner can do well with creativity. Their poor grasp of the applied SP technique also contributes to the issues, likely resulting in poor scenarios. The SP literature appears to have undermined the latter issue.

In the second group, the reasons for SP practitioners' lack of eagerness to understand SP and, therefore, not understanding it are different. They are:

- d) practitioners have an already set mind about the future due to various reasons, e.g., commissioning research previously on a subject, and their results are taken for, leading to ex-ante confidence (Phadnis *et al.*, 2015, p. 1407), and belief perseverance (Bradfield, 2012, p. 267); practitioners are lobbyists, and they have their agendas to defend, resulting with an inclination towards focusing on one scenario which is associated with confirmation bias and experience bias (Bradfield, 2012, p. 268; Bradfield, 2008, p. 204),
- e) practitioners who do not understand that they do not have control over the exogenous factors (Wack, 1985b), and they cannot control the future (Wack, 1985a),
- f) practitioners do not care about scenario planning, e.g., lack of motivation, the subject is not of interest to them,
- g) practitioners do not have sufficient time and overloaded with tasks at work (Wright *et al.*, 2019; Soste *et al.*, 2015)

The multicase findings assert that conflict management in the scenario planning workshops is the second most important aspect of reaching a shared understanding. The SP facilitators' ability to manage the conflicts and use of humour and playfulness

supports resolving the conflicts. Speaking openly and trust, and creativity feed into each other. The relationship is necessary to reach a shared understanding and discover beyond usual, leading to transformed understanding. They are found relevant to the added value perspective of creativity and discussed later in this chapter.

Transformed understanding theme conclusion

The quintain findings presented so far have demonstrated the primary role of creativity in scenario planning effectiveness. Three studies in scenario planning literature share commonalities with the quintain findings. The studies are explained and discussed considering multicase findings in this section. The discussion has allowed for:

- investigating the conceptual positioning of past studies,
- comparing the studies with the multicase findings, and
- checking for similarities and differences.

The discussion process is aimed to identify a theoretical/ conceptual framework future research can use.

Miller's (2007) Future Literacy Concept

Previously, Miller (2007, p. 348) has demonstrated three levels of “futures literacy”. Although his approach to building the three stages is different from this doctoral project, the similarities are stark in some aspects. Miller (2007) has proposed three literacy levels and linked relevant tasks and techniques to each level. According to him, futures literacy is “the capacity to explore the potential of the present to give rise to the future” (Miller, 2007, p. 347). Each level is a prerequisite to the next level, e.g. level 2 can be achieved after level completing level 1, level 3 after level 2. In this doctoral project, the author has not identified that sort of a relationship. The three subthemes are necessary to reach “transformed understanding”, but a level differentiation is not observed among the subthemes. The subthemes and the theme are not associated with any form of literacy, e.g. scenario planning competence or expertise.

Futures literacy (FL) is seen as “the capacity to think about the potential of the present to give rise to the future by developing and interpreting stories about possible, probable and desirable futures” (Miller, 2007, p. 347). The multicase findings in this doctoral project reflect a similar observation, although it is implicit. From a capacity-building perspective, the theme and its subthemes in this doctoral research are two dimensional, unlike the futures literacy concept. The added value theme also contributes to the transformed understanding theme. However, the added value is not perceived as a prerequisite to transformed understanding by the researcher. Therefore, the link between the two themes is not considered part of the capacity-building process chain, but the added value complements the occurrence of transformed understanding.

The first level of FL is “awareness”. It is mainly “about developing temporal and situational awareness—meaning a greater appreciation that change happens over time and that particular constituencies, products or organisations can be situated in time according to their values and expectations” (Van der Heijden, et al., 2002; Ringland, 2002 in Miller, 2007, p. 348). Miller (2007) demonstrates the awareness level with the good, bad, and ugly scenarios. The cases with only subtheme choose and combine creatively appear to overlap with his first level concept. Miller (2007) interprets the level as the most common foresight practice and with a strong track record. However, he also associates the first level with stories that suffer from limitations and with pitfalls that can be overcome. However, the multicase findings assert otherwise. The cases which have utilised only choose and combine creatively have achieved the desired outcomes of their scenario planning practices. Even when the scenario developers have aimed for a transformed understanding, as seen in case 6, the scenarios' end-users have not responded to it. It appears that the SP literature can be idealistic with its expectations and somewhat dictating on SP in terms of what should be expected from it. The multicase findings demonstrate that SP is sometimes expected to function less than the literature professes, and it is okay. Level 1 FL – awareness – also discusses the importance of a basic understanding of assumptions, such as values and expectations. In contrast, the multicase findings have strongly emphasised the importance of reaching a shared understanding and taking ownership of the scenarios.

The second level, “discovery”, is about disabling the limitations of imposed “values and expectations when thinking about the future”. The subtheme discover beyond usual does not explicitly involve the logic of imposed values and expectations as detrimental factors. Therefore they are not necessary elements to overcome. Nonetheless, FL discovery and discover beyond usual have one crucial concept in common. They both recognise opening up new insights as crucial and a challenging step.

Additionally, creativity's role in FL “awareness” and “discovery” are differentiated, similar to the multicase findings. Both discovery and discover beyond usual emphasise the “discovery of the unknown” and “the application of the methods that combine creativity and social science to the task of discovery usually do not involve the same methods or competence as Level 1 FL” (Miller, 2007, pg. 352). For instance, the subtheme artistic touches and humour, trust, playfulness, and fun moments support the SP practices in their quest to discover beyond the usual. On the other hand, the cases that only “choose and combine creatively” have not used the added value elements.

Finally, Level 3 FL – choice – “integrates the insights of the two previous levels” (Miller, 2007, pg. 355). The third level looks at the choice of SP end-users among the developed scenarios and their use in the strategy-making stage. Except for two cases, this doctoral research does not observe the scenarios’ direct use in strategy-making as a primary tool. As illustrated in the multicase findings, the purposes of using SP are varied, and SP most often is used to feed into the organisations' strategic thinking. Only in cases 4 and 16 SP is used as a stand-alone tool. In both cases, one scenario is chosen for vision development, which means that SP evidently and fundamentally affected the organisation’s vision development. Although case 16 is a scenario development practice aimed to feed into maritime spatial planning, a maritime spatial planner reported that they have still worked on the spatial plans. The vision they have built is based on the developed future scenarios. However, it is early to comment on how the chosen vision is reflected in the maritime spatial planning and whether the spatial planners are able to accommodate the chosen vision in their plans entirely or with altercations. In short, Miller (2007)’s Level 3 choice concept is not structured as

a single theme or a subtheme in this doctoral dissertation but is considered part of the SP effectiveness.

The literature does not always differentiate the emphasis on creativity in SP practices and its role in scenario planning. For instance, in the FL concept of Miller (2007), creativity is mentioned, but its function is not clearly explained. Discovery is considered the level at which creativity is most emphasised. However, the explanation of the relationship between the level and creativity is minuscule.

Mindset Change Effect of SP, Sensemaking and Storytelling Concepts

Bowman (2016, p. 83) has demonstrated scenario planning as a “foresight activity that draws together aspects of sense-making, organizing and storytelling”. Through the sense-making, organising and storytelling lenses, ‘mindset change’ is presented as “a key benefit of scenario planning” (Bowman, 2016 in Wright *et al.*, 2019, p. 14). Similar to the quintain findings, Bowman (2016, pg. 93) claims that mindset change “can only come from participation, from being embedded in the process and experiencing both the episodic and continuous flow of sensemaking and storytelling”.

The term sensemaking was presented first time by academics who examined “how meaning is constructed and transmitted” (Maitlis and Christianson, 2014, p. 60). Garfinkel (1967) introduced ethnomethodology and sensemaking to sociology and Weick (1969) first talked about sensemaking in organisational context, which later was picked up by researchers doing research around the social constructionist paradigm instead of objectivism (Maitlis and Christianson, 2014). Recognising the multitude of definitions of sensemaking, Maitlis and Christianson (2014, p. 66) produced a derived definition of it as the following:

a process, prompted by violated expectations, that involves attending to and bracketing cues in the environment, creating intersubjective meaning through cycles of interpretation and action, and thereby enacting a more ordered environment from which further cues can be drawn.

Sensemaking is claimed to have captured the process of scenario planning in addition to organising and storytelling and conceptualised it at an inter-organisational level (Bowman, 2016).

The multicase findings demonstrate the SP practices as a process that overlaps with the definition of sensemaking above. The subthemes discover beyond usual and choose and combine creatively; however, they are not captured sufficiently by sensemaking. Sensemaking literature states that it is prompted or triggered when “members confront events, issues, and actions that are somehow surprising or confusing” (Maitlis, 2005, p. 21), which is considered a creative process by Drazin, Glynn and Kazanjian (1999).

Bowman (2016) makes no mention of creativity despite the mindset change benefit of scenario planning. However, implicitly, creativity is mentioned as the following:

Consequently, the nature and trends of the present are inextricable from the logic used to create the scenarios. Thus, the resultant product or artefact of the process becomes loaded with meaning that is intended to serve as a bridge to a new cognitive space (Bowman et al., 2013) at the organizational or societal level (Bowman, 2016, p. 80).

Despite illustrating the sensemaking process in scenario planning and how it leads to acting as a link to a new cognitive space, a detailed account of creativity in the process is lacking.

Sensemaking literature reports enabling innovation and creativity in organisations through the “construction of new meanings, and it is such new meanings that underpin new ways of organising and understanding” as a “process directed at creating order from confusion and chaos (Maitlis and Christianson, 2014, p. 93). Maitlis and Christianson’s (2014) surprise in recognising creativity’s nature and how it is separated from the status quo, producing at least short-term disorder, is explicitly stated in their research paper. They recognise that sensemaking is targeted at creating order when confusion arises. Sensemaking misses out on the intentionality of being creative and generating creative ideas. Weick’s (1995, pg. 90) following account

demonstrates a contrasting view of SP scholars instead of the emphasis of sensemaking on novelty as a problem to be solved rather than the desired end:

To label something that is novel or undesirable as a "problem" is to imply that it is also something to be solved. But that is not the only label that is possible. If the novelty is truly open to a variety of labels, then one could also say things like, that is an issue, manage it; that is a dilemma, reframe it; that is a paradox, accept that is a conflict, synthesize that is an opportunity take it. To label a novelty a problem is a consequential act, just as it is consequential to call it an issue. That is the whole point of sensemaking.

In addition to above, there are also issues with how creativity is framed in sensemaking. For instance, Ford (2000) demonstrates three issues in the conceptualisation of creativity in sensemaking of Drazin, Glynn and Kazanjian (1999), which has been influential on the subject with almost 2000 citations. The issues are associated with:

- employing a somewhat tautological process creativity definition, e.g., “creativity is a process that leads to creative activity” (Ford, 2000, p. 284),
- taking a reductionist account and dismissing what they considered functionalist-reductionist research orientation of creativity literature instead of delving into it with empirical research and further understanding it, and
- focusing on large-scale and long-duration projects, not capturing and revealing differences between other units of analysis such as groups, institutions and markets.

The process-oriented creativity approach to sensemaking does not entirely contradict creativity literature. Several scholars report creative product, and creative process approaches to researching creativity. For instance, Hennessey, Amabile and Mueller (2011) identify both types and state their assessment is focused on creative products, whereas Harvey and Kou (2013) direct their attention to group creativity throughout the creative process with the study subjects are tasked. However, defining creativity as the "process of engagement in creative acts, regardless of whether the resultant

outcomes are novel, useful, or creative” (Drazin, Glynn and Kazanjian, 1999, p. 287) contradicts the underpinning logic of this doctoral research. It is also considered a disadvantageous conceptualisation instead of creative actions and outcomes conceptualisation (Ford, 2000).

Andersen, Hansen and Selin (2021) have reviewed 30 European scenario planning projects. Using the sensemaking lens, they claim that “storytelling enables the interweaving of multiple uncertainties, revealing novel causal connections” (Andersen, Hansen and Selin, 2021, p. 8). The researcher of this doctoral project is unable to identify any assessment for any dimension of creativity in their case studies, novelty included. The multicase finding choose and combine creatively appears to be related to their interpretation of storytelling as an enabler of composing various uncertainties and revealing novel causal connections. However, empirical support for their claims is lacking.

The organisational focus of sensemaking research in business and management following Weick (1995) also appears to be restrictive to doing research in scenario planning. Participatory scenario planning practices that utilise public involvement in the process cannot be fully addressed through Weick’s (1995) sensemaking lens.

In terms of shared understanding perspective, Bowman (2016, p. 81) reports SP’s aid in establishing “coherence amongst multiple actors allowing meanings to materialise that can both facilitate and constraint their actions”.

Another lens, storytelling, has more emphasis on creativity than sensemaking. Bowman *et al.* (2013) summarise the components of storytelling in the scenario planning context, revealing the following:

- stories include a temporal chain of events, bounded by time and plausibility through mutually underpinning logic,
- story plots flourish on novelty, the contrast between the expected and the unexpected,
- “novelty allows for the suspension of disbelief”, which “links the storytelling with the audience” (Bowman *et al.*, 2013, p. 737), and

- people can connect to stories by relating to the messages in the stories.

The storytelling lens indeed explains the chain of events, reaching plausibility in the scenarios, and touches upon the novelty dimension of creativity. Its utilisation of dialogue and conversation allows for sharing of practitioners' perceptions (Wright and Goodwin, 2009) as it is a "generative practice through which reality is experienced, and individuals constitute and reconstitute themselves" (Wright, 2005, pg. 91- 92). In scenario planning, storytelling is "deployed as a means to engage intuition, expose deeply held assumptions and forge new and shared interpretative frames" (Wilkinson, Kupers and Mangalagiu, 2012, p. 700). Evidence in psychology and neuroscience suggests that storytelling leads to story production and story understanding, supporting the claims that comprehension and creation are mutually suited (Vervoort *et al.*, 2015). Storytelling prepares the ground, allows for conversation engagement, and leads to reaching a shared worldview (Boje, 1991).

In conclusion, research on scenario planning using sensemaking and storytelling lenses report similar findings to the multicase findings. However, the sensemaking lens cannot capture a detailed account of creativity in the scenarios with its current approach to creativity. Therefore, reconceptualising creativity in sensemaking and including the creative product perspective can enhance future research.

The following section introduces and discusses William's (2016) and evaluates its suitability to the multicase findings and offers directions for future creativity research in scenario planning.

Melanie William's Scenario Learning and Worldview Transformation Research

Williams (2016) has explored the impact of scenario learning on SP practitioners' thinking, focusing on transformation, worldview, systems thinking, tolerance to uncertainty, and futures thinking. She problematises her research questions as the following:

While numerous assertions in the classical scenario planning literature contend that engaging in scenario planning has a transformative effect (van der Heijden

2005; Schoemaker 1992; van der Heijden et al. 2002; Wack 1985) there is little beyond anecdotal evidence in this literature to back the claims. Nor is there a coherent theory explaining how transformation might occur (Williams, 2019, p. 261).

She positions systems thinking, future thinking and tolerance to uncertainty under the epistemological worldview of SP practitioners, arguing that her doctoral research findings support the scenario learning impact on SP practitioners' transformed worldview. Additionally, she considers that all beliefs are also located in an epistemological worldview, meaning that a transformed epistemological worldview suggests worldview transformation as one (Williams, 2016). The multicase findings do not claim a transformed worldview; however, they assert a transformed understanding of issues among scenario planning practitioners/scenario users.

Despite the focus of this project being on creativity and not learning, the multicase findings share similarities to William's (2016). The role of creativity in scenario planning appears to complement SP's role in learning. It is not surprising since the relationship between creativity and learning is noted and conceptualised in several ways in the creativity literature. Karwowski *et al.* (2020) summarise some of them as the following:

- by imagination, remote associations, and originality, creativity enhances learning,
- experiences and previous knowledge serve as a ground for creative thinking,
- too much focus on learning can impede creativity; on the other hand, too much focus on creative expression may deter “learning by making it less goal-oriented and unfocused” (Karwowski *et al.*, 2020, p. 4).

Two of the conceptualisations above: remote associations and novelty, and analogical reasoning, are previously reported.

Williams (2019) has informed her research through several concepts and theories. However, discussing all of them in this section is not possible and necessary. The experiential learning theories (Dewey, 1986; Kolb, 2014) and the transformative

learning theory (Kegan, 2009; Mezirow, 2006) appear relevant and appropriate to the multicase findings. The overlaps between the multicase findings and Williams (2016) findings are mainly informed by the theories mentioned.

Kolb's (2014, p. 31) experiential learning theory is a "holistic integrative perspective on learning that combines experience, perception, cognition, and behaviour" and he defines learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 2014, p. 49). The influential work of Wallas (1926) has introduced a five-stage model of the creative process. It has inspired numerous research projects for almost nine decades (Sadler-Smith, 2015), and it is easily adaptable to the Kolb's (2014) experiential learning cycle due to the remarkable similarities among them (Kolb, 2014, p. 45).

Unlike the previous creative process theory of sensemaking by Drazin, Glynn and Kazanjian (1999), the conceptual model of Wallas (1926) guides the researchers from idea generation to implementation. The Wallas' model includes "reflection and action, experimenting, seeking feedback, and searching for new ways to do things" in an iterative fashion (Zhou and Shalley, 2011, p. 287). The multicase findings "discover beyond usual" and "choose and combine creatively" bear a resemblance to Wallas's (1926) preparation and intimation stages.

Preparation is reliant on domain-specific knowledge, which is drawn from the issue's home domain. However, creative individuals "may also procure important knowledge from other seemingly unrelated source domains either through deliberate scanning or serendipity" (Zhou and Shalley, 2011, p. 348). Conceptually, the preparation stage accommodates the intentionality of discovering beyond usual.

The intimations stage is related to the fringe consciousness and "have been connected with the 'sudden' and 'unexpected' appearance of their new ideas" (Wallas, 1926, p. 96). Sadler-Smith (2015) reports that Wallas's intimations stage shares strong similarities with other creativity researchers, especially creative intuitions. They consist of the following:

- “a vague anticipatory perception that orients creative work in a promising direction” (Policastro, 1995, p. 5 in Sadler-Smith, 2015, p. 349),
- “Feelings that arise when knowledge is combined in novel ways” (Dane and Pratt, 2009, p. 5 in Sadler-Smith, 2015, pg. 349), and
- “slow-to-form affectively-charged judgements occurring in advance of an insight that combine knowledge in novel ways based on divergent associations, and which orient behavior in a direction that may lead to a creative outcome” (Gore and Sadler-Smith, 2012, p. 308 in Sadler-Smith, 2015, p. 349).

Combining knowledge from different resources to produce creative ideas is found in multicase findings. Similarly, choosing and combining ideas throughout the scenario development stage to produce creative scenarios are also reported.

Illumination is restricted to the instantaneous “flash” or “click” as a result of a “successful train of association” (Wallas, 1926, p. 93-94). Illumination is the stage where the solution presents itself, also interpreted as the aha effect, followed by verification. Verification is the stage where the idea is evaluated using logic so that “it is an appropriate solution”(Zhou and Shalley, 2011, p. 287). The verification is further explained as:

Verification takes place within the sociocultural environment instantiated in Csikszentmihalyi’s concept of *field*. The field is made up of expert individuals who practice in the domain and represent the social organization of the domain and embody its rules. These are enacted by the members of the field (e.g., critics, curators, grant awarding bodies, peer reviewers journal editors, prize committees, investors, venture capitalists, etc.) who serve as gatekeepers. Creative insights do not exist in a vacuum because their Verification is culturally and historically to traditions and social structures (Sadler-Smith, 2015, p. 349).

Verification partially covers the multicase findings linked to the reaching shared understanding and taking ownership subtheme. The subtheme demonstrates that the

SP practitioners accept or reject the creative ideas following their judgment on the ideas.

Wallas' creative model process is not popular in the scenario planning literature. Patel (2016) has investigated the meta-process for rethinking, supporting his research through multiple concepts and theories, including Wallas' model. However, its contribution to Patel's research remained limited to framing the research question as Wallas' model is used only to frame the "discovery that leads to sudden illumination and insight" (Patel, 2016, p. 142) aspect of SP.

As discussed so far, the multicase findings map well onto the Wallas' model. A similar observation is previously made for the Poincaré' model by MacKay and McKiernan (2010). They approach the scenario process as "an ingenious mix of art and science" and evaluate it as a creative process that offers potent perceptions of "how the future might unfold and what actions executive teams can take now so that organisations might survive and thrive" (MacKay and McKiernan, 2018, p. 36).

Wallas used Henri Poincaré's writings during the construction of the model, and consequently, Poincaré's account resonates with Wallas' Preparation, Incubation and Illumination stages. However, unlike Poincaré, Wallas dedicates the Incubation stage to the unconscious mental exploration where there is no mathematical thinking occurs. On the other hand, Poincaré pays attention to the post-Illumination stage. Finally, the "term *verification* is borrowed directly by Wallas from Poincaré" (Sadler-Smith, 2015, p. 344).

Added Value

Creativity consists of artistic touches: creative writing, visuals, storytellers, and creative moments through humour, playfulness and trust as an added value in scenario planning. Artistic touches were experienced as a means of spurring the creativity in the scenario development among SP practitioners and scenario flesh-out stage by the scenario narrative writers. It is noted as a creative process shaped by narrative, stories and more (MacKay and McKiernan, 2018) in the literature.

Creative moments are experienced through humour and playfulness, making a similar impact to artistic touches but also going beyond it and playing a conflict resolution role.

The multicase findings demonstrate the positive impact of visuals, e.g., maps, future state of a place in images, inviting storytellers to SP workshops, and creative writing on SP effectiveness through improving practitioners' creativity. Several scholars have previously reported the use of similar tools, for instance, Raford (2015), Selin *et al.* (2015), Flowers (2003). However, a scientific inquiry measuring the impact of using such approaches in SP creativity and its impact is lacking and therefore encouraged.

Future images, the visualised world states in different scenarios, reportedly trigger creativity among SP practitioners. "Visualizations help individuals and groups break free from overly restrictive constraints and limitations. If done properly..." (Anderson and Rothstein, 2004, p. 750). The findings suggest that visuals should be used timely and considerably; the use of visuals in the scenario development process can also be restrictive to participants' imagination. For instance, the maps introduced in the SP process can be taken for reality, potentially introducing fixation. The fixation effect is a well-known phenomenon in creativity research (Agogué *et al.*, 2014). For instance, the role of examples is investigated as a source of inspiration and fixation in the design literature. A recent meta-analytic review on the issue has found that the timing of "presenting examples at the beginning of problem-solving produced a larger positive impact on design solutions, as compared to presenting examples during problem solving" (Sio, Kotovsky and Cagan, 2015, p. 92). The authors have explained the finding with the sunk cost effect, stating that the people develop a commitment to their approach and tend to maintain it after some time. Additionally, the individuals in the studies usually benefited more from being "presented with one example than multiple ones" (Sio, Kotovsky and Cagan, 2015, p. 92). Creativity, and design literatures have transferable knowledge to offer to the scenario planning scholars and practitioners.

The findings further demonstrate the positive impact of humour, trust, playfulness and fun moments in scenario development workshops. Humour and playfulness are effective means of tackling conflicts among SP practitioners. Trust is perceived as a

requirement that feeds into creativity. Additionally, fun and playful moments also aid the scenario developers during the scenarios' fleshing out stage. It allows them to be imaginative with the future events, names and places, e.g., naming an imaginary organisation with an imaginary function that fits into the scenario based on how things may evolve over the years, taking into account what organisations may emerge.

Similar to the findings, Popova (2012, in Proctor, 2019) outlines five factors that make people more creative. They are:

- “Space: ‘You can’t become playful, and therefore creative, if you’re under your usual pressures’,
- Time: ‘It’s not enough to create space; you have to create your space for a specific period of time’,
- Time: ‘Giving your mind as long as possible to come up with something original’ and ‘learning to tolerate the discomfort of pondering time and indecision’
- Confidence: ‘Nothing will stop you being creative so effectively as the fear of making a mistake.’
- Humour: ‘The main evolutionary significance of humour is that it gets us from the closed’” (Popova, 2012 in Proctor, 2019, p. 27).

The factors above are derived from the personal experience of John Cleese, a scriptwriter for television and radio and an actor, and map well onto the finding. Future research may investigate any potential positive impact of embedding the factors in the SP process.

From the SP literature perspective, Chermack (2011) talks about playful attitude and highlights its role in businesses, supporting the claims of playfulness as a creative personality indicator. More recently, Chermack *et al.* (2015) have measured the impact of scenario planning on creative organisational climate. Their findings are previously demonstrated in the CIS of SP effectiveness literature in this doctoral project. The multicase findings reveal similar dimensions as necessary for effective SP practices. However, the findings further shed light on the interaction between playfulness and

humour, and conflicts, demonstrating the former as a means of supporting the latter's resolution. Although the Chermack *et al.* (2015) theorises organisational creative climate in scenario planning, their study measures SP's impact through pre-post tests. Therefore, it does not offer an evidence-based explanation of how the creative climate variables interact with each other. Further research following their research and this doctoral research's findings are required.

Creativity and innovation relationship is another finding that requires further research. The multicase findings demonstrate an innovative idea development through scenario planning despite the aim of its practice is not innovative service idea generation as seen in case 4.

Van der Heijden (2005, p. 58) has illustrated "the innovator attitude" stating that "the characteristic outcome of the successful strategizing project involves an original invention, based on a unique reframing of the strategic situation of the organisation in its world". However, he looks at innovation from the strategy innovation perspective. Innovation, according to him, in the scenario planning context is "applying new combinations of Distinctive Competencies, changing the "the rules of the commercial", cost innovation" (Van der Heijden, 2005, p. 277). Most of the SP literature discusses innovation from the strategy-making perspective, for instance, Schoemaker (1993), Major, Asch and Cordey-Hayes (2001), Van Der Heijden (2004), Chermack and Nimon (2008). However, a few also have attempted to demonstrate scenario planning as an innovative product development process. For example, Hosbond, Nielsen and Aaen (2008) have reported process innovation in the case study they conducted. They approach innovation as a "process of turning opportunity into new ideas and of putting these into widespread practice" (Tidd and Bessant, 2005 in Hosbond, Nielsen and Aaen, 2008, p. 267). Rohrbeck (2012) has investigated strategy and innovation management subjects in scenario planning practices and concluded that scenario planning offered value to its practitioners to identify new business fields. Further research by Rohrbeck and Schwarz (2013) have approached innovation management from a value contribution perspective. Although their study has included all formalised strategic foresight activities, their research illuminates the field

regardless. Further research on innovative product and service idea generation of scenario planning as an added value is required.

Issues within and around creativity

The multicase findings demonstrate that creativity is elusive and should be handled with care in scenario planning. The multicase findings reveal that too much creativity can cause dysfunction (MacKay and McKiernan, 2010). However, it can also be lost during the SP process and unintentionally constrained. The loss of creativity in translation is one example of it.

The level of collaboration, communication, task structure, leadership, and social environment are contextual factors that underlie creativity enabling and disabling dynamics (Rosso, 2014). Accordingly, the multicase findings reveal that the environment where SP is practised can influence the scenario developers' creativity. Although most research looks at the creative environment in terms of creative organisations and socio-psychological aspects, the physical environment can also be influential (Van Der Lugt *et al.*, 2007). The findings further show that if the scenarios are planned to be published in academic journals, the scenario developers feel constrained creatively by academia; it is perceived as an environment with rigidity and without room for creativity.

The scenario developers see SP as a systematised method. Applying the method following its preset rules is perceived as a hindrance to creativity. Scenario development by morphological field analysis (MFA) can be one example of constrained creativity in SP literature. MFA has received criticism due to its overly structured process that can impede creative thinking (Ritchey, 1997 in Börjeson *et al.*, 2006). Scenario planning workshops are part of participative SP practices, and the role of facilitators in terms of the structure they provide is one aspect of potential creativity constraint. Leaving room open for content in the workshop throughout the process, e.g., discussions, but pre-restructuring the main objectives and the form of workshops are considered good practices (Poskitt, Waylen and Ainslie, 2021). Although empirical research on SP, creativity and constraints relationship is scarce, the case study

participants' observation of constrained creativity in SP is an exciting point and has opened up fruitful research directions.

Constraints can also benefit individual and group settings regarding creative performance (Rosso, 2014). A recent solution offered to creativity and constraints in SP is Stretch-Thinking Loops (Brooks and Curnin, 2021), developed through the creative constraints concept of Amabile (1988).

As observed in the choose and combine creatively subtheme findings, despite the formal step-by-step procedure, the scenario developers navigate the ways of being creative in the development process. Remote association for creative idea development is visible in the structured process of the driver and uncertainty identification stage. Even under a systematised and constrained process, creative ideas can flourish. “A new idea doesn’t necessarily need new resources. It’s quite often possible, even within the strictest of limitations, to detect degrees of newly found liberty” (De Brabandere, 2016, p. 149).

Multicase assertions – modified foreshadowed issues – illuminate the constraints further and reveal that efficiency concerns of SP practitioners are mainly observed in consultancy companies. Budget and time-related efficiency concern direct SP practitioners towards applying a standardised and fast scenario development process, which hinders the creative process. It appears that the creativity within constraint aspect is even more critical in today’s world of standardising. (De Brabandere, 2016, p. 149). Future research can investigate the constraints within creativity in the SP context.

Case study participants have perceived creativity as an ability. Several means of tapping into creativity are expressed in the interviews and previously reported in this chapter. Some SP practitioners are perceived as more innovative than others. Additionally, the concept of visionary people is another interesting finding of this doctoral research. Some SP practitioners and facilitators are perceived as more visionary than others. Visionary people are often researched in the leadership context in strategy, and entrepreneurship fields, see Westley and Mintzberg (1989). In scenario planning literature, for instance,

- visionary companies and organisations mentioned by Ringland and Schwartz (1998) and Lindgren and Bandhold (2003),
- “entrepreneurship – visionary proactivity “visionary process” (Tapio and Hietanen, 2002, p. 610),
- “visionary speculative image” type of scenarios (Anderson and Rothstein, 2004, p. 750),
- “visionary scenarios” (Gordon, 2020, p. 6),
- “visionary executives” (Cornish, 2004, p. 102),
- the necessity of “visionary thinking ability” in the driver and uncertainty identification stage (Dana Mietzner, 2005, p. 228), and
- thinking visionary together as a requirement for collaborative foresight in addition to being open-minded to achieve and promote “out-of-the-box thinking” (Gattringer and Wiener, 2020, p. 11).

SP literature does not appear to report visionary people, but the closest concept is remarkable people. Van der Heijden (2005) talks about remarkable people (RP) in his book at length. They are associated with influential thinkers who support reframing situations by presenting new perspectives, providing novel insights, and perceiving the world in a new way, aiming to change decision-makers’ mental models. They bring “original ideas, intuition, curiosity, courage (to suspend disbelief), invention, originality, emotion, intellectual sparkle” (Van der Heijden, 2005, p. 59) to the table. RP are different from experts since they are not domain knowledge sources but “people who can look at the same old dots and connect them in new ways” (Van der Heijden, 2005, p. 22). He associates RP with highly divergent thinkers. The typical traits of such people who offer “unique insights”. They are “idea generators”, “pushing the edges”, and “already living in the future” (Van der Heijden, 2005, p. 223). The latter characteristic of RP bears a strong resemblance to visionary people. To the researcher’s best knowledge, visionary people are not a scientifically inquired concept except for Dabrowski’s (1964) theory of positive disintegration. According to his theory, there are five levels of personality development (Harper *et al.*, 2017). Level five is associated with “creative expression” where “truly visionary works, works that are unique and novel, are created by people expressing a vision unrestrained by

convention” (Tillier, 2002, p. 8). As such individuals are able to express themselves unstrained by convention, their abilities are aligned with the “remarkable people” of scenario planning literature. RP “should be chosen to be both capable and willing to offer challenge to the organization's business-as-usual thinking” (Wright, Bradfield and Cairns, 2013, p. 635). Future research on remarkable people, and visionary people through the lens of positive disintegration theory may offer novel insights and enhance SP practices.

Requirements for creativity in scenario planning effectiveness

The multicase findings demonstrate a clear link between SP objectives and the use of creativity. SP literature usually investigates the practice in three schools (Franco, Meadows and Armstrong, 2013; Rafael and Cynthia, 2014). The author has not focused on such classifications in this doctoral research. Instead, the quintain is investigated through the objectives of the SP practices in the case studies.

Different approaches to developing scenarios and using the scenario method exist in practice. Nevertheless, some aspects are similar. For example, the first step usually identifies the objectives and rigorously challenges the “mental maps that shape people’s perception” (Dana Mietzner, 2005, p. 227). However, there are exceptions to such objectives and processes.

The multicase findings show that the end users’ expectations from the scenarios are met by the consultants and the researchers through different forms of SP practices. Whenever the aim of SP is transforming understanding on an issue, creativity is more emphasised in the SP practices. Although there are exceptions, the intuitive logic (IL) School of scenario planning is used in such circumstances. From the IL school of SP perspective, the “scenario process is one of creative thinking where the aim is to open up consideration of all possibilities in a complex and ambiguous world, not close down thinking through selectivity and exclusion” (Wright and Cairns, 2011, p. 24). The necessity of creativity is emphasised in IL scenarios as well as its elusiveness. Schoemaker (1993, p.212) states, “to a large extent, scenarios require creativity and intuition that are difficult to systematize.”

Schoemaker and van der Heijden (1992, p.44) explain how Shell developed its vision, strategically structuring it to generate a competitive advantage in chosen businesses. They argue that the strategic vision process “required a search deep in the organization, and depended for success on open communications and creativity motivators”. In this doctoral research, the author has identified openness and creativity as necessary in the scenario development stage when the aim is to transform understanding.

Openness has emerged in the findings in openness to share ideas among SP practitioners. Furthermore, it is accompanied by trust and not being afraid of speaking thoughts. “Unrestrained thinking fosters creativity, encourages openness to new ideas” (Mostert et al. 2007 in Johnson *et al.*, 2012, p. 4). Openness supports the nonrejection of options too early in the process. In contrast, limited openness is linked with the likelihood of going back to the familiar and short-term thinking, leading to decreased possibility of having a conversation around thinking the unthinkable with other people (Burt *et al.*, 2017).

Some of the points discussed so far have emerged as requirements in the form of expectations of SP facilitators from SP practitioners. The importance of SP their understanding of the SP process and their commitment are one of the requirements.

The open-mindedness of SP practitioners and their unique viewpoints are seen as ways to explore alternative decisions that can be made, sparking creativity to navigate uncertainty and ambiguity (Marquitz, Badding and Chermack, 2016; Burt *et al.*, 2017).

However, the multicase findings also demonstrate the lobbying activities and the stakeholders with agendas in some case studies. They are identified in participative scenario planning practices, and the SP facilitators have reported them as problematic. The findings cannot establish how the agendas and the lobbying activities are resolved in the SP practices.

SP workshops are expected to “provide a forum for active, equitable and creative discussion of complex social-ecological systems and inherent future uncertainty” (Johnson *et al.*, 2012, p. 3). Cairns and Wright (2017, p. 81) offer “ground rules” for scenario methods that are “truly inclusive and is to be used to explore full range of

possible and plausible futures”. Case 14 and 16 are good examples of such SP practices in their participative nature and objectives. The practitioners’ lobbying activities and agendas are commonly observed as well. Six ground rules that Cairns and Wright (2017) offer for conflict management can better assist future participative SP practices. However, the ground rules cannot address the practitioners’ ex-ante beliefs and inclination towards defending their best interests. Although “the point of scenarios is to explore ‘the limits of possibility’ without value judgement and without recourse to probability analysis” (Cairns and Wright, 2017, p. 81), it does not always occur.

Considering that participative SP practices are becoming more and more common, and open foresight is expected to evolve and be practised more often (Venugopal, Gokmen and Sunner, 2021), SP literature should investigate the means for tackling the issue.

Scenario planning is a fusion of analytical and creative activities (Chermack, 2011). Accordingly, the findings show that creativity in SP is one aspect that needs to be balanced. A trade-off between creativity and hard facts, and common understanding of the ideas are observed in the findings. “Scenario thinking as a creative process that involves subjectivity, intuition and emotion, but which also involves rationality and objectivity” (Wright and Cairns, 2011, p. 15). “Creativity should be useful” is another finding of the research. Although it is tautological, the usefulness dimension of scenario planning is emphasised through the expression. As stated by Wright and Cairns (2011, p. 16), “all information, ideas and opinions put forward in a scenario development exercise should be embraced and then, crucially, evaluated for relevance and usefulness in the creation of plausible scenarios of the future”.

Thinking creatively and “producing a fun set of scenarios” is not sufficient since many scenario practices “fail to gather necessary support the options and events they present” (Chermack, 2011, p. 160). Like all ideas, creative ideas should be backed up with hard facts and rationality in SP, logically supporting them whenever possible to avoid a premature rejection.

5.4.7. Summary of Findings

In this chapter, the findings of four analyses were presented and further discussed concerning the research questions. The discussions were made incrementally; every analysis finding was later discussed in the light of new findings.

Previously, the author's creativity assessment revealed that there were creative ideas in the maritime scenarios and Shell scenarios. Although his subjective creativity assessment generated new insights and answered the research question, "are maritime scenarios creative?", it was insufficient to conclude the doctoral work. Several reasons led to that insufficiency. First, the author's subjective creativity analysis was a limitation to concluding the research question since the author realised he needed to talk to the scenario teams by acknowledging personal level creativity—their subjective creativity assessment of the scenarios needed to be sought. Additionally, the author identified the need for developing a creativity definition in the scenario planning context, using the scenario team's input. Lastly, scenario publications did not always clearly report their objectives for developing the scenarios. Therefore, the author could not identify what was desired with their development and what was achieved through them. It was essential to conclude the doctoral work to sufficiently investigate the role of creativity in scenario planning effectiveness on scenario users.

The scenario teams' creativity assessment was sought to continue the work. This chapter presented their creativity assessment. The majority of the ideas that the author identified as creative were also found creative by the scenario teams. However, there were instances where the ideas that were creative to the author were not to the scenario teams. The opposite was also observed. Since the aim of the assessment was not to suggest a definitive evaluation of the scenarios for creativity, the findings functioned to reveal the ideas that were found creative by the author and the scenario teams, explaining the reasoning behind the assessment. The work is grounded in the constructivist perspective. The constructivist approach to the research has meant that the work is interested in the interpretation of creativity by both the author and the scenario teams, which serves as a means of understanding creativity in the scenario planning effectiveness context.

In this chapter, the qualitative content analysis findings of the scenario teams' creativity definition were presented, revealing general and scenario planning-specific definitions of creativity.

Finally, the chapter presented the findings answering the quintain – creativity's role in scenario planning effectiveness. Accordingly, the findings asserted that creativity was associated with transforming the scenario users' understanding of the issues. For it to actualise in scenario planning, three phenomena had to happen. Discover beyond usual, choose and combine creatively, and reach a shared understanding and take ownership of the scenarios were the three subthemes that explained the occurrence of transformed understanding. Creativity was also perceived as an added value in scenario planning, associated with artistic touches, humour, trust, playfulness and fun moments, and innovation.

The chapter also presented several issues within and around creativity that were experienced in the application of scenario planning. Creativity-induced dysfunction, as well as the impact of constrained creativity, were explained. Creativity was linked with personality, and some participants stated that lacking a creative personality would cause difficulties in SP.

Finally, the requirements for creativity in scenario planning were reported. The findings clearly demonstrated that the purpose of conducting a scenario planning project was closely related to how creativity was used in the projects. Whenever transforming understanding of an issue was part of SP objective, all three elements associated with creativity: discovering beyond usual, choosing and combining creatively, reaching a shared understanding, and taking ownership were observed. The scenario users' expectations from SP played a critical role in the matter.

The findings were concluded by explaining the scenario team/facilitators' expectations from the SP practitioners and underlining the importance of supporting scenario planning with creativity and hard facts. Furthermore, the utility dimension of creativity was emphasised, stating that reaching a common understanding of the scenarios was even more critical when creativity was present in the scenarios.

The next and final chapter presents a summary of the findings, targeting the research questions and answering them based on research findings. Furthermore, implications of the findings for scenario teams and users, SP consultants and maritime stakeholders are presented. It will be followed by presenting this doctoral work's contribution to knowledge. Finally, the limitations of the doctoral work are provided.

Chapter 6: Discussions and Conclusion

6.1. Introduction

The findings will be summarised in this chapter and linked with their related research questions. The implications of the findings for practice regarding scenario planning practitioners, users, consultants and contributions to knowledge will be presented. The limitations of the doctoral work will come next.

6.2. Summary of Findings

6.2.1. Summary of Systematic Review Findings

In Chapter 1, the rationale of the research was presented, introducing scenario planning, the shipping industry and creativity to the reader. It was realised that the theoretical underpinnings of SP needed further work (Burt, 2011; Burt and van der Heijden, 2008; Chermack, 2004; Crawford, 2019), notably SP's effectiveness was an under-researched area (Balarezo and Nielsen, 2017; Wright, Cairns and Bradfield, 2013). Accordingly, the author formulated the first research question which was used as an anchor question for the literature review. The anchor question for the literature review was:

RQ1: What are the areas scenario planning is effective on scenario users?

A systematic review of the scenario planning literature has sampled research evidence. The research evidence is gathered from publications that have expressly set out to test the effectiveness of scenario planning on scenario users. 22 peer-reviewed research papers were sampled in the process. The literature review is later populated with purposive sampling, enabling a richer account of scenario planning effectiveness literature and deepening the discussions around the CIS findings.

The author synthesised research evidence by the CIS method to answer the question. A theoretical framework is presented in Chapter 2. Four synthesising arguments:

- scenario planning as an enhancing process,
- change,

- drawbacks and requirements of chosen scenario planning approach and research,
- scenario planning and its comparison with other long-term planning tools

have demonstrated the sophisticated nature of scenario planning.

The synthetic arguments and constructs are positioned according to their temporal occurrences in reported scenario planning interventions. The framework is illustrated in a diagram. The synthetic argument “scenario planning and its comparison with other strategy tools” (SPICOST) is positioned under *prior to SP process* as it relates to the central decision of choosing scenario planning or other strategy-making tools for long-term thinking. Another synthetic argument, drawbacks and requirements of chosen scenario planning approach and research (DRSPAR) is linked to SPICOST since research evidence for choosing and practising SP effectively is built into the synthetic argument. DRSPAR offers research evidence related to both *before the SP process* and *during the SP process* and therefore positioned under them.

Scenario planning is not the only tool available to organisations and communities for their endeavour to look ahead into the future and developing strategy options. The theoretical framework suggests that the objectives of the scenario users should align with what scenario planning has to offer. For instance, if the objective is counteracting cognitive biases, evidence suggests that other strategy tools offer similar benefits to their users. The drawbacks of scenario planning and requirements of effective scenario planning practices are also should be known by its users. It also has implications for the facilitators of SP. Being proactive and recognising SP’s shortcomings and potential remedies for the SP process can enhance the effectiveness on its users. The literature reports adverse and no-effect areas. In this regard, type, content, information structure, and practitioners’ interpretation of the scenarios emerged as important issues.

The synthetic arguments, scenario planning as an enhancing process and change are positioned under *during SP process*, *end of SP process* and *post SP process*. The effects of SP are reported in the literature starting with the development/ presentation of the scenarios and after the scenario development processes. SP is found effective for cognitive biases, thinking, learning and unlearning during the SP processes. Desired changes in judgement, belief and decision-making are supported with research

evidence during and at the of the SP processes. Increased firm performance is reported after completing the scenario planning projects.

It is also revealed that scenario planning:

- empowers scenario users,
- supports their voices to be heard,
- provides a platform for them to get involved in discussions, and
- makes them feel valued as individuals and valuable to the organisations they are part of.

Regarding the construct “have voice”, as this phenomenon occurs during the application of the SP techniques, it is coded in *during scenario process*. The “Networking- collaboration” construct fits at the *end of* and *post scenario process*. At the end of scenario workshops, “networking” was observed, and further collaboration based on these new contacts was carried on in some instances after scenario workshops. The “Taking action” construct is detected after the end of scenario workshops. SP’s impact, adverse effects, no effects, unexpected effects, and effects on cognitive biases, thinking, judgment, belief, and decision making were observed *during*, and at the *end of scenario process*.

Outcomes of the CIS process also revealed the limitations of available research areas. As a strategic thinking tool and discussions on whether scenario planning is a science or art (Ogilvy, 2005; Schwartz, 2012), creativity and creative thinking aspects of scenario planning appeared to be inadequately researched in the literature. When the alleged benefits of scenario planning and evidence-informed CIS process outcomes were compared, elements related to challenging the scenario users’ status quo thinking and SP’s effectiveness in supporting the users with thinking the unthinkable were the areas that received little scientific support.

Although creativity and its role in scenario planning effectiveness appeared to be a research area worth pursuing, the author has also had to consider the industrial focus of the work. Therefore, the suitability of doing scenario planning research on the industry and more specifically investigating the role of creativity in SP effectiveness

would only be decided following an exploratory qualitative study with the shipping stakeholders.

6.2.2. Summary of Exploratory Pilot Study

The work has aimed to contribute to not only scenario planning literature but also strategic maritime management literature. Therefore, the author was tasked with identifying a research gap that would also contribute to industrial knowledge and practice. Hence, the necessity of an exploratory qualitative pilot study investigating the forward-looking practices of the stakeholders has emerged. The investigation has aimed to explore the suitability of scenario planning research and identify a research gap by discovering long-term thinking approaches in the industry. The findings can be found in Appendix 2. The author conducted the exploratory pilot study to investigate the forward-looking practices in the shipping industry by interviewing the stakeholders. RQ2 guided the study.

RQ2: How do the shipping industry stakeholders make strategy?

The investigation revealed the nature of the industry and the challenges industry stakeholders experienced. The challenges were mainly focused around adapting to digitalisation and the complexity of the industry, e.g., geographically differing regulations and demand uncertainty. Industry takes action to such issues by adopting short to medium-term solutions. For example, the demand uncertainty between Inter-Asia trades is tackled by deploying feeder vessels due to their flexibility to increase the transportation capacity with added feeder vessels whenever necessary.

Regarding medium to long-term thinking, the industry stakeholders reported focusing on up to five years ahead. However, long-term thinking practices were also observed. The participants appeared to be more inclined to spend time thinking about the shorter term due to higher certainty of the nearer future than ten years and longer. One participant reported that the seaports she was a part of for almost twenty years applied scenario planning as an aid to developing the company vision. Another participant also reported the existence of a department practising scenario planning. However, the pilot study could not gather further information about their activities. SWOT analysis also

came out in the interviews and was reportedly used by one company. However, further information on what SWOT analysis did for the company was not provided. Overall, strategy and decision-making processes varied across the companies. Given the sensitive nature of strategic decisions, some participants refused to provide a detailed explanation of their companies' strategy and decision-making processes. Nonetheless, the interviews with the stakeholders pointed out that scenario planning research on the shipping industry was an appropriate research area.

The participants reported using several data sources that they used to anticipate the future. For example, consultancy reports, news articles and expert knowledge were used in the industry. However, regarding the quality of data sources, some consultancy reports advising on the industry outlook and providing their subscribers with market forecasts were criticised for overly optimistic predictions.

The findings helped the author choose a research gap to pursue in the continuation of the doctoral work. One of the pilot study participants who applied scenario planning for the port's vision development expressed the similarities between the scenario planning publications that other maritime stakeholders published. Her observation of the published maritime scenarios was that they all looked the same. The similarities between the scenarios different maritime stakeholders developed were an interesting observation. The author of this work also found the participant report a worthy investigation area and channelled his focus to creativity and scenario planning practices in the maritime industry.

6.2.3. Multiple Case Study Findings

The final part of the work – a multiple case study – aimed at answering the remaining research questions. They were:

RQ3: Are maritime scenarios creative?

RQ4: What is the role of creativity in scenario planning effectiveness on scenario users?

6.2.3.1. Author's Creativity Assessment

RQ3 was first answered by the author's subjective creativity assessment of the maritime and Shell scenarios. A comparative deductive qualitative content analysis was conducted to identify the ideas with novelty, utility, and surprise – the three dimensions of creativity formed the categories. Content analysis resulted in five subcategories for novelty, and three for utility and surprise.

From the creative idea point of view, the answer to the research question was yes, maritime scenarios were creative, but not all of them were. Based on the author's subjective assessment, the maritime scenarios did not score consistently high across three dimensions of creativity. In contrast, Shell scenarios scored consistently high in three dimensions of creativity and produced some creative ideas. Novelty, utility and surprise were identified in every Shell scenario publication. However, the maritime scenarios' creativity assessment results wavered. The lack of novelty and surprise in some maritime scenarios publications resulted in zero creative ideas. Utility was the most frequent code.

The findings showed similarities to previous research reported in the creativity literature. Novelty and surprise in the scenarios were identified in much lower numbers than utility, meaning that utility was not a decisive factor in the creativity assessment. The literature shares similar results; a negative correlation between novelty and utility was reported (Runco and Charles, 1993; Diedrich *et al.*, 2015; Mueller, Melwani and Goncalo, 2012; Ward, 2008; Manske and Davis, 1968). Novelty was also assessed as the primary predictor and a prerequisite to creativity (Runco and Charles, 1993).

Unexpectedly, the author recognised the excerpts that were coded as utility functioned uniquely in the scenarios—the logical connections in the scenarios. The logical connections in scenarios functioned as links to cause and effect, for instance, an event leading to another, an idea leading to another. 223 extracts in the utility dimension had the word 'lead/led'. Another word that functioned similarly to "lead" was "make/made", with 18 occurrences.

Although novelty and surprise were found in lower quantities and played a predictive role in the creativity assessment, utility was also essential. The author realised that connections, causal processes, and logical sequences were captured in the scenarios through utility and its subcategories. Usefulness primarily captured the logical chains and serviceableness played an identifying role in ideas' functionality.

Utility - or other concepts that are used in creativity research instead of: usefulness, relevance, workability (Douglas et al., 2006), value (Acar, Tarakci and van Knippenberg, 2019), practicality (Mueller, Melwani and Goncalo, 2012), ensures that the ideas that are assessed as creative are not simply novel or surprising.

The author gave the Flaherty's explanation on the issue as an example, illustrating the condition of novelty without utility:

A creative idea will be defined simply as one that is both novel and useful (or influential) in a particular social setting The definition captures the cultural relativity of creativity (using a lever to move a rock might be judged novel in a Cro-Magnon civilization, but not in a modern one), and it also captures the distinction between the creative and the merely eccentric or mentally ill (novelty without utility) (Flaherty, 2005, p.1).

The author reported that during his assessment of the scenarios, creative ideas challenged his thinking. As a stakeholder in the maritime industry with an academic and professional background, he discovered ideas that he did not know and had not thought about before. "Aha" moments were also experienced by the author. However, novelty, utility and surprise separately were not sufficient to reach those moments; he experienced them with creative ideas. An excerpt that he coded as creative was also presented as an example.

Ports themselves have been able to establish themselves as 'data-hubs'. Data management is controlled most likely by the port authorities. This is feasible as they are collectives managing holistic port operations and branding and responding directly to port owners (Inkinen, Helminen and Saarikoski, 2021, p.6).

The scenario extract above opened up a new understanding that was also surprising to the author. Despite his knowledge of an already operational port that served as a data hub, he still did not think about the possibility of the concept becoming common. What caught him by surprise was the evolving role of traditional port authorities that were envisioned in the scenarios; port authorities turning into data management authorities or at least taking up the role in addition to their traditional functions. The idea was feasible because port authorities operate holistically. It means being responsible for different functions and operations happening under their jurisdictions.

The author concluded the chapter by discussing the findings in relation to past chapters and offered several future research directions. Notable areas of the discussion were

- the challenging conventional thinking impact of scenario planning and creativity,
- creativity in scenario planning and how it is misunderstood,
- novelty and usefulness trade relationship how it shows similarities to novelty and plausibility relationship in scenario planning,
- excess creativity and the bias against creativity in scenario planning, and
- contextuality, creativity and scenario planning.

The author presented an example from the scenario planning literature regarding creativity in scenario planning and how it is misunderstood. Amer, Daim and Jetter (2013) summarised scenario validation criteria; creativity and novelty were bundled together, and relevance and pertinence were placed in another bundle. The author reviewed the creativity literature in this doctoral work and presented that novelty/originality and utility/relevance was considered to be two essential elements in defining creativity and creativity assessment (Kaufman, Plucker and Baer, 2008, pg.47; Hennessey, Amabile and Mueller, 2011, pg.253; McCarthy, Chen and McNamee, 2018; Diedrich *et al.*, 2015; Runco, 2014, pg.297; Douglas *et al.*, 2006). The author further suggested that the confusion regarding creativity in scenario planning literature might indicate the insufficient knowledge of scenario planning researchers about creativity literature. Supposing that it was the case, considering the involvement of some scenario planning researchers in SP applications in real-life projects, the issue might have been reflected beyond academic research and occurred

in SP applications, e.g. management consultants. Considering the practice-based nature of SP, the knowledge and expertise of consultants in creativity also may have implications for SP effectiveness.

The subsequent discussion was about the novelty and usefulness trade-off relationship and how it showed similarities to the novelty and plausibility relationship in scenario planning. Furthermore, the author stated the possibility of overemphasising plausibility in scenario development processes. He argued that overemphasising plausibility could deter the exploration of novel ideas. SP literature briefly introduced the issue, mentioning how overemphasis on plausibility could limit the extent of exploratory thinking and caused a feedback loop for existing mental models (Wright and Cairns, 2011 in Crawford, 2019), and increased the likelihood of simulation bias and overconfidence (Wright, Bradfield and Cairns, 2013). Similarly, the author's systematic literature review findings identified a relationship between the perceived usefulness of a scenario and the favourability of a decision. Phadnis et al. (2015) found that "a changed judgement is likely to become favourable if the investment is found useful in the scenario". The role usefulness plays in scenario planning is not researched except for the abovementioned study. The author questioned whether practitioners/scenario users in a scenario development process, e.g., workshops, focus on the usefulness aspect of the outcome (scenarios) for their existing ideas and plans.

The author also discussed creativity-induced dysfunction in scenario planning and the bias against creativity based on MacKay and McKiernan (2010) and Mueller, Melwani and Goncalo (2012). Scenario planning creates uncertainty among practitioners through exposure to surprising and unusual ideas. Thinking about the future is a challenging endeavour. Adding the tension of novel and surprising idea expectations from the scenario team will likely result in a bias against creativity. Previously, the CIS chapter suggested that openness in scenario practitioners could support creativity in the SP process. However, Mueller, Melwani and Goncalo (2012) also factored in openness in their experiments and still observed the bias. The conclusion from their study that has implications for scenario planning takes us back to the novelty and usefulness trade-off. Difficulty gaining acceptance for creative ideas was prominent when practical and unoriginal options were available. An important conclusion of the

above discussions is that creative idea retention in scenario planning is a vital issue. The author reckoned before the creativity assessment of two sets of scenarios that the scenario planning process required additional support mechanisms when necessary to increase the creative ideas' presence in the scenario development process. However, upon conducting the analysis and further reviewing the creativity assessment literature while comparatively discussing his research findings, the author has recognised the importance of creative idea retention in the scenario planning process. Notably, the bias against creativity phenomenon and creativity dysfunction in scenario planning appeared to be essential issues that could contribute to the premature rejection of creative ideas in the SP process. Additionally, the author has highlighted that creativity is often misunderstood and given examples of inconsistent presentation of terms related to creativity in the SP literature. The author has interpreted those instances as contributing factors to being vigilant to creativity and factors impacting the effectiveness of SP negatively.

The creativity literature also illustrated the contextuality of creativity and its implications for scenario planning research. The author stated the importance of investigating creativity by taking contextuality into account when the scenarios were assessed for creativity. Therefore, he decided to investigate the issue further by interviewing the scenario teams.

6.2.3.2.Scenario Teams' Perception

Within-case analysis findings revealed the scenario teams' creativity assessment of the scenarios answering RQ3 from their perspective.

The findings revealed that the maritime scenarios were creative according to their developers. Despite the exceptions, most of the scenarios were perceived as creative in their ideas. However, the number of creative ideas in the scenarios differed. The findings also revealed another side of the creativity and scenario planning relationship.

The participants reported additional insights and perspectives on the forms of creativity in scenario planning. Their perspective focused on creativity as a process.

The author identifies that based on the scenario teams' experience of creativity as a process, the conceptual model of Wallas (1926) maps onto the findings.

The participants' creativity definitions in general and in the scenario planning context were sought. The investigation served to understand their perception of creativity and develop a definition of creativity for the scenario planning literature. The following definition was created by the author based on the participants' input:

Creativity in scenario planning can be achieved by combining knowledge from different fields, looking out for industry examples, and bringing new and old knowledge and insights to come up with new insights.

Such insights fundamentally allow one to see what is coming through by being open to questioning the taken-for-granted assumptions, letting oneself think broader, getting out of professional roles, exploring well beyond traditional industry topics and even thinking about unrealistic and impractical ideas.

Creative ideas should be useful; they work and turn into value. They lead to doing something of that rather than just seeing something coming at. Scenarios should lead to surprise and stretch thinking but should not be pure creativity as it is only one element next to hard facts and subjective facts.

The perception of the scenario teams of creativity appeared to be similar to this doctoral work's author and creativity scholars. The findings have demonstrated that the scenario team members have focused on the novelty dimension of creativity. However, the utility dimension has also emerged in the interviews in the form of a concept that creativity needs to be complemented. Some participants have also stated that the surprise should accompany creativity.

Finally, the quintain – the role of creativity in scenario planning effectiveness was discovered by answering RQ3,

RQ4: what is the role of creativity in scenario planning effectiveness on scenario users?

The multiple case analysis findings revealed one main and one supporting role of creativity. Creativity's central role was transforming the scenario users' understanding. It was achieved by discovering beyond the usual ideas, creatively choosing and combining the ideas in the scenario development process, reaching a shared understanding of the scenarios, and taking ownership of them. The multicase findings "discover beyond usual" and "choose and combine creatively" bear a resemblance to Wallas's (1926) preparation and intimation stages. A similar observation of the scenario planning process and its similarity with the Poincaré model was made by MacKay and McKiernan (2010). Wallas used Henri Poincaré's writings during the construction of the model, and consequently, Poincaré's account resonates with Wallas' Preparation, Incubation and Illumination stages. Therefore, this doctoral work offers empirical findings supporting MacKay and McKiernan (2010) and suggests using Wallas' conceptual model for future research.

The findings also laid out the requirements for creativity's role in scenario planning effectiveness. They demonstrated that the role of creativity in scenario planning depended on the SP project's purpose. The author has identified that the utilisation of creativity depended on what was aimed with practising scenario planning; the projects that intended to transform the scenario users' understanding of an issue or problem:

- A. had creative ideas in the scenarios, and
- B. the creative ideas were given as examples by the scenario teams for the transformation of the scenario users' understandings.

The scenario projects that did not aim to look beyond the usual thinking and consequently transform understanding did not involve creative ideas serving those purposes. Instead, the scenario projects in this category were intended for informing the scenario users about future trends and research findings in the form of plausible future scenarios. Therefore, the author has realised the existence of a relationship between:

1. what is aimed at practising scenario planning,
2. what is achieved by the practice, and
3. the role of creative ideas in achieving what is desired by the SP practice.

The findings assert that the scenario development process and the resulting scenario narratives do not have to be creative for an SP project to be deemed effective if the project aim does not involve transforming understanding. Accordingly, the scenario users' expectations from the project make a significant impact. The author has identified a scenario planning project in one of the cases where creativity and transformed understanding was not desired by the client but were intended to be delivered by the project's scenario team. The team perceived the project as ineffective in terms of not being able to deliver what they intended to deliver, e.g., helping see the client beyond the usual, thinking the unthinkable. Instead, the client was interested in a set of future scenarios which would show a range of activities in the sea. According to the scenario team, the policy-makers intentionally avoided the long-term scenarios as they would induce ambiguity in their policy-making and such ambiguity was undesirable.

Participants emphasised the utility dimension of creativity and the importance of understanding creative ideas. Furthermore, the participants suggested that supporting creative ideas with hard facts and maintaining the surprise dimension were crucial. Finally, the participants expressed their expectations from anyone participating in the scenario development process. Deep practitioner involvement, understanding the scenario development process, trust, openness, and not being afraid of expressing their thoughts emerged as necessary elements.

The supporting roles of creativity as an added-value were:

- artistic touches,
- humour, trust, playfulness and fun moments, and
- innovation.

Finally, the findings also identified issues within and around creativity. They were associated with creativity-induced dysfunction, constrained creativity, loss of creativity and personality.

The foreshadowed issues evolved throughout the analysis and were finalised at the end. In chapter 6, the quintain was answered and discussed in light of revised foreshadowed issues, also called multi-case assertions. The original foreshadowed issues were as follows:

Scenario planning practitioners should be able to make their voices heard for creativity to impact scenario planning as desired.

Creativity's role is questionable in making any desired impact on policymaking scenarios considering the lack of creative ideas in the scenario policymaking scenarios and previously reported ineffectiveness of SP in policymaking.

At the end of the scenario planning application, the practitioners are less likely to be surprised by the outcome of the scenarios in which the author did not identify any surprising ideas. It is also because scenario planning was also found ineffective for the degree of surprise in the literature.

The cases where the author did not identify creative ideas are unlikely to challenge the scenario planning practitioners' and scenario developers' status quo thinking. The scenario planning literature is already slim in terms of evidence supporting the "breaking free from normal thinking" phenomenon.

The scenario developers are afraid of creativity. It is caused by the fear that it can lead to dysfunction in the scenario development process, and the bias against creativity contributes to it.

Plausibility and consistency concerns as well as the novelty and usefulness trade-off lead to an overemphasis on plausibility, usefulness and consistency, leaving novel ideas aside to be discarded.

The original foreshadowed issues were revised throughout the data collection and analysis. Some of the foreshadowed issues did not map onto the multiple case study findings and they were eventually discarded. Although the revision of the foreshadowed issues is expected, the author acknowledges that discarding several foreshadowed issues and offering multicase assertions that were not expected is related

to two issues: changing the research questions and research design due to external factors and the creative process oriented shift of the findings which the author initially did not expect. It is further explained in the limitations section in this chapter. Nonetheless, the multicase assertions were developed drawing from the data collection and analysis and aided to answer the quintain and its respective research question. The following multicase assertions were presented and discussed in Chapter 5:

Reaching a shared understanding is important for effective scenario planning practices but crucial for creativity to aid transformed understanding.

To reach a shared understanding, scenario planning practitioners needed to understand what the scenario planning application aimed. SP practitioners in two categories are perceived as detrimental to reaching a shared understanding:

- 1) SP practitioners do not understand the purpose of scenario planning (practitioners are eager; however, they do not understand it), e.g., a practitioner with PMT school of scenario planning understanding in an Intuitive Logic school-based scenario planning workshop, individual differences, e.g., some people are more visionary than the others.
- 2) SP practitioners do not want to understand the purpose of scenario planning (practitioners are not eager) because:
 - a) practitioners have an already set mind about the future due to various reasons, e.g., previous research on the issue was investigated by another party and their results taken for, practitioners are lobbyists and have their agendas to defend,
 - b) practitioners do not understand that they do not have control over the exogenous factors, and they cannot control the future,
 - c) practitioners do not care about scenario planning, e.g., lack of motivation, the subject is not of interest to them, practitioners do not have sufficient time and overloaded with tasks at work

Conflict management in the scenario planning workshops was the second most important aspect of reaching a shared understanding. The SP facilitators'

ability to manage the conflicts and use humour and playfulness supported resolving the conflicts.

Participatory scenario planning practices are preferred over non-participatory designs to reach a shared understanding and legitimise the outcome.

Speaking openly and trust, and creativity feed into each other. The relationship is necessary for reaching a shared understanding and discovering beyond usual.

Scenario planning effectiveness is measured in three ways:

- a. practitioner turn-out rate,
- b. client – scenario user – feedback, and
- c. SP practitioner/user feedback.

However, clients did not always give feedback on SP effectiveness, and the developers did not always pursue one. Additionally, the practitioner turn-out rate is not a healthy indicator of SP effectiveness due to the two types of practitioners listed previously, e.g., a practitioner might be present but not eager to contribute

Scenario validation criteria for measuring the quality of output are mostly ignored. The criteria were limited to plausibility, consistency, and coherency whenever applied. Plausibility was the highest criterion applied for scenario validation.

The scenarios were not assessed for novelty and surprise. The scenario builders were hesitant to support novel and surprising ideas in the scenario development process and include them in the final scenarios. Scenario developers had a slightly different understanding of creativity.

Efficiency concerns on budget and time prevented the scenario developers from reiterating the scenario development. Same concerns also lead SP practitioners towards applying a systematised scenario development that is proven to be fast which may hinder the creative process.

No lobbying or stakeholders with agendas were reported in scenario planning practices that were conducted for private companies. However, considering the secondary SP objectives of the private companies included “being thought leader”, “promoting the brand” and “increasing sales”, the companies might have been the lobbying parties with agendas in their scenario development workshops.

The multicase assertions predominantly pointed out the importance of reaching a shared understanding and revealed detailed factors impacting its occurrence. SP practitioners were demonstrated in two broad categories based on the factors affecting their contribution to the scenario development process: practitioners who are eager; however, they do not understand SP and practitioners who are not eager for SP but are present in the process.

6.3.Implications for Practice

6.3.1. Implications for scenario teams and users

SP is an intricate tool. Multiple methodological approaches, e.g. IL, LP, PMT, are available to the scenario teams and users. This doctoral work does not differentiate the methodological variety in SP regarding their effectiveness but synthesises available evidence in a unified fashion.

The CIS of evidence has revealed the drawbacks and requirements of scenario planning (DRSPAR). The theme offers useful insights to the scenario teams and users. Creativity and how it is embedded in SP depends on the project's purpose. The findings assert that unless scenario users’ understanding of a given issue or problem is not part of the objectives, creativity plays a lesser role in SP. Especially the idea generation stage early in the process where the scenario developers aim for discovering beyond the usual thinking differs by the emphasis given. Therefore, scenario teams should acknowledge what is desired from SP and tweak the process accordingly.

Too much and too little creativity in SP are both problematic. The findings report cases where some scenarios had to be discarded due to the inability to logically structure the scenarios. Choosing a step-by-step scenario development process can also be

constraining and not the best way to develop scenarios. The scenario team should ensure the type of scenario development process match well with what is desired from SP. The case study findings have reported cases where the scenario developers did not follow any standard SP methodologies but achieved what was desired from the scenarios.

Acknowledging the adverse effects and ineffectual conditions of scenario planning might prepare the scenario developers and users for future scenario projects. For instance, previous research evidence shows that scenario planning increases confidence optimism bias and optimistic prediction bias. Therefore, scenario teams and users should be aware of SP's side effects, and seek and offer solutions that counter-bias. For example, tweaking the planning difficulty is offered in the literature as a solution to optimism bias. Scenario teams may adopt tweaking the planning difficulty in their projects to provide a better SP experience to the scenario users.

Participatory scenario planning studies suggest that the lack of diversity in scenario practitioners causes less successful scenario interventions. Too convergent or divergent practitioners can be detrimental to flourishing views. In terms of creative thinking, the practitioners' orientation toward convergent and divergent thinking should be further explored in future research. This doctoral work is unable to contribute to this discussion. Nonetheless, the scenario developers should be aware of it.

Openness and acceptability of engaging in challenging conversations support scenario planning regarding achieving challenging conversations. Through those, different opinions can flourish.

The author's closer examination of the scenarios in three dimensions of creativity has revealed that novelty, surprise and utility play different functions. While novelty and surprise are the indicators of creative ideas, utility functions as a means of providing the scenario narratives with connections, causal chains and logical sequences. SP literature reports several scenario validity tests by testing the scenarios for plausibility, internal consistency, relevancy, novelty and transparency (Crawford, 2019). The findings of this work assert that a three-dimensional definition of creativity offers a

unified and systematic means of testing the scenario narratives. The three dimensions complement the suggested criteria listed above.

Scenario planning should be conducive to building a collaborative environment in its workshops, as the workshops can facilitate that. There are instances where collaboration and networking do not occur. Time pressure is given as a reason for it.

The scenario teams should also knowledge the added value perspective of creativity. Creative writing, use of visuals such as maps and the future state of a place, and employing storytellers were considered impactful on the scenario planning process. Future images reportedly triggered the practitioners to think about the future and assisted the discussions further. However, using maps in the scenario development process can be a double-edged sword. The issue of practitioners' fixation on the current state of the world and not being able to visualise other potentials is reported by the scenario team members.

The scenario teams can utilise humour and playfulness in the scenario development process for conflict management in the scenario workshops. As illustrated in chapter 6, the participative SP practices concerning the spatial planning of a geographic area can raise a range of emotions among the practitioners. Humour and playfulness were found useful for tackling the issues.

Openness and trust support the creativity of scenario teams, allowing the practitioners to share their ideas freely. During the scenario development process, fun moments are also linked with letting the practitioners be imaginative and envision companies. Such moments contribute to the scenario narratives.

6.3.2. Implications for Scenario Consultants

Scenario planning may not be for everyone, not in every condition. Several research papers demonstrate that SP practitioners have not changed their opinions after participating in SP workshops. High-level confidence before participating in SP workshops, one-off SP applications, and practitioners with financial mental model style are some of the reasons for the issue. The theme appears to be related to

practitioners' personalities and the application of SP. Unlearning is suggested to tackle deeply rooted assumptions. A similar observation to unchanged opinions is made when the scenarios are delivered but not developed by the scenario users. Evidence suggests that delivered scenarios are unable to change the scenario users' opinions. It is explained by disconfirmation bias — a condition of scenarios being inconsistent with the practitioners' ex-ante beliefs.

Multiple case study findings further show that the theme “scenarios may not be for everyone” is supported by additional evidence. The case study findings support the CIS findings. Scenario planning consultants should be cautious of the following situations:

- Practitioners may make up their minds about the future due to various reasons, e.g. commissioning a research project previously and taking their findings as a fact, which may lead to ex-ante confidence and belief perseverance.
- Practitioners may pursue lobbying for a cause in the scenario development process and have agendas to defend. It is associated with confirmation and experience bias, focusing on one appropriate scenario for their agendas.
- Scenario users may not understand that scenarios are constructed following several exogenous factors that the users have no control over—not grasping the scenario development process leads to problems.
- Practitioners may not be interested in the scenario development process at a given time. They also may not have sufficient time due to the task load they have at hand in other areas of their work.

Scenario planning may not be for everyone but it is not the only tool used in the strategy context. Regarding debiasing effects of strategy tools, others, e.g., SWOT, Porter's five forces, and value chain, show debiasing effects. This doctoral work has not compared other strategy tools with scenario planning, and the literature in that regard is limited. However, the consultants should make an informed decision on applying scenario planning and consider other strategy-making tools or combination

tools after carefully examining their pros and cons. This doctoral work has offered an evidence-based theoretical framework and further research findings on SP's effective and ineffective areas. The findings can be useful for consultants who consider using SP for their clients.

SP is not a forecasting tool. The CIS of the literature reveals that quantitative forecasting methods provide more accurate forecasting results. Furthermore, evidence suggests that SP is not effective for change management. However, SP is usually advocated as an effective change management tool. Evidence related to the SP's ineffectiveness in change management was gathered from a study that acknowledged several limitations. Therefore, further research would further illuminate the topic and the consultants should be wary of using SP for change management considering, alas limited, past research findings.

If SP is used for continuous learning, scenario consultants should be cautious. Continuous learning is not observed in SP projects. The reason for it is that SP is often a one-off application.

Measuring the effectiveness of SP is difficult. Inconclusive results were presented in the literature, e.g., scenario planning intervention and its effect on systems thinking. The literature also did not provide rich evidence about SP's challenged status-quo thinking effect. In only one study, three SP practitioners reported "breaking free from normal thinking". Arguably, the nearest experience to that is thinking differently. Several research papers provide evidence of changed mental models, thinking differently through decreased framing bias, changed priorities of the elements discussed in SP workshops and shifting understanding through learning. They relate to challenging usual thinking in terms of "reframing perceptions and therefore the mindsets" (Wright, Bradfield and Cairns, 2013).

Additional research evidence is provided in this work through a multiple case study regarding the above area. The findings indicate that creativity is linked to challenging conventional thinking. The consultants should not diminish the importance of creativity, especially when challenging the status quo thinking is one of the aims of undertaking an SP project. In such instances, creative ideas are associated with

effective scenarios. The author's creativity assessment of scenarios has revealed that creative ideas led to the "aha" moments, challenging the conventional thinking of the author. The scenario teams' creativity assessment of their scenarios has revealed the same experience for them. The creative ideas that were come up with during the scenario development process allowed the scenario users to think differently than before. Several examples of such experiences were presented in Chapter 5. A major takeaway from this doctoral work is that scenario planning consultants should be well informed about the objectives of their SP projects and accommodate the need for creativity accordingly. Should one of the aims of exercising SP is challenging conventional thinking and leading the scenario users to think differently, creativity should be an essential element of the SP process and outcome – the scenario narratives.

Creativity is an elusive concept. The author suggests that consultants offering scenario planning to their clients should be familiar with the creativity literature. Creative ideas do not have to be H-level in the scenario development process and scenario narratives. P-level creative ideas offer novelty, utility and surprise to the person who encounters them for the first time. Wallas' (1926) and Poincare's (Sadler-Smith, 2015) creative thinking process theories map onto the work's findings well. Furthermore, the author offers a definition of creativity in the scenario planning context presented in Chapter 5 as a useful guideline for approaching creativity in the SP context.

As it is established so far, scenario planning can be exercised for multiple purposes. This doctoral work focused on its mindset-challenging effect. Creativity is an essential part of the scenario development process when the ambition is pushing the boundaries of thinking, seeing what was not seen before and seeing beyond the usual thinking. Accordingly, scenario consultants should aim to discover beyond the usual ideas in the process. Furthermore, after the initial stages of the process, such ideas should be chosen and combined creatively. Reaching a shared understanding is also revealed in the findings as an essential part of the SP process. The CIS of SP effectiveness literature previously reported minimal evidence for reaching a shared understanding of a given problem among the practitioners and users. Shared understanding and taking ownership is the final and essential part of transforming the scenario users'

understanding. The findings of this work expand the CIS findings by emphasising that practitioners/ users are expected to grasp:

- given problem or issue that is under scrutiny in the SP process,
- applied scenario planning technique, e.g. which methodology offers what and why it is chosen, how it proceeds, and
- the logic of constructed scenarios, giving credibility to the ideas developed through SP.

The bullet points above are found especially important when creative ideas are present since they are prone to rejection in the process prematurely. The author emphasises the importance of taking ownership of the scenarios as it is also perceived as crucial for the scenarios' consideration for actionable plans. Analysis revealed that when the users did not own the scenarios, the scenarios were discarded and were of no use to the users.

The consultants should know that not every changed judgement of scenario users following SP are desired changes. For instance, a recent study has revealed that “a changed judgement is likely to become favourable if the investment is found useful in the scenarios” (Phadnis et al., 2015). Therefore, decision makers' perception of the usefulness of the investment plan concerning the scenarios may act as a confirmation bias. Additionally, the scenario users may be approaching the scenarios in terms of given future scenarios' usefulness concerning their ex-ante ideas and decisions.

Although this doctoral work does not focus on innovation, an innovative service idea was identified in the research. Scenario consultants may be able to utilise SP as a means of innovative idea generation process.

6.3.3. Implications for the Maritime Stakeholders

Similar to the scenario teams, users and consultants, the maritime stakeholders have takeaways from this doctoral work due to the case studies' focus on the industry. The industry is going through a transitioning period. The energy transition and the maritime-related carbon dioxide emissions-related issues are two hot topics under

discussion in recent years. Short and medium-term thinking cannot address those issues but requires long-term thinking efforts. Digitalisation is another topic which has found its place in the industry, opening up a vast array of new business opportunities. Entrepreneurs can benefit from a digitalised maritime industry. As illustrated in the case studies, energy, CO2 emissions and digitalisation in the industry were approached by practising scenario planning. For instance, in case 4, a scenario user reported SP's effectiveness in setting a vision that is competitive and original to the users. The scenarios resulted in several energy options for adoption in the future. By practising SP with extensive practitioner input, the company – the scenario user – also had the opportunity to decide on a vision for which the majority of SP practitioners showed their support. Case 13 investigated digitalisation in the maritime industry context by developing a scenario. The scenario developers offered a somewhat controversial view on the industry's future, spurring a vast range of discussions around the topic.

The stakeholders also commission the development of future scenarios to appear as thought leaders in the industry. The author has realised while analysing the participant interviews for foreshadowed issues that some of the SP practising stakeholders used their scenarios for marketing purposes. Therefore, publishing future scenarios was considered a move to be seen as a thought leader in the industry and used to support their sales.

6.4. Contribution to knowledge

This doctoral work presents original findings by employing a creative research design investigating the effectiveness of scenario planning in general and furthermore specifically the quintain – the role of creativity in scenario planning effectiveness.

The work offers a theoretical framework concerning the effectiveness of SP and explains the phenomenon in four synthesising arguments. First, “scenario planning as enhancing process” explains the perceived role of scenario planning by its users and the desired impact areas of scenario planning with evidence reported in the literature. The synthesising argument “change” further demonstrates the changes that are observed among scenario users. SP practitioners find their voice in the process, find opportunities for networking and collaboration and take action. The third synthesising

argument presents the requirements and drawbacks of SP practices and SP research (DRSPAR). Synthetic constructs such as “scenario planning may not be for everyone” provide the reader with fresh insight into scenario planning, highlighting that it may not work for everyone and every condition. The construct draws from research evidence demonstrating SP's adverse, unexpected and no influence conditions as reported in the literature. Finally, the last synthesising argument, SPICOST, compares SP with other strategy tools and discusses the practitioners' prior experience with SP and other strategy-making tools. SP is not the only strategy-making tool; several tools are at the disposal of the parties aiming to look at the future, develop strategy options and a vision. Evidence suggests that SP is not the only tool that reduces cognitive biases. The suitability of tools for the project purpose as well as the tools' benefits and drawbacks should be taken into consideration before choosing one tool or a combination of tools over others. An informed decision on making the choice is likely to produce an effective intervention.

The exploratory pilot study presented in Appendix 2 reveals insights into the latest strategy-making practices of the shipping stakeholders. The shipping industry is known for being secretive and the strategy-making processes are seldomly reported. The findings contribute to the maritime literature regarding their future-looking practices, including short, medium and long-term views. Furthermore, the pilot study also presents their strategy-making processes. An application of scenario planning by a group of stakeholders is observed and SP has contributed to the company's vision development. Scenario planning is a relevant research area in the shipping industry.

The multiple case study further presents original research on the creativity of maritime and Shell scenarios, the scenario teams' experience in the maritime scenarios' development concerning the objectives and their achievements, as well as the quintain.

Creativity can be investigated in terms of person, products, places, processes and persuasion. In the scenario planning context, the author takes the scenarios as creative products and the scenario planning exercise as a creative process. However, future scenarios had never been assessed for creativity before, and creativity in the scenario planning context was seldomly researched. This doctoral work allows for a deeper

understanding of what creativity in scenario planning is, how it is manifested in the scenario narratives, and how it comes out in the scenario development process, providing empirical evidence on all accounts as well as creativity's role in SP effectiveness on the users.

Findings contribute to knowledge by assessing the scenario for creativity subjectively. By doing so, the work allows for considering the context during the research. Three dimensions of creativity: novelty, utility and surprise are sought and found in the maritime and Shell scenarios. Qualitative content analysis has revealed several sub-categories associated with the three dimensions of creativity. The establishment of the sub-categories contributes to knowledge by offering observed sub-categories for novelty, utility and surprise which were not identified in the scenario planning context before. Novelty is observed in the form of newness, change, creating, and revolutionary. Utility is identified in the usefulness, beneficialness and serviceableness of the ideas. Finally, surprise is found in the sub-categories of suddenness, unexpectedness and, unimagined.

The author has developed several foreshadowed issues following reviewing the creativity literature, CIS of SP effectiveness literature and the creativity assessment of two sets of scenarios. The author believes one particular issue that he has framed is especially significant for future scenario planning projects:

The scenario developers are afraid of creativity. It is caused by the fear that it can lead to dysfunction in the scenario development process, and the bias against creativity contributes to it.

The statement above has implications for creative idea retention in the scenario development process. For SP to be effective when creativity is a priority in the process, mechanisms to counteract the issue are required.

Regarding the quintain, the findings presented the nuance between SP practices in two groups. The first group of SP practices aimed to develop scenarios to challenge conventional thinking and see beyond the usual ideas. The second group used SP as a tool for systematically producing plausible futures. The latter cases did not emphasise

challenging conventional thinking by putting effort into seeing the beyond commonly thought ideas. Creativity is seen as an integral part of scenario planning in the first group. However, even when one of the main ambitions of using scenario planning was not to see beyond the usual, creativity was found in the scenario development processes.

Subjective creativity assessment of the author and the scenario teams are triangulated in the work. The findings revealed that creative ideas were present in Shell scenarios more frequently than in maritime scenarios. Novelty, utility and surprise were identified in every Shell scenario publication. The lack of novelty and surprise in some maritime scenarios meant that such scenarios had zero creative ideas. The majority of scenarios where creative ideas were not identified belonged to the second group of maritime scenarios – the cases that did not emphasise challenging conventional thinking by putting effort into seeing the beyond commonly thought ideas.

Despite the differences in the two groups of maritime scenarios, several creativity techniques were observed across the cases. The emphasis on creativity changed in the two groups but the findings assert that scenario development is a creative process. Wallas' (1926) and Poincare's (Sadler-Smith, 2015) creative thinking process theories can be used for future scenario development practices and research.

The scenario teams are bounded to the environment in which they are situated. Therefore, when assessing the scenarios for creativity, the environment that scenario teams are in should be considered. The issues, environment and requirements call for thinking about the context during the assessment. Despite the emphasis on H-level novelty in the literature, this doctoral work emphasises the value of P-level novelty, asserting that the occurrence of an idea to an individual for the first time through developed or delivered scenarios is part of scenario planning effectiveness. "The creativity involved in producing subjective novelty is just as genuine as that involved in objective novelty" (Kaufmann, 2003, p. 237-238).

This doctoral work also contributes to knowledge by adopting CIS for evidence synthesis, which is now an acknowledged approach in healthcare and nursing studies. However, the method's adoption in business and management research is slow, and

this work can be considered one of the first examples. Similarly, Stake's approach to case studies was adopted in this work, and the author's experience with it contributes to the case study literature. The author finds the CIS-derived theoretical framework and its utilisation as foreshadowed issues following a Stakian multiple case study appropriate, methodologically creative, and sound.

6.5.Limitations

This doctoral work has systematically reviewed the scenario planning effectiveness literature and synthesised evidence, offering a theoretical framework using CIS as a method. An exploratory pilot study is later conducted with the shipping industry stakeholders, and a multiple case study has investigated the quintain – the role of creativity in SP effectiveness on the users.

Several limitations have come with the choice of methodologies and overall research design. Systematically reviewing the literature for evidence synthesis has gathered enough research papers, which the author then synthesised and developed a framework. However, the criticality of the analysis was limited to discussing the subject with only nineteen research papers. Having recognised the limitation, the author later purposively sampled further publications to increase the discussion quality of the work. Choosing the sampling approach suggested for CIS would have prevented the need for a workaround solution.

The literature is limited in terms of the number of scientific research set out to test SP's effectiveness. Therefore, the author could not focus on a school of scenario planning for data synthesis. Instead, he offered a general review of scenario planning. Additionally, the delivered and developed scenarios likely to influence the scenario users differently. The author tried and differentiated the effectiveness of the two types of scenario use, informing the reader whenever the scenarios were presented but not developed by the subjects. However, exclusively focusing on the effectiveness of the developed or delivered scenarios was impossible.

Furthermore, the author did not pursue two types of data synthesis following the delivered and developed scenario differences. The limited number of research

evidence meant that such differentiation would cause defragmentation rather than a synthesis. Those limitations are grounded in the number of research outputs available currently. Should the number of research papers increase in the future, scholars can make the methodological and delivered/ developed scenario effectiveness differentiation in their evidence synthesis research.

The systematic review of the literature and the data analysis in CIS could be conducted collaboratively with several researchers. So instead, only the author – the doctoral researcher who has prepared this thesis – was responsible for reviewing the literature and conducting the analysis. The author's tedious approach challenges the limitations of sampling, e.g., creating lists A, B, and C and iteratively reviewing the research output for inclusion and exclusion, setting an explicit inclusion and exclusion criteria, and data analysis, e.g., exploring and choosing the most suitable qualitative data coding approaches (Saldaña, 2016) administering line-by-line coding for fine-grained analysis, and finally presenting the research output at a reputable conference and further making enhancements on the review by taking the given feedback into account, e.g., low criticality and discussion depth.

The exploratory pilot study has functioned to identify and choose a research gap to pursue in the work. The author aimed to conduct ten interviews with various stakeholders in the industry. Due to various reasons, such as not signing the consent form, the number of interviews included in the analysis decreased. Two pilot study participants joined the study by email. Although with one of them, email exchange was possible, allowing for further questioning of the participant's response, the other participant's response to the interview questionnaire was limited to a one-off interaction. Interviewing the participants on a video would have allowed for richer input. The author might invite further respondents to the study as a solution to the issue. However, his concern for the primary data collection in the continuation of the study meant that he had to be economical with the number of pilot study interviews. The author had potential research questions and designs in mind, which required many participants from the shipping industry.

The multiple case study was aimed to be continued by including the scenario teams from Shell. However, they did not participate in the research. As a result, the doctoral work had to continue with only maritime scenarios.

Before the interviews, the scenario teams were not informed of the task – their creativity assessment of the scenarios. The author informed the participants that the interviews would be about their scenarios and creativity. Not disclosing so much information about the research was intentional. The author did not want the participants to prepare for the interview, e.g., by learning more about creativity and potentially changing their opinions on what creativity was, which might affect their response to the creativity assessment-related questions. However, this approach also meant that the interviewees had to re-read their scenarios to refresh their memories. One hour time slot that was dedicated to the interviews was exceeded in most cases. Additional interviews with the scenario teams allowed for receiving detailed responses from the participants. Neither participant's involvement in the study ceased until the saturation in their response to the questions was reached. The author is grateful to the participants for their contribution, especially considering neither of them rejected the additional interview request whenever it was necessary. However, the author could have anticipated the time required from the participants more accurately and informed the participants accordingly.

The multiple case study included scenario projects conducted fairly recently and earlier ones such as ten years from the time of the data collection stage of this doctoral work. Recollection bias and the temptation to offer socially desirable answers are known and reported issues in interviews (Stein *et al.*, 2016). Over half of the case studies, six out of eleven, recruited at least two scenario team members. The interviewee's responses were cross-checked for consistency by the author during the data collection and analysis stage. In one instance, the participants had different opinions about their SP project and how it coincided with the financial crisis. It later turned out that the participants had different opinions on the start of the crisis – 2008/2009.

The social-desirability bias was minimised by offering anonymity and confidentiality to the participants and carefully structuring the interview questionnaire to maintain the questions' neutral wording.

The above limitations could be mitigated further by expanding the data collection duration and sampling additional actors involved in the SP projects. The scenario developers' involvement in the case study could be further systematically triangulated with the scenario users' participation. The two main reasons for the shorter than desired data collection duration were the emergent design of the work and the changes that had to be made to the research questions/design due to external factors. The author tried to reach out to the scenario users when the scenarios were developed for a specific client. For example, case 15 and case 7 were the scenario projects conducted for MAN and the Port of Rotterdam, respectively. However, the author did not have access to those organisations despite his efforts to include them in the case study. Given the travel restrictions, the author could not visit the companies in person. His inquiries by email and telephone were not responded to.

The author's previous research questions and design had to be changed from an experimental design to a multiple case study format. The foreshadowed issues he identified were more suitable for the initial research project he planned. Using the same foreshadowed issues in the case study meant revising and modifying them substantially, some of which had to be discarded entirely. Nonetheless, the case study offered multi-case assertions based on data collection and analysis without losing any explanation power and illuminated the quintain. One problem that was caused by the foreshadowed issues was the weaker than usual ability to frame the study. Therefore, the author had to put in more effort to frame the study during the data collection and analysis stages.

The pilot and multiple case study research recruited participants from different countries, most of whom spoke English as a second language. The same situation also applies to the author as a Turkish researcher who speaks Turkish natively; English is his second language. The author did not experience any difficulties understanding the participants during the interviews, except for one participant. The author utilised two

techniques to prevent misunderstandings in the interviews. The first one was during the interviews. After a participant answered an interview question or a section of the questionnaire, the author summarised the participant's input based on his notes and checked with the participant to see if there was any misunderstanding. All participants patiently responded to the author's questions. When the author's summary did not fully correspond to the participants' answers, they explained their answers until both parties were on the same page. The second technique was sending the interview transcriptions to the participants, asking for their confirmation. Most participants spent additional time reviewing the transcriptions, adding further information whenever they deemed necessary. However, there were instances where inaudible words remained in the transcripts.

Finally, the culturally different backgrounds of the participants had implications for creativity. Creativity and culture are theorised in the literature where culture influences the development of creative ideas, such as cultural factors permitting or restricting the freedom to think and encouraging or discouraging diversity and tolerability (Stein, 1953). The influence of culture on the creativity assessment, e.g. cross-cultural teams and creativity, is another implication of culture in this doctoral work (Hempel and Sue-Chan, 2010). While investigating creativity from the scenario teams' points of view, the author brought the participants' cultural interpretation of creativity into the work. Although the case study considered the contextual differences in the cases and interpreted findings accordingly, the influence of culture on the scenario teams' answers remained limited. Cross-cultural differences across the participants and how they affect creativity were not questioned and remained unanswered. The main reason for these limitations is the author's constructivist approach to the research problems. The meaning-making of the individuals – the scenario team members – was at the centre of the work. A social constructionist approach would allow for tackling the limitation. However, this doctoral work is more concerned with the individuals' experience in the scenario development process and their subjective interpretation of creativity. Through constructivism, the culture is acknowledged but not placed at the forefront of this scientific work. Furthermore, all the case studies came from Europe and were conducted by and for European entities. Therefore, the cultural differences are not as likely to be high as in a scenario where the cases come from geographically

and culturally varied groups of people, such as choosing cases from Europe, Africa, Latin America, and the Far East in a multiple case study.

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APPENDICES

A.1. Appendix 1: Definition of Terms

Several definitions are provided below before starting with the definitions central to the research and moving forward specific to the maritime and scenario planning literature.

Effect “a change which is a result or consequence of an action or other cause” (‘Effect’, 2020)

Effective “successful in producing a desired or intended result” (‘Effective’, 2020)

Participants Professionals from the shipping industry who contributed to the work in the exploratory pilot study in chapter 4 and the scenario team members and scenario users who contributed to the multiple case study in chapters 6.

Pilot project “an experimental, exploratory, test, preliminary, trial or try out investigation” (Thabane *et al.*, 2010)

Quintain “... an object or phenomenon or conditions to be studied – a target, but not a bull’s eye”, “the target collection” (Stake, 2006, p. 6).

Other terms that require clarification and their definitions are listed below.

Definition of Maritime Terms

Liner Shipping “the service of transporting goods by ship on regular routes, fixed schedule” including “container services and vehicle carrier services” (Kjaer, 2019).

Shipping⁴¹ “The transport of goods by sea or some other means” (Oxford University Press (OUP), 2021).

Shipping Business “the operation of ships in international traffic for income from the transport of passengers or cargo and includes any of the following activities where the relevant activity is directly connected with, or ancillary to” several activities including the rental, management, registration, financial, survey, provisional aspects of a ship (The Republic of the Marshall Islands Registrar of Non-resident Domestic Corporations, 2019, p. 3).

Shipping Industry⁴² “The industry is concerned with transporting freight, especially by ship” (Kyas *et al.*, 2021).

Maritime Transportation⁴³ “A type of transportation in which water masses are used for the shipment of people and cargo by any floating object” (Kartoğlu and Kum, 2019).

Maritime Industry “Means ports and terminals, ship services and boat building education, science and technology, marine trades and support services, ferries, movement of cargo and waterborne commerce, commercial and recreational fishing, navigation and government support services, including waterborne military operations and national security initiatives and the direct and indirect industries supporting the

⁴¹ In this work, shipping refers to the transport of goods by sea only.

⁴² In this work, the shipping industry refers to freight transportation by ships only, also commonly referred to as maritime shipping industry. Maritime literature often uses the term “shipping industry” and “maritime shipping industry” interchangeably, for instance, see Managi (2007), Stopford (2009), Atilhan *et al.*, (2021)

⁴³ Maritime transportation and shipping are used interchangeably in this work.

entire marine transportation system” (Lexis Advance through the New Jersey Register, 2022).

Definition of Scenario Planning Terms

Cognitive Bias “people’s systematic but purportedly flawed patterns of responses to judgement and decision problems” (Wilke and Mata, 2012, p. 531)

Developed scenarios The scenarios that are “developed by the client group⁴⁴”, “using inductive thinking” (Cairns and Wright, 2018, p. 250).

Delivered scenarios The scenarios that are developed by external experts and delivered to the client group, where the scenarios are “interrogated through deductive logic” (Cairns and Wright, 2018, p. 250)

Driving forces “Those fundamental forces that bring about change or movement in the patterns and trends that we identify as underpinning observable events in the world” (Van der Heijden *et al.*, 2002, p. 282)

Effectiveness in scenario planning In the scenario planning context, these desired and intended results, in summary, are enhancing understanding, challenging conventional thinking and improving decision making (Wright, Bradfield and Cairns, 2013).

External experts An umbrella term that refers to different groups of people with various expected input into scenario planning. External experts can function as the facilitator in the IL school of scenario planning (MacKay and McKiernan, 2018) or contribute to knowledge in the scenario development process, complimenting the practitioners’ knowledge through interviews, surveys or participating in a workshop. The latter is also referred to as practitioners, as explained in this section. In LP and

⁴⁴ The client group is covered under the term scenario users in this work.

PMT, external experts drive the scenario development process, acting as project leaders (MacKay and McKiernan, 2018).

Facilitator Also referred to as “scenario planner”, “is the person (or group of people) involved in promoting and facilitating the learning process” (Van der Heijden, 1997 in Crawford, 2021, pg. 21).

Practitioners⁴⁵ “The managers, executives, directors, CEOs, and stakeholders who participate in a workshop. Sometimes referred to as the “management team”” (Van der Heijden, *et al.*, 2002 in Crawford, 2021, p. 21) In participative scenario development processes (Flynn *et al.*, 2018), stakeholders, e.g., the general public, representatives of companies, NGOs, who participate in a scenario development workshop are also referred to as practitioners in the work.

Process of scenario development “The process of scenario development includes various parts or elements, e.g., number of identifiable tasks to handle in scenario studies. First, there is an element consisting of the generation of ideas and gathering of data. Second, there is an element of integration where parts are combined into wholes. Third, there is an element of checking the consistency of scenarios” (Börjeson *et al.*, 2006, p. 731).

Product⁴⁶ A fully developed; fleshed out and written up scenario narrative is also referred to as product in the work.

Remarkable people (RPs) “... individuals who are not part of the normal ongoing strategic conversation within the company, but are conversant with the industry

⁴⁵ Following Crawford (2021, p. 22), the work makes the differentiation between practitioner and facilitator to “maintain a distinction between those *participating within* and those *leading* the workshop”.

⁴⁶ The scenario narratives are treated as products in the work during creativity assessment.

structure, language, driving forces and key uncertainties, and whose knowledge overlaps the area where the client's knowledge is fragmented and unstructured. Such people can move thinking 'out of the box', triggering scenario teams to surface intuitive knowledge, and can then scaffold this into existing cognitive structures" (Van der Heijden *et al.*, 2002, p. 287).

Scenario development A "process" (Bradfield, 2012, p. 260; Bradfield, Derbyshire and Wright, 2016, p. 62) specifically concerned with "creating actual stories about the future" (Bishop, Hines and Collins, 2007, p. 6) which is an essential part of scenario planning (Bouhaleb and Smida, 2018).

Scenario planning⁴⁷ "a tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out" (Schwartz, 2012, p. 21).

Scenario team⁴⁸ Also referred to as Scenario developer team (Priess *et al.*, 2018) or scenario developers. Ideally a diverse group of people with "varying resources and expertise" who bring their "knowledge, imagination and creativity" to the scenario development process and perform the scenario development (Konno, Nonaka and Ogilvy, 2014, p. 30-31). The nature of scenario teams varies by the applied scenario development technique, e.g., IL, LP, PMT (Amer, Daim and Jetter, 2013, p. 28). In the most basic sense, scenario team – scenario developers – can consist of a group of

⁴⁷ This work has kept an open mind to the various scenario planning definitions, and the author has acknowledged their values to understand different approaches to scenario planning. However, Schwartz' (2012) definition has been influential in this work.

⁴⁸ Scenario team can contain or be equal to practitioners. Two different terms are employed in the work to be able to capture different scenario development processes, e.g., IL, LP, PMT. The term practitioner is used to refer to the scenario workshop participants.

external⁴⁹ experts e.g., researchers, consultants, or a mix of external experts and the members chosen from the entity commissioning the scenario planning task or only the members of the entity that is commissioning the task (Amer, Daim and Jetter, 2013). Respectively, in PMT scenario process, external experts consist of the scenario team with the role of leading the project. In LP school, scenario team includes both internal and external experts, scenario experts leading the project. In the IL scenario process, scenario team is internal, and the role of scenario expert is facilitating the project⁵⁰ (MacKay and McKiernan, 2018).

Scenario narrative “simply a hypothetical story that readers” who are outside of the scenario team “have no physical or emotional attachment to” (Bowman, 2016, p. 91).

Scenario users “Can be those who generate scenarios, those who use already existing scenarios and those whom scenarios are directed, even though they may not have asked for them” (Börjeson *et al.*, 2006, p. 725).

Techniques⁵¹ Also referred to as “scenario planning techniques” (Amer, Daim and Jetter, 2013, p. 23), “scenario development techniques” (Amer, Daim and Jetter, p.

⁴⁹ External in the eye of the entity, e.g., the client, commissioning the scenario planning task.

⁵⁰ Hence, the facilitator and practitioner terms refer to external expert and internal expert, respectively. The use of the facilitator and practitioner terms throughout the work is dedicated exclusively to refer to the IL school and participatory scenario development methods.

⁵¹ The author acknowledges the distinctions being made between scenario methods, scenario analysis and scenario thinking (Wright, Bradfield and Cairns, 2003). Scenario planning literature is riddled with terminological confusion, scenario building, scenario thinking, and scenario planning are used interchangeably (Balarezo and Nielsen, 2017). In this work, scenario planning is used as an umbrella term

28), and “scenario methodologies” that are generally divided into three schools, the intuitive logics school (IL), the probabilistic modified trends school (PMT), and La Prospective school (LA) (Bradfield *et al.*, 2005).

covering the scenario building and scenario analysis approaches, making necessary distinctions whenever necessary.

A.2. Appendix 2: The Pilot Study Findings

The pilot study aimed to explore the shipping industry stakeholders' forward-looking activities, the appropriateness of conducting an SP research on the industry and finally identify a research gap to pursue in the continuation of the doctoral work. This chapter's findings answer the following research questions:

RQ 3: How do the shipping industry stakeholders make strategy?

The findings are thematically presented below.

A2.1. The Findings

Participants' response to the interview questionnaire was identified and captured by three main themes and ten subthemes. Table A.1 summarises their occurrence and significance below.

Main Themes	Subthemes	Participants mentioning this theme
1. Overview of the maritime industry	a)The past, current, and anticipated future of shipping	(1/8)
	b)Nature of Maritime Business	(7/8)
	c)Taken actions against challenges in the shipping industry	(3/8)
2. Looking into the future	a)Sources of future knowledge	(7/8)
	b)Short to medium term thinking practises	(6/8)
	c)Long term thinking practises	(3/8)
	d)Strategy and decision making	(6/8)

	e)Issues associated with forecasts and sources of future knowledge	(3/8)
3. Questions remained unanswered by participants, and the questions that emerged	a)Questions participants did not answer	(1/8)
	b)The questions participants showed interest in and directed to the researcher	(6/8)

Table A. 1: Summary of themes

Source: Author's primary data collection

Theme 1: Overview of the maritime industry

Participants revealed valuable information about the shipping industry's past and current state, including operational and strategic decision-making approaches. It appeared that approaches differed across industries as well as within the same industry, e.g., container shipping, and bulk shipping. Prominent and chronic issues in the shipping industry stemmed from the participants' poor adaptation to digitalisation.

Subtheme 1.a. The past, current, and anticipated future of the shipping industry

The shipping industry has changed tremendously over the decades. Peter Overejinder, with 33 years of experience in the liner shipping industry, explained:

Once upon a time, a merchant would sail from Venice to Alexandria buy goods, bring them back to Venice and sell them. Years later shipping evolved and merchants stayed at home... When I started in shipping, we operated the largest vessels on the Atlantic; 800 TEUs with 37 crew members, today vessels of 21.000 TEUs with only 12 crew members are the standard. At the same time, tests are being conducted on the Pacific to sail vessels on the computer without any crew. So what's next ?"... There are two lines which need to be considered

thoroughly; one is the direction of the traditional shipping operators such as Maersk and the second which I believe will be driving force in the next decades are the likes of AliBaba, Amazon who are developing into their - perhaps - 6PL companies who own and operate everything from vessels to drones, all aimed at "securing" the customer (you and me) completely this even includes financial services!" (Peter Overejinder).

Subtheme 1.b Nature of Shipping Business

Several participants discussed the complex and uncertain nature of the shipping industry. The industry consists of many different and connected parts. The interconnectedness of the industry was identified as one of the reasons for the complexity. Starting with Peter Overejinder's explanations, the following was noted:

Oil, Co2 e.g. the environmental discussion of course this will become more and more important, however, there is a limit to what extent the industry can develop their technical capabilities; lets be honest if we start considering this than one also needs to review and determine a strategic view on terminals, inland transportation etc .. this then combined makes the whole industry extremely complex (Peter Overejinder)

Several participants brought up external factors that affect the shipping business. These factors were perceived as another reason the business has been complex and uncertain. For instance, geographical differences and regulations vary from one region to another, affecting how the businesses operate. It means that the shipping companies need to consider every country's regulations they operate in. Mike Simmons expressed how geographical and regulation differences affect liner shipping companies with the following examples:

... also the types of refrigerants that are used and between the different suppliers as well [...] they have to make their compressors compatible sometimes more than one kind of gas especially because [...] for example, one, one type of refrigerant can be legal in Brazil but illegal in Europe. So well, that refrigerant can arrive with one kind of gas. If it's going to be refilled, then it

needs to be refilled with a different kind of gas. And so the supplier have to keep themselves up to speed and the compressors have to be compatible with different types of gases. In California, for example, [...] their emissions regulations that don't exist in in other states in the US. So if we have gensets generator modules that are connected to the refrigerated containers. If they're over a certain number of years old, they're not allowed to operate in California... those types of things we have to take into account if I go and buy or lease gensets that are not compatible to the California emissions regulations...(Mike Simmons).

Similar to Mike, Otis Smith also discussed the impact of regulations on the industry. The International Maritime Organisation was introducing new regulations aiming to cut sulphur oxide emissions at the time of the interview. The rule meant limiting the sulphur content in the fuel oil used on ships operating outside designated emission control areas (IMO, 2019). However, the new rules were also perceived by Nuwan Indika as rushed and contributed to the industry's uncertainty.

... the regulation cannot be underestimated ... the consequences of the new regulation ... cannot be underestimated. Because, number one, in order to be compliant, vessels need to either be built to be compliant ... or retrofitted with scrubbers in order to be compliant. So, the capital cost of compliance is significant 10s of millions of dollars in some cases per vessel... And number two is going to increase their operating costs significantly because I think we all know that bunkers make up something like 60% of the operating costs. So no shipping line in the world has the reserves or the financial stability to take these costs on themselves, they will look to pass on all of these costs to the consumer, whether the shipper or the consignee. So freight rates will be adjusted (Otis Smith).

... From what we've seen in the local industry for what we have seen at all the global forums we have attended. ... whatever it is, no one has a clear idea on this, and it seems a little bit too rushed or rather enforced a little bit

prematurely. Because you have all the traders who are not very much aware of what's gonna happen. You have some vessel owners who are not aware of what's going to happen and how they're going to manage it. You have even some tank ...(inaudible)... owners and operators who don't know what they will do with their facility starting January. So I mean, these are the people who are very much actively deep water in this (Nuwan Indika).

Uncertainty is a contributing factor to complexity. Customer demand is one of the elements of uncertainty that affects the maritime industry. Geographical differences and global changes also interplay with future customer demand contributing to uncertainty. From this point of view, complexity feeds into uncertainty in the industry.

... (collecting information from the customers) essentially is more complicated as it requires ... a prediction on how the customer is evolving. There is no way that the customer living in the West getting goods from the East will be the same as a customer located somewhere else. This means you need to look at global changes, global economic developments. Is there still a third world ? Or will be the third world henceforth be the first or second world, and will this third world be replaced by new geographic locations ? ... On the other hand, one also needs to look closely at the development of big data, artificial intelligence etc. At the same time, you need to take into account when looking at the future what the developments on the earth's resources and the impact on the logistics industry. Questions like will there be enough oil for the ships to run safely? Impact of climate change, CO2 reductions... (Peter Overejinder)

O Shipping Lines was one of the leading container shipping companies globally at the time of the interview in 2019. Minke Hassen from O Shipping Lines illustrated the state of the sector as doing business "in the industry logic of a vicious cycle". The cause and effect cycle he talked about is the chronic supply and demand problem. Minke expressed his dissatisfaction with the issue and the resulting unprofitability of the industry. He illustrated the problem:

...and one of the solutions to not make money is lowering the cost and buying new and larger vessels is a good way of lowering your cost so then you order

new vessels and then... that produces too much capacity in the industry. That puts downward pressure on your freight rates, and that makes poor profitability. And then the way to counter that is ordering on larger ships. And there you go. Right. So that has been the case, the past and still seems to be a bit. So that is, yes, that is a problem. And then on the other hand and if whenever we see the industry becoming a bit more profitable, just on the short term, ...then you see some companies sort of assuming that is now the new normal, after only a few quotas, and then start using that the higher earning to order new ships, because now things are better. And that sort of applies to certainty again (Minke Hansen).

Mike brought up two issues that persist in the container shipping industry; similar to Minke, Mike raised concerns about new vessel investments, particularly the ever-increasing container vessel sizes.

Cascading is the term used for the effect that the really large container ships have on the market. So, the really shipping companies Maersk, MSC, COSCO, they build these 20 and 22,000 TEU vessels that can only be used in very, very specific markets. So if last year, the average vessel sailing from China to North Europe, you know [...] Southampton Felixstowe if the average vessel sailing from China to North Europe is 18,000 TEUs. Then suddenly, these 20 - 22,000 TEU vessels come into the market, and there are only so many ports in the world that can handle such a sized vessel. So, COSCO and Maersk, they are going to switch out the 16-17,000 TEU vessels with their newer 20,000 TEU vessels, pushing up the average-sized vessel that calls in North Europe. But they have to do something with those 17,000 to vessels, they are only three or four years old. So they are going to have to either lay them up or push other ports like New York or Miami to increase their capacity building new terminals, buying new cranes that can handle such a large vessel (Mike Simmons).

Another issue Mike brought up was the volatility of the business. For example, trends in the shipping industry were volatile. An example of this was the intra-Asia trades.

In addition to the abovementioned descriptions, Peter Overejinder used a metaphor from evolution to portray the nature of maritime business, saying, "it's not a matter of making money for the shipowners, but I believe it is rather a survival of the fittest"

Putri from M Shipping Lines brought up digitalisation efforts where she discussed the issues on the customers' and the shipping company's side. For example, their customers require varied degrees of IT support to book their services. The participant also noted that their older clients required further support while younger clients did not struggle to access their services electronically as much. Some container shipping companies offer various services such as container booking, collection, tracking, bill of lading, online. However, she further explained that even some of their younger clients did not have an email address and required IT support:

.... most of our customers (are) your age, using the e-commerce apps, and so on, but some of them also still need some manual process like they mostly... some of our customers still have no email. So it's like... [...] our difficulties right now. Some of them are easy to use in our, I mean, easy to give them a session with us from their mobile phone doing with applications and so on, but some of them still are not able to join our development kits (Putri)

Putri previously described the problems they encountered due to poor adaptation of digitalisation among their customers. She later talked more about her experience in the liner shipping company, explaining that the company could not do forecasting since their data collection was of manual inputs; database cleanup and other technical arrangements were necessary and unavailable.

Subtheme 1.c. Actions taken in the shipping industry against challenges

The industry appears to have been working in challenging circumstances. Participants stated that different problems were addressed with various operational and strategic actions. However, short- to medium-term solutions to industry problems were causing other problems.

The allocation of feeder vessels was considered one way to respond to demand volatility. This was due to the flexibility the smaller vessels provided to the shipping companies.

... I would say the trends in the shipping industry, for example, the intra-Asia trades, they're extremely volatile. There are lots of natural resources, lots of commodity products that can that demand can come and go with the wind... there's a little bit of a trend in the Inter-Asia trades to go with smaller vessels calling more frequently... and being more ... flexible, because... if you put in really large vessels calling small ports... I call it small for us, I guess, you know, calling smaller ports like Jakarta or, or I don't know Chittagong, where there's definitely a lot of potential but if there's a sudden huge drop in import or export, that huge vessel becomes much less efficient. So, you know, instead of a big vessel doing a weekly call, but a smaller feeder, feeder network, making more frequent calls or even being more flexible, making less frequent calls, but still mitigating the risk of having a large vessel and a huge overhead and using smaller vessels (Mike).

Scrapping is one approach taken by the shipowners for the overcapacity issue. Slow steaming is another industry practice that helped the shipping companies reduce bunker costs, emissions and fleet overcapacity. However, slow steaming was not considered a long-term solution as it might lead to issues for the customers. Regarding this, Otis Smith explained:

...I don't know if it's a long term solution. Short term, I think it could work... So no, I don't think it would be nice, those people are obsessed with just-in-time deliveries, confining us in manufacturing heartland of Europe, for example, that to the procurement in Asia, they are the whole supply chain system is tainted around this just in time delivery. In so many cases, they want the shortest delivery time possible... when it (slow-steaming) started five, six years ago, we know that the market was heavily overcapacity, then much more than it is now. And then as a result of the increase in bunker pricing of 2015... I think there was a lot of scrapping... earlier on this year that the tonnage has

started to increase again by large, because it is very, very large vessels, which has come into into play (Otis Smith).

Despite the implementation of slow-steaming and scrapping the fleet in the past decade, growing vessel sizes increased the global tonnage.

Ports and terminals must invest in their infrastructures and superstructures to accommodate the increased size of the container ships. However, it causes a race on the land side. The ports have to provide desired services to remain in the business. Mike summarised the issue as the following:

...But with that comes the problem of the infrastructure on the ground. It's okay if you bring in a new crane and if you expand your port to have a berth that can support a 20,000 TEU vessel, but what about the trains? What about the space on the ground? What about the amount of truckers? You know, it's no simple thing to discharge 5000 containers in one day. There's another vessel coming today after, have to do something with those 5000 containers and there also has to be commercial activity that supports the import of such a large quantity of containers (Mike Simmons).

The response to cascading effect was the consolidation of shipping companies. Mike perceived the essence of the problem as inefficiency. "This inefficiency leads to more and more consolidation to mitigate inefficiency", he explained. Furthermore, he argued that the inefficiency spanned the inter-connected sectors because of the close association of container shipping companies, shipbuilders, container manufacturers, and leasing companies. It meant consolidation was not limited to the container shipping companies, but the interconnected sectors implemented consolidation, too.

Operational and strategic partnerships were another option that took place in the industry. Combining resources allowed the companies to remain operational and competitive. Some of the partnerships were limited to the operational aspects of the business, as Putri stated:

... sometimes we are using our own ships to delivery cargo, sometimes we are

having a cooperation with another shipping company to deliver in some remote areas where it will be easier for us to have cooperation and then delivering stuffs in like Indonesia, which is kind of difficult and not with lower volume to deliver for them... sometimes they have no ... shipping roads to deliver stuff on that part. And that or maybe they still have no... hassle to deliver the cargo to selected areas and then some areas ... we cannot deliver at the time. So mostly, we have a change of the vessel (Putri).

Efficiently utilising available resources required cooperation both on the logistics side and the space sharing side on board. Mike explained:

...So there's a lot of cooperation going on in the logistics side, if it was commercial (it) would be called ... price fixing and not legal ... But actually ... on the saving side or on the operational side, there's quite a lot of cooperation going on between shipping companies. And it wasn't that way just as early as 10 years ago. But there were just too many containers and too many costs in the market for us to ignore that if we share space on vessels or if we shared empty containers, then it would actually be quite a bit more sustainable as far as our ecosystems concerned (Mike Simmons).

Other partnerships were beyond being merely operational, according to Otis Smith.

... PIL provides COSCO a vehicle to go to new markets in particular Africa. The PIL has a lot of expertise and vertical depth experience of Africa, whereas COSCO doesn't. Africa is not a large trade volume, such as the Trans Pacific or the Europe to Asia, where you can simply improve your profitability by improving market share. But by just by manipulating rates, Africa is more about relationships is more about their certain countries. So COSCO, I think, has used a relationship with PIL to try and penetrate Africa, the strategic way (Otis Smith).

Theme 2: Looking into the future

The theme looking into the future was constructed around participants' planning practices, strategy and decision-making, and the sources of knowledge they use to anticipate the future. Up to five years of planning were the most common among the participants. However, shorter and longer planning approaches were also observed.

Subtheme 2.a. Sources of future knowledge in use

Participants revealed various ways of acquiring qualitative and quantitative knowledge when they look ahead into the future. Discussions, idea exchange, brainstorming, intelligence tools use, relevant publications such as container trade statistics, regional governmental data, shipping consultancy reports, and the news were utilised. However, a few participants also criticised the quality of sources and forecasts.

Neil Ramos explained in his email:

The strategy is made by having discussions/ ideas exchanged among a working group as well as operating board, based on existing clients and prospects, changing in operations and we use Domo-Business Intelligence Tool in some extent (Neil Ramos).

Nuwan Mendes talked about the quality of publications they followed. Their judgement on the quality of publications was based on whether the source led them to potential business opportunities or not. He told:

...There are always pros and cons. And there're always good publications and bad and good leads and bad ones... we do follow up the time that also it's never at the face front... we have found that sometimes it's a bit glamorised or sometimes ... it's like publicity ... they have paid the publication to promote them, promote the story or promote this project. So at that stage is not a very useful lead for us. It's just about the image and publicity. So it's very tough for me to like narrow it down and tell you exactly like that... Nothing's at face value. So you can read an article about a project but it may not even be materialised. It may be just a fluff piece article, put by journalists (Nuwan)

Minke Hassen informed us regarding their data sources:

...we have sort of macro forecasting team here of five people or so... That follow international trade markets very closely, and both in terms of gathering actual data, which is the baseline for forecasting, from various different sources ... and they have a lot different sources that you might have come across in container shipping, something like container trade statistics, CTS, but also a lot regional kind of data sources from governments, PS in the US and so therefore, they put together that in the global wide trade (Minke).

Adrie explained their data gathering approach. Although they used statistical data, they acknowledged that they did not use statistics for every occasion. Instead, Adrie explained using expert knowledge and reports from other companies, including their competitors. An example she gave was from an instance where they examined the energy transition of the future:

...we had some subjects to be discussed and there was a small working group which was dealing with the discussion... we have discussed this with the management team and now not even the stakeholders, but it just was an internal exercise based on all kinds of reports that have been produced by other companies. For example, dedicated an agenda for hydrogen development and also because of the climate adaptation programs in the Netherlands, there were... kind of climate type of climate tables. And so we had a climate table, industry table in the North and the South and in all those ...

Otis Smith provided information on the use of 'guts' in long-term thinking. He also talked about more accessible, high-quality information due to digitalisation and transparency.

... with the advent of digitalisation with the advent of more accurate information upon which to better decisions and also financial modelling, which were not available, the transparency of information the external organisation is providing economic indicators for countries for regions for hemispheres, etc, or play into the hands of the shipping organisations... So I think that there is more logic and... There's more guts and more consideration in the decision

making process these days, that I would say is case for commercially owned shipping lines... (Otis Smith).

Similar to other participants, Mike Simmons talked about the use of consultancy publications:

...some companies basically have access to different companies, consultancy companies, reports like yearly, bimonthly monthly publications for the next you know, forecasting and stuff and so... yes, there are a few I would say that same follows very closely Drewry and alpha liner... I think it's also Dynamar...

Peter Overejinder contributed to this subtheme, sharing his observations. He told:

...Tools provided for by the OESO, EU, the world bank, IMF and the like are the likely predicting tools they use to predict what the future may hold and what the future may require but is at the same driven by cost reductions (Peter Overejinder).

Subtheme 2.b. Short to Medium Term Thinking Practises

Different sectors and business functions in the maritime industry choose and implement planning pragmatically, based on practicality and value generation. Otis Smith explained that the company conducts in-house monthly forecasting practices. Minke Lassen from O Shipping Lines said their division focused on planning for up to five years, emphasising the importance of making sense of the near-term future. Mike Simmons from another liner shipping company told that the container leasing business function he is part of plan up to 10-12 weeks. Other participants also described their efforts to make planning five years into the future: one is another container shipping line based in the Far East and another is a port based in Europe.

...we do forecasting ... is done on a general trading basis, on a monthly basis. So trends and quirks and directions in the industry, and will very quickly reported back to the key management in Singapore (Otis Smith).

...So we're talking about one and a half to two months now. We do have an SAP based in house developed system to forecast... I believe it's ... eight or twelve weeks I don't remember right now because I'm not there anymore. But twelve weeks is about the best that you can do see on the empty side. twelve weeks is pretty simple... but when you're looking at commercial forecast of sales, it's really hit and miss. It's very hard to even forecast four weeks into the future, what kind of cargo you're able to sell how the market will be... bananas. Let's just say... if you have export of bananas that can go to Korea or to Europe or to Spain, you know, the price of bananas can change in all three of those locations. And maybe even the price would be extremely low and so, Costa Rica, bananas would just stay in Costa Rica for the local market or they would, they would put them into a coma and wait, you know, several weeks or months (Mike Simmons).

Minke emphasised the importance of making sense of the nearer future as opposed to ten years ahead. He painted a broad picture of their five-year-ahead thinking process.

... I think I'd be best understand how to really make sense of the more near term... we have sort of macro forecasting team here of five people or so... That follow international trade markets very closely, and both in terms of gathering actual data, which is the baseline for forecasting, from various different sources ... and they have a lot different sources that you might have come across in container shipping, something like container trade statistics, CTS, but also a lot regional kind of data sources from governments, PS in the US and so therefore, they put together that in the global wide trade, and then forecast on that based on GDP growth and other sort of trade related effects on that and the main focus is the next year or so and do regularly five year forecast because that impacts the course of decision in ordering vessels, we take vessel decisions, and then also not as frequent, we also do longer term studies on how do we think in twenty year horizon trade develops due to shifts in supply chains... (Minke Hassen).

The container shipping line in the Far East explained their efforts to plan five years into the future, despite the problems they faced with their implementation.

... we've been trying our best to have a long time planning like three years or four years, three years and five years forward, but unfortunately, our current conditions they'll give us difficulties to make it happen. So, what we are doing right now is still like having a scanning and then monitoring our competitors movement and still thinking what is our customer trends and keep moving forward before our customer before our competitors doing it (Putri).

The participant from the port sector explained their efforts to actualise five-year plans:

... We are having a five year steps to plan which we are updating every year... we also have a... we look at five main areas for future development and we call this so called target tree. And yes the simple as it is and we started... the tree has five main directions one of them is economic development and the other one is connected to sustainability also nautical development is part of it and the development of the organisation. And then is one other element is the financial part of the company. Every year we are some actualising (Adrie).

Nuwan Mendez represented Z Shipping company and Port Agency in the interview. The company offers shipping services such as freight forwarding, customs clearance, and vessel and port agency services. It is a smaller company compared to the other maritime companies participants represented. Z Shipping's approach differs from the other participants:

...So we are constantly looking for more opportunities where we can tap into that natural geographic benefit to create ourselves into a true hub position... how we see going forward or how we make our plans going forward is we always look at new projects, new opportunities for our part of the world, our region, and we do forecasting and plans and making decisions based on that... external measures forecast with ... general reports ...(inaudible)... watching the news. And then we will do from our side is once we get the lead... we have a marketing business development team, a small team that will do keeping

studying the project... it may just be a one paragraph newspaper article, but they will start a different take more detail, try to find out who the shipper is who the consignee is who the nominated lines are (Nuwan).

Subtheme 2.c. Long-Term Thinking Practises

The long-term thinking aspect of this research received mixed comments from the participants. Although up to five-year planning efforts were the most common, some participants included longer time horizons in their future thinking. Long-term thinking consisted of various desk research, looking at the future trends and, in some instances, the application of scenario planning.

Despite the focus on the nearer-term, O Shipping Lines factored in the future trends and scenario-based processes to look ahead. Thomas explained that long-term thinking was relevant to the industry, and O Shipping Lines had a dedicated team concentrated on that aspect. They focused on the future trends and updated the scenarios whenever they felt the need. However, he also noted that twenty years and ahead-thinking was not at the core of their short-term relationship with the business.

... I think I'd be best understand how to really make sense of the more near term... for companies (long-term) is relevant as well.. And that's why we do it as well... a lot of external input on that we ourselves catch up on different topics and what is going on around the world and diving into those some of those topics that are more relevant for us than not... This long term twenty years plus is not really the core, this is sort of not that well developed because it is long term view but it is not too crucial for the more short term relation of the business... I don't want to give you the impression that this is the core of we do, what we do here, it is something we do here from time to time... because it is very assumption based on trends and stuff, then you would have, let's say our industry is exposed to changes in automation, and on one axis growth, and the other axis would be regionalisation, That could be all trends. So, you have different things that you do not know how develop. So, if you have that the world is in its current form maybe that is the base case, and in terms of trade

restrictions then you have the scenario where we started having which we are probably trending at the moment perhaps (Minke Hansen).

Adrie explained another long-term thinking practice. Following the Port of Rotterdam, they created their port vision for 2030. The process was supported by scenario planning.

...port of Rotterdam ... came with it ... port's future vision plan. We also made such a plan which is also called the port vision of the seaports towards 2030... what we did is to look ahead as far as in the four box model, we looked at the development of the growth of the port and it ... grew with a big green of what's of the gray. So using fossil or using green energy systems and we do to prepare this vision we took more than 150 stakeholders into the discussion to which time we should formalise our visions to to reach our targets. So and these discussions finally led to the establishment of our visions for 2030 (Adrie).

Neil Ramos from Logistics and Warehousing industries briefly stated in his email response that their company made use of forecasting scenario planning. However, further details on their practices were not provided.

... We used a lot forecasting and scenario planning before a new fiscal year, and during the fiscal year to adjust to unforeseen events that occurred or we believe will occur (Neil Ramos).

Subtheme 2.d. Strategy and Decision Making

Participants described their strategy-making processes with varying degrees of detail. A participant explicitly stated that they did not wish to delve into the process in length in the interview. Putri briefly talked about following Michael Porter's teachings; the company pursued product differentiation and cost adjustment at the same time. SWOT analysis, customer satisfaction index, future trend analysis, scenario planning, desk research, brainstorming and discussions came up in the interviews. Although these were included in the previous subthemes, this subtheme was constructed around the participant knowledge shared on strategy making and planning and decision making.

Putri, representing a liner container shipping company, informed us on the competition element in their strategy making and explained:

...At the beginning, we were using SWOT analysis as the Customer Satisfaction Index, to know how is the exact customer our customer needs. And then just like Michael Porter, say, we are doing our product differentiation and of cost adjustment at the same time (Putri).

Adrie from the port sector and Nuwan from the port agency industry talked about competition and seeking opportunities. They were concerned with attracting businesses. The port managed to attract data centres to their ports. However, the underlying objective of the construction of the port was different. The port of Eemshaven, according to Adrie, was designed to operate as a petrochemical deepsea port which failed and ended up with “no target and no success”. She further explained:

... we discovered that there are different functions of the port and we said if we want to develop the port, we should do something different than all other ports are doing. So and therefore we are using a different strategy. And we follow mostly looking at challenges which is has not been discovered or not been materialised in other ports... So, when we are looking to a sampling, searching for customers behind customers. So, knowing that we have a lot of power production in the port by through power plants, I've asked myself a quiz the question, which kind of companies of industries are using a lot power. In this case we discovered that data centres are using this kind of power. And so, that is our strategy (Adrie).

The above example did not appear to result from a formal strategy-making process. However, the port vision that they developed through a participatory scenario-based process allowed them to set future targets and a vision for 2030. According to her, the green energy transition received more attention and support from the participants during the process. She explained:

... what we did is to look ahead as far as... in the four box model, we looked at the development of the growth of the port and it kind of... growth with a big

green, growth of the gray. So using fossil or using green energy systems and we do... to prepare this vision we took more than 150 stakeholders into the discussion to which time we should formalise our visions to to reach our targets... So we have on one side, just regular business plan five year plan. And on the other side, we have our port's vision. And that is more looking towards the future. And now ... we are now in the middle of this whole energy transition discussion.

Adrie's experience is comparable to Nuwan's. Nuwan is in port agency and 3PL business. Ports and port agencies rely on shipping operators for business. As a result, Nuwan was concerned with seeking opportunities, attracting and offering services to potential clients. Different from Adrie's experience, port agencies do not have the authority to change a port's business model. In Nuwan's case, his business strictly relies on the vessels calling the port they are doing business in. He explained:

... we are very much focused on any large projects or development happening in the region that create an opportunity for cargo to be incentivised to project. So, that will give an opportunity for transshipment... So they may as a liner want to come dump off in a easier to manage quick turnaround place like Colombo and then we can find feed operators to translate that volume to that Indian for similarly, even in Sri Lanka, if there is a big project we would then work and see where the project the way the cargo is being sourced from that it's whatever it is, it's a new airport that's being built ... so and then we would look where the cargo is being sourced from and then we would approach ...(inaudible)... their keep them nominate assess the agent and do an integrated solution logistics for them.

Neil Ramos briefly informed us of the company's strategy; however, his email did not clarify their strategy-making process. He communicated:

...C Logistics Services has a strategy, planning the future, and this includes "digital transformation" most of our operations, and creating synergies across the group as well as preparing for the consequences of a "hard Brexit" (Neil Ramos).

Otis Smith talked about the rationality of decision-making and how it has changed over the years. According to him, employing external consultants was a common practice for many organisations to verify their decision-making.

...the transparency of information the the external organisation is providing economic indicators for countries for regions for hemispheres, etc, or play into the hands of the shipping organisations and the type of decisions on purchasing of new tonnage, building new vessels or redirecting vessels into new fleets isn't just an operational consideration anymore. I mean, there are a multitude of different factors to consider a lot of organisations now use external consultants to to verify their own decision making. In many cases, now, these organisations are listed companies that are responsible for shareholders as much as the families (Otis Smith).

At the time of the interview, Minke Hansen was the director of strategy development. He gave an overview of the strategy and decision-making process:

...I think in most companies strategy functions, such as mine do not deciding the strategies, right?.. facilitating the decision making the top management. so, it is having interactions with them, and in giving them the required support to take the decision. And also challenge of course, in the any sort of pre-preset directions they would want to go in and that's basically what is (Minke Hansen).

2.e. Issues associated with the forecasts and sources of future knowledge

Some participants talked about issues with market intelligence related to lack of credibility, poor forecasting and steep costs.

Nuwan Mendes talked about the quality of publications they followed as well as the steep cost of acquiring the reports. Their judgement on the quality of publications was based on whether the source led them to potential business opportunities or not. He explained:

...There are always pros and cons. And there're always good publications and bad and good leads and bad ones... we do follow up the time that also it's never at the face front... we have found that sometimes it's a bit glamorised or sometimes ... it's like publicity ... they have paid the publication to promote them, promote the story or promote this project. So at that stage is not a very useful lead for us. It's just about the image and publicity. So it's very tough for me to like narrow it down and tell you exactly like that... Nothing's at face value. So you can read an article about a project but it may not even be materialised. It may be just a fluff piece article, put by journalists (Nuwan)

He also highlighted the difficulties with accessing high-quality publications, the cost being a barrier to access.

...we have found when it comes to, I suppose there are some publications that we get very specific commodity information, those tend to be accurate, of course, they're very, rather somewhat accurate... they're very expensive and you have to register and be a part of it. And we have different ways from our principles and partners that we get those or see sometimes, but they otherwise quite expensive to be a part of those tend to be more accurate in terms of the movements and in terms of the kind of commodity that we source and the general price of the commodity that is going around (Nuwan).

Minke Hansen stated that they used triangulation of data sources within their in-house demand forecasting practises. He further added that their forecasts were often more accurate than maritime consultancy reports'. His observation in the industry helped us understand the forecasting issues that were persistent and problematic. He further explained:

...So the thing is, I won't point fingers at companies, because I don't know how they forecast internally...and also in presentations that they make to the market and all that most of them rely on these industry experts, which would be Alphaliner, Drewry, Clarkson, what are you not, most of them... We have an in-house set up to forecast and we actually typically are much lower. And that is also we sort of try to make that public as much as possible with as much

lower than these companies are. But most shipping companies do not have such an internal setup, rely fully on these external companies. And they have a tendency historically to overshoot. So, it's just it's an industry problem that we are overshooting and making wrong or wrong decision based on profile forecasting.

Further input about the future-oriented publications came from Adrie. They reviewed future scenarios developed for the maritime industry. When Adrie was asked about the similarities and differences between the future scenarios they reviewed, Adrie explained:

...my feeling is that most of those plans are all looking a lot the same. Every port has the same challenges to grow to develop into the future, what we have is assuring the Netherlands, we have coped through the regulations of the European Union. And ... because I'm more or less looking as a marketeer to watch strategy and looking how can we become different from other ports to realise our goal is to attack the companies we would like to have and of course, I have always a feeling to be a little bit different than the other ports to get some ... what is it distinct (Adrie).

Theme 3 Questions remained unanswered and the questions that emerged

The theme 'Questions remained unanswered and the questions that emerged' was constructed around the questions that the participants did not answer due to various reasons and the questions that participants came up with during the interview process. They also brought up questions that they thought were worthy of future research. The researcher of this doctoral research felt the need to construct this theme as the participants' inputs appear to be helpful for future research directions.

Subtheme 3.a. Questions remained unanswered

Participants shared their valuable insights and contributed to this phase of the doctoral research. Sensitive questions about companies' strategy and decision-making processes were answered in varying degrees. However, in some instances, probing

questions about strategy development remained unanswered. Probing questions were directed to achieve a greater level of understanding of the strategy-making processes of the companies. For example, questions about the dynamics between the strategy department and the board of directors who have the power to make the final calls on decisions and further insights about strategy orchestration were not answered.

Subtheme 3.b The questions that participants showed interest in and directed to the researcher

The long-term focus of the interview questions led participants to think about the future and future-related issues in the maritime industry. As a result, participants expressed their interests in various questions. The questions included how other companies thought about the future, visionaries in the industry, culture, and new technological advancements.

Otis Smith showed interest in geographical and corporate culture and how they affected maritime companies' forecasting, business, and decision-making. He explained:

...I think, culture has a lot to do with forecasting, business, you know, the culture of... the geographic culture, but also the culture of the mindset of the shareholders or the controllers. And I think, Maersk, for example, display this very rigorous analytical, heavy decision-making process, which I think slows things down a little bit (Otis).

Neil expressed interest in how other companies were seeing the future; they asked:

...it could be interesting to know how other companies are seeing the future of the industry in 5 years/10 years, changes and challenges (Neill).

Mike talked about tracking devices and how much impact they would make in the container shipping sector. He explained:

Well, there's a big trend in the industry now for tracking devices and one thing that that has caught on quite well is tracking devices in reefer containers

refrigerated containers. So, you can track the temperature the O₂, the CO₂ and even as far as whether the door was opened or if there was even a jarring force like if it was in an accident or something like that, but to implement that on the 20 million containers in the market of dry you know, your regular dry containers is quite a large investment... So that's something that is going to be really big in the container industry (Mike).

Minke Hassen suggested investigating how stakeholders in the industry estimate the future, relying on what information, using what models etc., were essential to understanding. He explained:

...some point that you start really diving into the details of how do people estimate the future... is (it) based on some kind of facts, research and models? Or do they rely on externals? Or how do they base the future? What kind of sources do they use? On a bit more concretely? I think... they'll be good to understand (Minke).

Although Peter Overejinder briefly mentioned the visionaries in the industry, the notion of visionaries and their role in the maritime industry is an attractive future research area. He discussed the tools available for forecasting and explained:

...Agree that tools provided from by inter-governmental institutes may be considered to be “dangerous” but for the time they are the best available. Unless you meet up with a Visionair within the industry ... in which case I would ask him for assistance on the stock market (Peter Overejinder).

A2.2. Conclusion and Research Directions

The exploratory phase of this doctoral work has examined how stakeholders in the shipping industry look ahead into the future. The industry's forward-looking practices are not well-documented in the literature, and analysis has revealed valuable insights about those practices contributing to the literature. The analysis also reveals future research directions, one of which is pursued in the next stage of this doctoral project.

Most participants discussed the complex and uncertain nature of the maritime industry. Their reasoning behind those was the maritime industry's evolution over the years, and internal and external factors affecting and changing the industry and its sectors. For instance, some participants gave environmental discussions and legislation as examples. Changing environmental legislation would mean affecting the shipowners, ship operators, ports and terminals, inland transportation companies, and other connected sectors. Geographical differences were another example given by participants to demonstrate the complexity of the industry. Some participants also brought up supply and demand uncertainty, volatility, and cascading effect.

The analysis further revealed several actions against chronic problems in the industry. For instance, the allocation of feeder vessels was one way to tackle demand volatility. In addition, slow steaming and scrapping appeared to be other approaches taken by shipping companies to adjust their fleet supply for transportation demand. However, those actions still would not prove sufficient at times due to the global commercial fleet's oversupply of transportation capacity. In this case, the shipping companies and other sectors in the industry went for consolidation. Consolidation meant that companies chose operational and strategic partnerships to be more efficient and effective at using their resources and, therefore, saving costs.

Most participants talked about their experience with short to medium-term and long-term thinking practices. These included the sources of knowledge they acquired to think about the future. Qualitative and quantitative information use was observed. These were expert knowledge, various statistical data, intelligence tools, consultancy reports, and other publications such as future scenarios and visions developed by other companies operating in the maritime industry. While some participants talked about their experience in discussions and idea exchange solely internally, others reported a high number of participant input in their future thinking practises. The analysis does not aim to generalise the findings but explore the future thinking practices in the industry. However, based on interview input, the companies appeared inclined to use statistical data to forecast short to medium-term futures. Expert opinion appeared to be more common when the companies aimed to envision medium to long-term future and develop a vision.

Participants also brought up several issues associated with data sources. The problems they observed were related to reliability. For example, several participants mentioned accuracy problems in the news, consultancy reports and industry-focused forecasts that reputable shipping intelligence companies publish and sell weekly, monthly, and yearly. Another issue one participant raised was access to knowledge. While others saw incremental improvements with how access to knowledge grew into more available over the years due to digitalisation, some publications' steep cost played a barrier role.

Participants explained that they focused on different time spans depending on the industry and business function. For example, allocating the containers required up to 12 weeks of forecasting and planning, whereas shipping liner companies reported monthly and yearly forecasting practices. Monthly forecasting was considered crucial to keeping track of trends and directions in the industry. Most participants explained that they did not try and foresee the future over five years. The reason behind their decision was the unpredictability of the industry.

Despite the focus on the short to medium-term future, few participants explained that they practised long-term thinking. For example, one of them argued that up to five years of thinking was the focus of their strategy department but further explained that another team in the corporation was looking into longer time horizons. They also added that scenario planning was one way of looking into the future. The analysis cannot explain why they focused on five years but practised scenario planning and allocated resources to long-term thinking. Another participant disclosed detailed information on their vision development following a competitor. The vision they built for their port was supported by scenario planning.

The strategy and decision-making subtheme is a continuation of the previous subthemes and closely linked with it. However, in addition to participants' approaches to short, medium and long-term thinking, this subtheme also captured two new topics which were not discussed before: competitiveness, differentiation and seeking opportunities. Participants emphasised the importance of being on the watch for potential business opportunities and seizing those opportunities before their

competitors do. Differentiation was another topic that came up in the interviews. Thinking differently about long-term futures was considered crucial to remaining competitive and profitable by a participant. The same participant also discussed what other companies did with their long-term visions and stated that those plans looked remarkably alike. The effectiveness of scenario planning appears questionable in terms of being competitive and different in the market if the process outcomes are very similar for its practising organisations. A third interviewee stated that they used scenario planning for strategy making, but further information was not disclosed.

Participants shared their valuable insights in the interviews and answered the questions in their best capacity. However, the sensitive nature of interview questions meant that some questions were not answered in desired depth and length. Although a general sense of their strategy and decision-making processes were explained, some probing questions the researcher directed remained unanswered.

Participants' input also generated other fruitful research directions. The time limitation of participants also meant two participants responded to the interview questions by email. In one instance, an interviewee reverted and responded to the researcher's further questions. In the second instance, the response was limited to a single email exchange.

The questions they raised were recorded, analysed and presented in the final theme. The role culture plays in decision making, both geographical and organisational culture, was brought up by a participant. One participant showed curiosity about how other maritime industry organisations were looking ahead into the future. Similarly, another participant was curious about what other organisations did to "estimate the future", discussing the importance of chosen variables, information sources, type of facts, research and models, external input and the basis of their future estimates. Visionaries came up in the interviews only once and briefly but appeared to be a worthy future research area and therefore added in the final subtheme.

One participant who adopted scenario planning in the vision development process for their ports was experienced in scenario planning through literature review and practice. Her observation of the published maritime scenarios was that they all looked the same.

The similarities between the scenarios that different maritime stakeholders develop is an interesting observation. The author of this work has found the participant report a worthy investigation area and channelled his focus to creativity and scenario planning practices in the maritime industry.

Scenario planning does not have a rich history in the shipping industry. However, participant input has illustrated its use. Therefore, researching scenario planning in the shipping industry is a reasonable effort to contribute to industry knowledge and practice.

A.3. Appendix 3: Systematic Literature Review Table of Scenario Planning Effectiveness Research and Critical Appraisal Findings

Paper	Sample Characteristics	Design	Measure/Analysis	Summary of Main Findings	Quality Assessment
Sedor (2002) Experiment 1	n=86 financial analysts	full-factorial 2 x 2 between-subjects experimental design, quantitative	Preliminary and post forecasts made by subjects, open ended questionnaire, use a full-factorial 2 x 2 between-subjects design with the structure of information (scenario vs. list) and the sign of prior earnings (loss vs. profit) as independent variables. The primary dependent variable is subjects' forecasted earnings change	Cognitive process consistency with scenario thinking check by principal component analysis (eigenvalue = 2.04, explained variance = 68%). H1 not supported based on the information provided by first year forecasts ($F_{1,76} = 1.82$, $p = 0.09$, one tailed). The year two forecasts support H1 ($F_{1,76} = 4.15$, $p = 0.02$, one-tailed). S.T. mediation impact ($F_{1,77} = 3.58$, $p = 0.03$, one tailed).	Clear research objectives. Purposive sampling. No clear indication regarding subjects' randomisation procedure. Lack of information at follow up stage (e.g. whether all subjects at preliminary stage completed the post-forecasts or were there any exclusions are not stated). Researcher's position is not clear. Some statistical tests run in research require assumption checks (unclear whether the assumptions were checked or not).

<p><i>Experiment 2</i></p>	<p>n= 49 MBA students</p>	<p>1 x 3 between-subjects experimental experiment, quantitative</p>	<p>Preliminary and post forecasts made by subjects, open ended questionnaire, used “a full-factorial 2 x 2 between-subjects design with the structure of information (scenario vs. list) and the sign of prior earnings (loss vs. profit) as independent variables”. The participants' forecasted earnings change is the primary dependent variable.</p>	<p>Information content and information structure difference insignificant ($t_{39} = 0.31$, $p = 0.38$ and $t_{39} = 0.64$, $p = 0.26$, p values one tailed). Information structure differences rather than the content difference affected Experiment 1 outcomes ($t_{39} = 2.16$, $p = 0.02$ and $t_{39} = 1.70$, $p = 0.05$, p values one tailed, year 1 and year 2, resp.)</p>	<p>Clear research objectives. Convenience sampling. As in experiment 1, no clear indication regarding subjects' randomisation procedure. There is lack of information at follow up stage. Researcher' position in research is not clear. A potential confound addressed in exp 2.</p>
<p>Totin <i>et al.</i> (2018)</p>	<p>n= 38 scenario participants and n=26 interview participants holding different professional positions in agriculture, food, security, and environment sectors</p>	<p>Longitudinal design, Qualitative</p>	<p>Structured interviews, coding the recorded interview transcriptions, thematic analysis. Their process followed the (I)NSPECT approach</p>	<p>A year after scenario planning workshops, the practitioners of the workshop reported enhanced social networks.</p>	<p>Clear research objectives. Purposive sampling. There is no mention of underlying research philosophy. The positioning of researchers is unclear except the statement of that they took part in scenario workshops.</p>
<p>Meissner, and Wulf (2013)</p>	<p>n=252 graduate students</p>	<p>separate-sample pre-test – post-test control</p>	<p>A modified framing bias and a decision quality questionnaire for pre and</p>	<p>Some evidence of scenario planning ability to impact</p>	<p>Clear research objectives. Convenience sampling. No</p>

		group design, quantitative	post-tests, scenario planning as intervention, Full scenario group did Schoemaker's scenario planning steps, partial group did only till the 4 th step of the same approach.	cognitive biases positively and enhance decision quality.	confounding variable stated. No detail was given regarding the random assignment procedure of the subjects.
Phelps, Chan and Kapsalis, S.C. (2001) <i>Study 1</i>	n= 22 water, and water and sewerage companies in Wales and England	Survey, quantitative	Questionnaire based on literature review and discussions with experts, defining scope, database construction, building the scenarios, and choosing strategic options.	Correlation between performance and the combination of size and scenario planning. Performance measures included both service level and financial return.	Clear research objectives. Census sampling. Small sample size prevented strong statistical results. Company size was a confounding variable of research.
<i>Study 2</i>	n= 100 IT companies	Survey, quantitative	Questionnaire designed based on initial contact with a few companies	Confounding factor in study 1 was targeted and eliminated. Size effect resulted to be low. Preliminary result supporting scenario planning effectiveness on performance.	Clear research objectives. Systematic sampling. Low return rate (25%). Even though the size factor was targeted, other potential confounding variables such as, management style and culture were not controlled.

Glick <i>et al.</i> (2012)	n= 129 participants including workers to managers from 10 different organisations.	Longitudinal design, quantitative	The Mental Model Style Survey (MMSS) for pre and post-test, scenario workshops as intervention	Scenario planning workshops may alter participants' mental model in organisational context. Except financial mental model, other 4 models were observed to shifted among subjects.	Clear research objectives. Purposive sampling. No control group. Pre-test influence is a potential bias remained unclear. Due to longitudinal design, apart from scenario planning workshops, other potential treatments might have intervened subjects' mental models which was not investigated.
Schomaker, P.J.H. (1993) <i>Experiment 1</i>	n= 65 University of Chicago MBA students, n= 63 MBA students' friends	Longitudinal design, quantitative	Questionnaire for pre and post-test, workshops as intervention, Shell school scenario planning	Strong support for H1: <i>Asking subjects to construct multiple scenarios concerning the possible values of key uncertainties will widen their subjective confidence ranges.</i>	Clear research objectives. Convenience sampling. No further information regarding sample Clear research objectives. Potential confounding factors are stated yet, there was no strategy to deal with them.
<i>Experiment 2</i>	n= 75 University of Chicago MBA students (new sample from the same population	Two-stage between subject design, quantitative	List and scenario conditions as intervention, prediction task, Shell school scenario planning	Extreme scenarios may not stretch subjective confidence ranges but instead, reduce them.	

	as in Experiment 1)				
<i>Experiment 3</i>	n= 78 University of Chicago MBA students	Between subject design, quantitative	Probability assignment exercise, Shell school scenario planning	Evaluating the severity of conjunction fallacies in scenario construction is hard to assess	Clear research objectives. Convenience sampling. Subjects were randomly assigned to group A or B. Longitudinal design
<i>Experiment 4</i>	n= 109 University of Chicago MBA students	Quantitative	Scenario construction case reading followed by a subjective correlation matrix analysis of trends and key uncertainties assignment, Shell school scenario planning	The majority of the participants failed producing internally rational correlation matrices. Overconfidence reduction benefit of scenario planning may be real, but it might be based on subjective inputs that are flawed (statistically incoherent).	Clear research objectives. Convenience sampling. No control group present.
Visser and Chermack (2009)	n= 9 multinational companies operating in competitive industries that apply scenario planning	Qualitative	Semi-structured in-depth interviews, pattern matching, already scenario planning implementing organisations sampled	Different scenario planning practises were observed. The majority of the respondents stated a positive impact of scenario planning on	Clear research objectives. Purposive sampling. Clear information on sample characteristics and data collection process. In results, not all

				overall company performance.	participants' voices presented equally.
Zegras and Rayle (2012)	n= 37 workshops participants n= 22 out of 37 pre-workshop respondents n= 17 out of 22 post-workshop respondents	Longitudinal, mixed method	Scenario planning workshops, questionnaire, observation, workshop document reviewing, Shell school scenario planning	Individual interconnection increases and tendency to collaborate between scenario workshop participants	Clear research objectives. Purposive sampling. Some information regarding sample characteristics provided. Potential pre-test bias. Research design is not the best for research question.
Chermack and Nimon (2008)	n= 41 intervention n= 43 comparison group (participants held different managerial positions in a technology company in the States)	Pre-test post-test design, quantitative	the General Decision-Making Style (GDMS) Survey, developed from Shell,	Preliminary result for shift in practitioners' mental models after scenario planning workshops. Furthermore, scenario planning is useful and appealing way for employees who do not normally engage in decision making process.	Clear research objectives. Purposive sampling. Control and treatment group sample characteristics show differences. No potential confounding factors were stated e.g. use of other strategic planning tools by participants. Pre-test influence. Reliability and validity tests were run.
Chermack <i>et al.</i> (2015)	n= 48 participants from four organisations for intervention, n=44 participants	Pre-test post-test design, quantitative, 5 workshops based on Shell's	SOQ - Situational Outlook Questionnaire	Scenario planning effect on some variables (freedom, trust, idea-time, play/humour, conflicts	Clear research objectives. Convenience sampling. Confounding variables mentioned but nothing done. Pre-test

	from four organisations for control group	scenario approach		and risk) was supported. Challenge and involvement, idea-support and debates insignificant.	influence. Validity tests and test assumptions were run.
Haeffner <i>et al.</i> (2012)	n= 133 participants from 10 different organisations who had scenario planning experience	One group pre and post-test design, quantitative, Performance-based scenario planning workshops	The Dimensions of the Learning Organisation Questionnaire (DLOQ), scenario planning workshop as intervention	The t test results show that all variables except continuous learning (p value = 0.35) (?) are significant. (Dialogue and Inquiry, Collaboration and Team Learning, Embedded Systems, Leadership $\alpha < 0.01$) Empowerment sig at $\alpha < 0.05$	Clear research objectives. Non-random convenience sampling. Single scenario planning workshop approach as intervention with some degree of freedom in terms of industry specific customisation It's unclear whether pre and post-tests were the same length DLOQ or the pre-test was a shorter version whereas the post-test was full scale DLOQ implication. Statistical assumptions met.

Chermack <i>et al.</i> (2017)	n= 48 participants who participated scenario planning projects in intervention group and n=44 in comparison group who did not	Pre-post-test control group design, quantitative	Wagnild and Young's Resilience Scale as pre and post-test instrument, scenario planning workshops as intervention	The t test results show significant change in intervention group $t(48) = 2.38, p = 0.02$. insignificant for comparison group = $t(48) = 1.85, p = 0.07$.	Clear research objectives. Convenience sampling. Sample demographic data presented. Confounding factors unknown. Pre-test influence potentially. Lack of random sampling. Perception based measures. Reliability and validity tests sig.
Johnson <i>et al.</i> (2012)	n= 39 end-of-workshop survey participants, n= 14 out of 39 interview participants n= 5 out of 39 for follow-up interviews	Post-test design, mixed methods	Survey, semi-structured interviews (developed by the researchers), researcher observation, Workshops employed the [I]NSPECT process	Participants reported enhanced systematic thinking, improved relationships, new perspectives and expanded knowledge. Participatory scenario structure enabled the practitioners engage in discussion.	Clear research objectives. Mixed-method design attempted to be justified by pointing out similar studies in social learning field. No divergent results between surveys and interviews. No reliability and validity statement or concern shared. Data analysis procedure is unknown. Regarding research design, the focus is more

					on scenario planning rather than how it impacts the participants.
Min and Arkes. (2012) <i>Experiment 1</i>	n= 185 initial survey respondents who were engaged to be married n= 105 out of 185 respondents completed a follow up survey	2 x 2 between-subjects experimental design, quantitative	Prediction survey, initial and follow up surveys, a 2 (planning difficulty: easy two-step vs. difficult five-step) ¥ 2 (accountability: high vs. low) between-subjects design.	Subjects assigned to a harder planning task made more realistic estimates than the participants assigned to easier planning task.	Clear research objectives. Purposive sampling. Random assignment statement, no details regarding how random assignment performed. Confounding factors checked. No control group. Self-selection bias corrected. It is unclear whether the assessors were blinded or not. Low follow-up rate.
<i>Experiment 2</i>	n= 127 business students initial survey n= 92 out of 127 business students completed the follow up survey	2 x 2 between-subjects experimental design, quantitative	Prediction survey, initial and follow up surveys, a 2 (planning difficulty: easy two-step vs. difficult eight-step) X 2 (scenario type: optimistic vs. pessimistic) between subjects design with a nonfactorial control condition.	Decrease was observed on the optimistic prediction bias when respondents generated the difficult rather than the easy scenarios. Furthermore, the bias also decreased in easy pessimistic scenario generation comparing to the difficult	Clear research objectives. Purposive sampling. Random assignment statement, no details regarding how random assignment performed. Confounding factors checked. There is a control group. Self-selection bias corrected. It is unclear whether the assessors were blinded or not. Acceptable

				pessimistic scenario generation group.	follow up rate (almost 80%).
<i>Experiment 3</i>	n= 148 students initial survey, n= 118 out of 148 completed the follow up survey	2 x 2 between-subjects experimental design, quantitative	Prediction survey, initial and follow up surveys, a 2 (planning difficulty: easy two-step vs. difficult eight-step) X 2 (meaning of ease: ease is good vs. ease is bad) between-subjects design	The subjective meaning of ease qualified the planning difficulty effect. Planners who produced a difficult instead of an easy optimistic scenario were less likely to demonstrate the optimistic prediction bias when they positively interpreted the feeling of ease.	Clear research objectives. Purposive sampling. Random assignment statement, no details regarding how random assignment performed. Confounding factors checked. There is a control group. Self-selection bias corrected. It is unclear whether the assessors were blinded or not. Acceptable follow up rate
<i>Phadnis et al. (2015) Study 1</i>	n= 342 experts from businesses (shippers, LSPs, carriers etc) and transport consultancies, government agencies, academia, community groups	Pre-post-test no control group design, quantitative	Online pre-test and post-test A and post-test B, single and multiple scenario planning as intervention, scenario-axes technique.	No significant confidence level change on investment decisions ($\chi^2 = 5.65$, $df = 3$, $p = 0.13$). Around half of the participants changed their investment decision after scenario practise (55.1%).	Clear research objectives. Stratified random sampling. No control group. Even though the experts come from the same industry, not much information given regarding sample characteristics. Post-test was conducted right after treatment. No mention of confounding factors. No missing values.

					Reliability was attempted to be sustained by assigning skilled samples.
<i>Study 2</i>	n= 275	Pre-post-test no control group design, quantitative	Online pre-test and post-test A and post-test B, single and multiple scenario planning as intervention, scenario-axes technique	Insignificant confidence level change after scenario practise ($p = 0.979$, two-tailed paired t -test). More than half of participants changed their investment decisions (69.5%).	
Kuhn and Sniezek (1996)	n= 186 introductory psychology students	Pre-post-test control group design, quantitative	initial and follow up surveys, scenarios given as intervention, Increase-decrease-hybrid scenarios given	Presenting multiple scenarios did not reduce confidence compared to the presentation of only one scenario, despite scenario advocates' claims . Little additional impact on confidence and uncertainty due to presentation of	Clear research objectives. Convenience sampling. Confounding variables are unknown. Control group. MANOVA, ANOVA assumption checks unknown.

				multiple scenarios compared to only one was observed.	
Schnaars and Topol (1987)	n= 82 students doing different business degrees e.g.PhD, MBA, undergrad	Experimental-Quantitative	Graph only or graph and scenarios given, followed by participants' forecasts asked, The three scenarios were arrayed according to the popular 'optimistic', 'pessimistic', and 'middleground' scheme given to them	Scenarios did not lessen the degree of surprise to outcomes. Sales forecasters who received scenarios felt more confident about their predictions than those who did not. It indicates that SU focus on a single, favoured scenario rather than the entire scenario set; multiple scenarios did not enhance the accuracy of judgmental sales forecasts	Random assignment of sample. Convenience Sampling. Analysis revealed no change in forecasting accuracy among these three groups. No control group. Statistical assumption checks were not stated.
Veliquette <i>et al.</i> (2012)	n= 137 from ten different organisations in the USA that participated in the scenario planning project	Pre-post-test no control group quantitative design	The CQEC instrument as pre and post surveys, scenario planning workshops as intervention	Statistical tests run were found significant which support that communication skills and practitioner engagement are improved through scenarios planning efforts. Also noted that, there is empirical	Clear research objectives. Convenience sampling is applied. Measurements appear to be appropriate for both outcome and intervention. However, missing values are observed. It is difficult to assess whether a

				support for scenario planning's improvements on dialogue, conversation quality, and engagement are outcomes of the scenario planning process.	complete outcome data is presented. Confounding factors are not listed and appears to be a weakness to the research. The SP intervention appears to be administered as it should be.
Marquitz, Badding and Chermack (2016)	n = 92 from four different organisations from the healthcare and academic environments who were experiencing some kind of transitions in organisations, Intervention group N: 48, comparison N: 44	Quasi-experimental, pre-test/post-test design with intervention and comparison groups.	The Inventory of Complicated Grief (ICG) instrument as pre-post test surveys, scenario planning workshops as intervention	“While the hypothesis of the study was not supported, there are important findings for the study on scenario planning, change and grief.”	Clear research objectives. Convenience sampling is applied. However, sampling criteria is rather vague. Measurements appear to be appropriate for both outcome and intervention. It is difficult to assess whether a complete outcome data is presented. Confounding factors are not listed and appears to be a weakness to the research. The SP intervention appears to be administered as it should be.

Burt and Nair (2020)	A leading Scotch whisky producer	24 month long longitudinal field study, qualitative, face-to-face meetings, participant observation as primary data, notes taken during the SP workshops	Gioia Method	Unlearning, rather than learning helped the organisation to generate strategic foresight. Strategic foresight helped the organisation challenge their thinking by overcoming rigidities in their ex-ante thinking.	Clear research questions. Data collection addresses the research questions. Their qualitative approach answers the question appropriately. Data collection and analysis methods appear to be sound. Interpretations are rooted in the findings and sufficiently covered. There is coherence between data sources, collection, analysis and interpretation.
Olabisi, Adebisi and Kakwera (2016)	N: 29 in Burkina workshop, N: 34 in Nigeria workshop, :24 in Malawi workshop. SP workshop participants chosen from related industry's stakeholders. Purposive sampling to	Scenario planning as intervention, Scenario workshops used the (I)NSPECT process. Intervention and comparison groups. Quantitative design.	Pre-post test approach, survey administration (the survey developed by the researchers). T-test analysis, scenario planning workshops as intervention	Increased consensus among practitioners, allowing them to hear from diverse perspectives. Unchanged opinions regarding the priorities that were set before SP and after.	Clear research questions. Participants represent the target population. Measurement issues are observed. For instance, the survey instrument was assessed by the researchers potentially insufficient to capture the nuanced changed opinions among practitioners.

	accommodate diverse perspectives.				Validity and reliability of the developed survey questionnaire was not assessed before application (No pilot study application). It is difficult to assess whether the researchers present a complete outcome data. Cofounding factors were not mentioned. The SP workshops appear to be administered following a standardised process and no issues are reported.
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Table A. 2: Systematic literature review table and critical appraisal findings

Source: Author’s systematic review of the SP effectiveness literature and critical appraisal findings based on the MMAT Tool as developed by Hong et al. (2018)

A.4. Appendix 4: Participant Information Sheet for the Shipping Industry Stakeholders

/University of Strathclyde Logo/

Participant Information Sheet for the Shipping Industry Stakeholders

Name of department: Hunter Centre for Entrepreneurship

Title of the study: Gokhan Gokmen's PhD Research Project

Introduction

This research is conducted by doctoral researcher Gokhan Gokmen as part of his PhD research, supervised by Prof. Peter McKiernan at Strathclyde Business School. Gokhan is a seasoned and curious scholar who previously worked and completed trainings in the maritime and logistics industries and holds an MSc degree in Marine Transport with Management from the Marine School of Science and Technology of the University of Newcastle Upon Tyne. Prof. Peter McKiernan holds several academic, managerial and consultant positions at Strathclyde Business School, Vesalius College, Vrije Universiteit Brussel APS Bank, University of Malta, University of Notre Dame, Australia Dean, and British Academy of Management and many more throughout his well-established and renowned career.

What is the purpose of this research?

The purpose of this research is exploring the uses of planning tools and forms of foresight the companies use in the shipping industry in order to find out how do the stakeholders look ahead of the future. The research also aims to gather the opinions of the participants regarding the potential future directions of this research and what other questions do they think would contribute to the industrial knowledge in strategic management and maritime shipping domain.

The predominant reason for investing in this research is discovering the stakeholders' perception of the future in the shipping industry, investigating how they make sense of the future as well as the uses of strategy making tools, and the impacts of scenario planning. Most of the business and management research that focus on the shipping

industry so far have neglected the aspects of current long-term planning practises in industry as well as the human factor within it. Therefore, instead of relying on extrapolation of historical shipping data and forecasting, this research takes a qualitative approach, and consequently, this research project and the following data collection and analysis will shed light on foresight, managerial cognition and strategy making practises in industry as well as receive feedback in terms of the future directions of this research.

By taking part in this research project, you will receive insights on how the industry stakeholders overall and sectors in the shipping perceive the future, how do stakeholders operate and navigate their businesses against the future unknowns. Additionally, by measuring the impact of scenario planning on the participants, some participants who did not have prior knowledge on that will be able to discover that effective foresight tool, experience it from a reliable and expert source and have the opportunity to further discuss, learn, and should they wish, build strategies based on the outcomes which will be shared by the researcher once the results are available. Although the research is planned to be published in primarily research papers and presented to scientific communities, such processes are highly time consuming and long journeys, in some cases publishing a research paper can take up to three years. Therefore, another opportunity the participants seize by taking part is acquiring the most up-to-date results while it is fresh and highly relevant. Such knowledge can contribute to company competitive advantage.

Do you have to take part?

No, you do not have to. It is at participant's discretion to take part in the research therefore, the participation is completely voluntary. Refusing to participate or withdrawing participation will not affect any other aspects of the way a participant is treated (i.e. participants have a right to withdraw from the research without detriment).

What will you do in the project?

If you want to be a part of and contribute to the project, doctoral researcher Gokhan Gokmen will need your skype details and set up an appointment with you for an online interview. The time slots and availability will be discussed, and a suitable slot will be

agreed by e-mail. However, once the appointment is set, the researcher would expect the participants to stick with the agreed time slot. However, given an early notice, rescheduling the appointments will be possible.

In overall, research data collection will include interviewing participants individually and distributing and collecting Delphi survey questionnaires. The interview duration is anticipated to be approximately 60 minutes. During the interview, the researcher will ask you questions and start the conversation on the topics mentioned previously in this document. The interview questions will include the followings:

1. Can you introduce yourself and the company you're currently working? (Aiming to learn and confirm participant full name, job title, the number of years being in the current position and previous work experience as well as education received).
2. Can you talk about strategy making processes in your company? (Aiming to learn and understand how strategy making happens, what processes, tools and other means of strategy making is performed)
3. How do you make sense of the future and the future uncertainties?

The three questions above will then be expanded based on the interaction between the interviewee and the interviewer.

The Delphi survey will ask the participants the following questions:

1. Can you introduce yourself and the company you're currently working? (Aiming to learn and confirm participant full name, job title, the number of years being in the current position and previous work experience as well as education received).
2. Can you talk about strategy making processes in your company? (Aiming to learn and understand how strategy making happens, what processes, tools and other means of strategy making is performed)
3. How do you make sense of the future and the future uncertainties?
4. What are your ideas on the following future shipping scenarios? (Aiming to understand whether the scenarios are considered plausible, surprising, comprehensive, internally consistent, and each element will be inquired with separate questions in the survey)
5. What elements and parts of the scenarios would you like to change? Why?

Why have you been invited to take part?

If you have been invited to take part in this project, then that means you have been identified as a potential contributor and satisfy the research requirements. The participants who are invited to this project are the stakeholders in shipping who have either a responsibility for strategy making and long-term planning in the shipping industry, relevant sectors or are specialised in that domain. The stakeholders can be / from shipping agencies, port authorities, ship-owners, freight forwarders, shipping financiers, insurers, manning and procurement, consultants, academics, NGOs.

What information is being collected in the project?

Two types of information will be collected during the interviews and survey. First type is personal information that are, full name, the name of the organisation worked within, the duration of work experience, any relevant previous work experience, and if applicable the degree(s) and its place(s) received. Those data will be your identifiable data and will be used for descriptive purposes.

The second type of information are the answers you give to the interview and survey questions. Apart from the research aims detailed in the related section, due to semi-structured nature of the interviews, the researcher may ask you other relevant questions in line with research objectives.

Who will have access to the information?

The raw information, which are the personal details, interview records and transcripts, survey responses will be accessed by the chief researcher who also is in this instance the interviewer himself and the supervisor Prof. Peter McKiernan. Should a participant wish to be pseudo-anonymised, this will be done by assigning a code name. If the participant wishes to proceed with this option, the published study or the studies based on the data provided by this project will include only the participant code name rather than the full name. The code names can be assigned to the interviewee's name as well

as the company they work in (e.g. company X). Due to the need for a more transparent dissemination of the study results, the industry being worked at should be clearly declared in the study which will serve as part of the PhD thesis. In case of the project as a whole or a part gets published as a research paper or by other means of channels, the industry information will remain as agreed herewith.

Additionally, the participant's professional position (e.g. the position you hold in the organisation/company) will not be pseudo-anonymised. However, if the participant wishes to be referred in the study by a more general way, such terms; top manager, middle manager etc. can be used for the convenience of the participant. However, the participant should inform the chief researcher accordingly.

Should the participant wish the data to be destroyed following the completion of the thesis and publication of the study as a research paper or other means of dissemination of the study, the chief researcher will make sure the information provided by the participant safely be destroyed in accordance with the EU data protection laws.

Where will the information be stored and how long will it be kept for?

Information will be collected on researcher's personal laptop and should the participants give consent for recording the interview, initially this will be simultaneously done on the device. The personal laptop will be ensured to have the latest security updates and complimented with an anti-virus software to ensure participant information anonymity. Later the data will be transferred to the Strathclyde Business School provided work PC and a copy of them will be saved on Strathcloud which is a secure university electronic data storage. Following this, any interview data temporally saved on the personal laptop will be permanently deleted. Furthermore, the data will be encrypted by an encryption software. Only the researchers Gokhan Gokmen and Peter McKiernan will have access to data which will be stored in the work PC until successfully passing the PhD viva and graduation. After receiving the degree, the data will be destroyed in accordance with the EU data protection laws. According to the university RKES guidelines, the completed research data should be stored in Pure, which is the data repository for research undertaken at University of Strathclyde. This will be done according to the university rules.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

Please also read our [Privacy Notice for Research Participants](#)

What happens next?

If you wish you take part in this research project, please kindly get in touch with the chief researcher Gokhan Gokmen by e-mail: gokhan.gokmen@strath.ac.uk

Participants who would like to take part in this research will receive the study results once the researchers finalise the data analysis and have the results.

Your initial contact will be followed by asking you to sign a consent form to confirm this.

If you wish not to get involved in the project thank you for your attention.

Researcher	contact	details:
Gokhan	Gokmen,	Gokhan.gokmen@strath.ac.uk
E-mail:		gokhan.gokmen@strath.ac.uk
Address: Hunter Centre for Entrepreneurship, University of Strathclyde, Strathclyde Business School, Stenhouse Building, Level 4, 199 Cathedral Street, Glasgow G4 0QU, UK		

Chief	Investigator	details:
Peter		McKiernan
E-mail:		peter.mckiernan@strath.ac.uk
Address: Hunter Centre for Entrepreneurship, University of Strathclyde, Strathclyde Business School, Stenhouse Building, Level 4, 199 Cathedral Street, Glasgow G4 0QU, UK		

This research was granted ethical approval by the University of Strathclyde Ethics Committee.

If you have any questions/concerns, during or after the research, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Secretary to the University Ethics Committee
Research & Knowledge Exchange Services
University of Strathclyde
Graham Hills Building
50 George Street
Glasgow
G1 1QE

Telephone: 0141 548 3707

Email: ethics@strath.ac.uk

Consent Form for the Shipping Industry Stakeholders

Name of department: Hunter Centre for Entrepreneurship

Title of the study: Gokhan Gokmen's PhD Research Project

- I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
- I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e. how it will be stored and for how long).
- I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
- I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request. This includes the following personal data:
 - video recordings that identify me;
 - audio recordings of interviews that identify me;
 - my personal information from transcripts.
- I understand that anonymised data (i.e. data that do not identify me personally) cannot be withdrawn once they have been included in the study.

- I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
- I consent to being a participant in the project.
- I consent to being audio and/or video recorded as part of the project
Yes / No

(PRINT NAME)	
Signature of Participant:	Date:

A.5. Appendix 5: Letter of Invitation to Potential Participants and Participant Information Sheet for the Scenario Developers and Users

/ University of Strathclyde Business School Logo/

Letter of invitation to potential participants

05.02.2021

Dear /add name/,

I am [Gokhan Gokmen](#), a doctoral researcher from Strathclyde Business School working with [Dr Peter McKiernan](#). We are researching scenario-based strategy practices in the shipping and energy industry to improve the scenario-based methodologies and our understanding of the industries' future. You are a valuable contributor to the field, and we would like to express our sincere appreciation for your contribution.

I am contacting you as a candidate to participate in a short interview, approximately 45 minutes. The interview will help us understand your experiences with the scenario building process: your aims and reflections on the outcomes and your perception of creativity in relation to the scenarios.

We offer our research findings to the participants in multiple formats. A brief outlining our findings will be circulated to you. I will also prepare a personalised video and talk through the findings and recommendations that you may find useful and apply on your future projects. Additionally, a one-to-one discussion on the research findings will also be available to you.

Pseudonymisation technique is applied in this study. We do this by assigning a pseudonym – fictitious - name to study participants, e.g. participant V, part of scenario building team of ‘scenario study name’. Interviews take place on Zoom or Skype at a time convenient to you. A detailed participant information sheet and consent form about the study with this letter is included.

Yours

sincerely,

Gokhan Gokmen

/University of Strathclyde Logo/

Participant Information Sheet for the Scenario Developers and Users

Name of department: Hunter Centre for Entrepreneurship

Title of the study: Gokhan Gokmen’s PhD Research Project

Introduction

This research is conducted by doctoral researcher Gokhan Gokmen as part of his PhD research, supervised by Prof. Peter McKiernan at Strathclyde Business School. Gokhan is a seasoned scholar who previously worked and completed training in the maritime and logistics industries and holds an MSc degree in Marine Transport with Management from the Marine School of Science and Technology of the University of Newcastle Upon Tyne. Prof. Peter McKiernan holds several academic, managerial and consultant positions at Strathclyde Business School, Vesalius College, Vrije Universiteit Brussel APS Bank, University of Malta, University of Notre Dame, Australia Dean, and British Academy of Management and many more throughout his well-established and renowned career.

What is the purpose of this research?

This research serves two purposes by interviewing the scenario developers for the shipping industry. First, the study draws on previously conducted systematic literature

review on the scenario planning effectiveness to test and develop scenario planning effectiveness theory further. Second, the doctoral researcher aims to give the scenario developers voice and discuss the creativity in the scenario narratives that they facilitated building or personally took part in creating/writing.

Do you have to take part?

No, you do not have to. It is at participants' discretion to take part in the research; therefore, the participation is entirely voluntary. Refusing to participate or withdrawing participation will not affect any other aspects of how a participant is treated (i.e. participants have a right to withdraw from the research without detriment).

What will you do in the project?

If you would like to contribute to the project, doctoral researcher Gokhan Gokmen will set up an appointment with you for an online interview. The time slots and availability will be discussed, and a suitable slot will be agreed by email. However, once the appointment is set, the researcher would expect the participants to stick with the agreed time slot. However, given an early notice, rescheduling the appointments will be possible. Interviews to take place on Zoom, which is licenced by the university.

Research data collection methods is semi-structured interviews. The interview duration is anticipated to be around 45 minutes. During the interview, the researcher will ask you questions to kick off the conversation on scenario planning aims and creativity in the scenario narratives.

Why have you been invited to take part?

You have been invited to take part in this project due to your valuable contributions to the shipping and energy industries in the strategic foresight domain. Participants who are invited to this project are the scenario developers for the shipping and energy industries who have published the scenarios in research journals, other electronic media or presented at the conferences.

What information is being collected in the project?

Two types of information will be collected during the interviews. First type is personal information that are, full name, the name of the organisation worked within, the duration of work experience, any relevant previous work experience, and if applicable the degree(s) and its place(s) received. Those data will be your identifiable data and will be used for descriptive purposes.

The second type of information are the answers you give to the interview questions. Apart from the research aims detailed in the related section, due to semi-structured nature of the interviews, the interviewer may ask you other relevant questions in line with research objectives.

Who will have access to the information?

The raw information, which are the personal details, interview records and transcripts will be accessed by supervisor Prof. Peter McKiernan and the doctoral researcher who also is in this instance the interviewer himself. Should a participant wish to be pseudo-anonymised, this will be done by assigning a code name. If a participant wishes to proceed with this option, dissemination of the study or studies based on data provided in this project will include only participants code name rather than their full name. The code names can be assigned to the interviewee's name as well as the company they work in (e.g. participant V, company M). Due to the need for a more transparent dissemination of the study results as well as the interviews' contributing nature to the secondary data analysis of the scenarios, participants' relevance to the scenarios and the industry being worked at should be clearly declared in the study which will serve as part of the PhD thesis. In case this research project as a whole or a part gets published as a research paper or by other means of channels, the industry information and the interviewees' relevance to their associated scenarios (e.g. participant V, part of scenario building team of "scenario study name") will remain as agreed herewith.

Additionally, the participant's professional position (e.g. the position you hold in the organisation/company) will not be pseudo-anonymised. However, if the participant wishes to be referred in the study by a more general way, such terms; project manager, project assistant, top manager, middle manager etc. can be used for the convenience

of the participant. However, the participant should inform the chief researcher on this request accordingly.

Should participants wish their personal data to be destroyed following the completion of the thesis and publication of the study as a research paper or other means of dissemination of the study, the chief researcher will make sure the participant identifier information safely be destroyed in accordance with the data protection laws.

Where will the information be stored and how long will it be kept for?

Information will be collected on researcher's personal laptop and should the participants give consent for recording the interview, initially this will be simultaneously done on the device. The personal laptop will be ensured to have the latest security updates and complimented with an anti-virus software to ensure participant information anonymity. Later data will be transferred to the Strathclyde Business School provided work PC and a copy of them will be saved on Strathcloud which is a secure university electronic data storage. Following this, should participants wish so, any interview data temporally saved on the personal laptop can be permanently deleted. Furthermore, the data will be encrypted by an encryption software. Only the researchers Gokhan Gokmen and Peter McKiernan will have access to data which will be stored in the work PC until successfully passing the PhD viva and graduation. According to the university RKES guidelines, the completed research data should be stored in Pure, which is the data repository for research undertaken at University of Strathclyde. This will be done according to the university rules. Lawful basis for processing data for this research is public task. This means individuals' rights to erasure and data portability do not apply. However, individuals do have a right to object. See ico.org.uk for more information.

Thank you for reading this information – please ask any questions if you are unsure about what is written here.

Please also read our [Privacy Notice for Research Participants](#)

What happens next?

If you wish you take part in this research project, please kindly get in touch with Gokhan Gokmen by email: gokhan.gokmen@strath.ac.uk

Participants who would like to take part in this research will receive the study results once the researchers finalise the data analysis and have the results.

Your initial contact will be followed by asking you to sign a consent form to confirm this.

If you wish not to get involved in the project thank you for your attention.

Researcher	contact	details:
Gokhan	Gokmen,	Gokhan.gokmen@strath.ac.uk
Email:		gokhan.gokmen@strath.ac.uk
Address: Hunter Centre for Entrepreneurship, University of Strathclyde, Strathclyde Business School, Stenhouse Building, Level 4, 199 Cathedral Street, Glasgow G4 0QU, UK		

Chief	Investigator	details:
Peter		McKiernan
Email:		peter.mckiernan@strath.ac.uk
Address: Hunter Centre for Entrepreneurship, University of Strathclyde, Strathclyde Business School, Stenhouse Building, Level 4, 199 Cathedral Street, Glasgow G4 0QU, UK		

This research was granted ethical approval by the University of Strathclyde Ethics Committee.

If you have any questions/concerns, during or after the research, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact:

Secretary	to	the	University	Ethics	Committee
Research	&	Knowledge	Exchange	Services	
University		of		Strathclyde	

Graham Hills Building
50 George Street
Glasgow
G1 1QE

Telephone: 0141 548 3707

Email: ethics@strath.ac.uk

Participant Information Sheet for Scenario Developers and Users

Name of department: Hunter Centre for Entrepreneurship

Title of the study: Gokhan Gokmen's PhD Research Project

- I confirm that I have read and understood the Participant Information Sheet for the above project and the researcher has answered any queries to my satisfaction.
 - I confirm that I have read and understood the Privacy Notice for Participants in Research Projects and understand how my personal information will be used and what will happen to it (i.e. how it will be stored and for how long).
 - I understand that my participation is voluntary and that I am free to withdraw from the project at any time, up to the point of completion, without having to give a reason and without any consequences.
 - I understand that I can request the withdrawal from the study of some personal information and that whenever possible researchers will comply with my request. This includes the following personal data:
 - video recordings that identify me;
 - audio recordings of interviews that identify me;
 - my personal information from transcripts.
 - I understand that anonymised data (i.e. data that do not identify me personally) cannot be withdrawn once they have been included in the study.
 - I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
 - I consent to being a participant in the project.
 - I consent to being audio and/or video recorded as part of the project
- Yes / No

(PRINT NAME)	
Signature of Participant:	Date:

A.6. Appendix 6: Multiple Case Study Interview Questionnaire

Interview Questions:

I. If a colleague of yours asked you, “what is scenario planning?”, based on your own practice, what would you tell them?

II. Why did you create the future scenarios?

III. What was the result in relations to your aims?

IV. Will you tell me what creativity means to you?

V. How about in the scenario planning context?

VI. What of the futures you developed through the scenario building exercise did you find creative?

VII. What ideas in the scenarios you found creative?

VIII. Can you elaborate on this sentence that I came across in the scenario narrative? e.g., what did you mean by ‘new technologies’?

IX: “It’s been argued that a creative idea, product or problem solution is novel, surprising and of value. In line with this definition, it’s been suggested that the higher number of creative ideas in the scenarios are associated with a more effective scenario planning practise for their developers. Do you agree or disagree with these?”

- a. “Why do you think this way?”
- b. “How strongly do you think this – very strongly, fairly strongly, or not at all strongly?”

X. What would you do differently?

XI. What did you expect me to ask, and I did not?

A.7. Appendix 7: Application of Worksheet 1 for the Cases Studies



Figure A. 1: Application of Worksheet 1 for the case studies

Source: Adapted from Stake (2006, p. 5)

A.8. Appendix 8: Case Reports

A.8.1. Case 3

Case 3 was a product of a well-known ship engine manufacturer's effort to understand the underlying dynamics that could shape or affect the maritime industry and describe the future actions that might plausibly unfold. The company's essential goals were to stress-test its strategy, learn about the developments in the industry and be better prepared to tackle future uncertainties.

Three participants contributed to the case through interviews: an external expert-facilitator, an internal expert who contributed to the scenario project by an interview and one internal expert-practitioner from the client company, positioned in the strategy team who was part of the scenario team. The chief consultant, Billie, worked for a consultancy company while conducting the scenario project. Rafael Ramirez inspired the consultancy company. According to Billie, Rafael Ramirez followed Shell-inspired the scenario school promoted by Kees van der Heijden and Oxford Futures. The internal expert-practitioner, Ingrid, supported the scenario planning project with the rest of the strategy team. The third person – internal expert – was one of the interviewees in the scenario planning project. The third person formed the mini-case in case 3.

The project started around the 2008 financial crisis and continued during the crisis. Billie and Ingrid had different opinions on the timing of scenario planning in terms of how the project coincided with the financial crisis. Billie suggested that the project had begun at the time of the crisis. According to Ingrid, the project started before the financial crisis. Both interviewees agreed that the project continued during the crisis and ended in 2010. Ingrid further explained that the company was still committed to the scenario project despite the financial crisis. However, its influence was felt and resulted in a longer completion duration than initially aimed. That was because the resources allocated to the project later had to be shared between other departments.

The scenario project started with a meeting where the representatives of the company and the consultants. They discussed the expectations of the company from the project

and the boundaries. Billie informed the author that the budget was not a problem for the company. Finally, the company's expectations, available time, and budget were considered, and Rafael Ramirez's scenario planning approach was decided to be pursued.

The following stage of the project was desk research and interviews with the experts. The company assigned a reference team and tasked them with choosing several experts inside and outside of the company from different geographies, competencies, and backgrounds. The participants were knowledgeable, visionary, and outspoken. A core team was also created and progressed in coordination with the reference team. The core team was responsible for desk research and documenting the interviews. The interviews were conducted with experts from the maritime industry, for example, shipping companies and offshore drilling companies. In addition, reputable experts such as Martin Stopford also joined.

The next stage was the orientation workshop. Several keynote speakers gave speeches, and this was followed by the practitioners' input to the scenario development stage. The orientation workshop aimed to reveal the practitioners' understanding of industry uncertainties. Billie explained:

...There was also several inputs from external speakers on those workshops... the work was mainly done by internal resources, which for me, is quite key. Because then the learning is embedded in the organisation. If you have a consultant to do the scenarios, you'll get a nice set of scenarios, but you don't learn anything. So you have to do them themselves yourself. That... what we had external speakers on the workshops, to inspire, and challenge and then all the external experts, we interviewed just to have alternative views on how world might go on. But then the scenario project team was of course, 100%, the company people, plus a couple of consultants, me and a colleague (Billie, facilitator)

The next stage was a scenario-building workshop. The workshop started with the keynote speakers' talks. The workshop included all the uncertainties identified previously. It aimed to build the scenarios. Two top key drivers chosen for the scenario

building were economic growth and fossil fuel use. After building the scenarios, they were checked through interviews

The last stage was a final workshop that followed the previous processes as an affirmation process. The workshop also was an opportunity to look at scenario consequences. The company's scenario team – facilitators and internal experts – was present in the workshop. Three scenarios were developed at the end.

The company employees wrote two scenarios. Billie wrote the third one. It was because the company employee responsible for the narrative could not complete the task. Three scenarios were produced at the end.

The chief consultant Billie evaluated the scenario planning project as successful. He said:

...when the initiative was launched, the shipping industry was hit by the financial crisis 2008. So, everybody saw order books, going down, cancellations... So the timing was far from perfect... the timing was a disaster, to get attention to the future, when you had very immediate problems to do to solve. But nonetheless, people started to see that 'okay, you cannot only put your attention to the immediate crisis, you have to put your attention to the long-term challenges, and build your thinking and strategy based on that.' So I am quite sure that when we were running the scenario project, and all the management team was involved. It helped them to balance between the immediate problems and ready strategy for the longer term. Otherwise, if there wouldn't have been this scenario, initiative, I do think that they would have indulged them into the immediate crisis and not being able to look more ahead (Billie, facilitator).

Ingrid evaluated scenario planning as a valuable process.

... (it was) enjoyed and particularly appreciated not only from the people directly working with the scenarios, but from the top management when we

had workshops and so on. It was a very good opportunity for them to step out of the normal day to day business and think a bit outside of their normal box, if you want to think about it. So that was a very positive process, which I will say, we achieved what we were expecting throughout the process (Ingrid, practitioner).

Torin made up the mini-case. He was interviewed at stage three before the scenarios were finalised. His involvement in the scenario development was limited to the part where he was asked to review the scenarios. He explained:

...when I was interviewed, I didn't know what the outcome would be either... They just asked questions. So, they had a handful of people that went around interviewing key people in the industry, most of them outside the company, but some insight, and I was one of those who have been interviewed inside... So it was just a colleague that interviewed me, not one that I even knew very well, who had a question and asked about future things about the marine industry (Torin, internal expert).

He was later also asked to develop ship concepts related to the scenarios. The request came after the scenarios were fully formed and were planned to be presented at an international shipping conference in Europe. An industrial designer supported the process by visualising the ship concepts. The concepts went through iterations. For instance, a nuclear-powered container vessel design was discarded following the Fukushima disaster in March 2011 (BBC NEWS, 2021).

According to Torin, one of the ship concept designs was LNG fuelled. It was because the company at the time was trying to promote the LNG fuelled engines. Torin did not consider the LNG option a new idea, confirming Ingrid's statement. The company already had LNG powered engines designed.

...the first concept I did with LNG was back in 2001. And even that was not for... kind of that was when the first vessels came out... the millennia shift. So... it wasn't there. But at that time... it was still a feeling that would be a

fuel. But we wanted to promote it, but it's also one of the fields that is still out there. As such, so yeah, we used LNG (Torin, internal expert).

Other concepts included autonomous vessels. The presentation of the scenarios at a conference was to inform the maritime stakeholders and also receive publicity.

... three ship concepts we made to get a little bit of more tangible feeling to what the scenarios were all about, but also draw more attention from the maritime media, because this was still done for media for the maritime business. The company, of course wanted to gain as much publicity as possible.

To a certain extent, he found scenario planning effective, stating that scenario planning could “bring out some insights and confirm certain trends and then point in certain direction”.

The issues faced:

- Although the budget was not restricted, there was not a budget for extravagant things, e.g., leaving the office and doing the SP workshops outside of the office
- The project was launched just before the financial crisis and continued during, which meant that the scenario development duration extended more than it was initially planned
- Follow-up research on identified themes was conducted for some time, but it later stopped.
- Participants were tempted to choose one scenario over another.
- Checking the scenarios against validation criteria such as plausibility was the final stage, and it was implemented by talking to the people. The chief consultant perceived it “as a lighter touch”. The reason for it was the energy in the project was consumed and there was a pressure to finalise the work. Moreover, considering the financial pressure of the market, they needed to wrap up the project.

The hierarchy in Finnish culture is flat. Billie and Ingrid stated that there was not a marginal hierarchy between the higher-level managers and the lower-level employees

during the scenario workshops. The timing of the scenario planning project coincided with the 2008 financial crisis. It was considered both positive and negative. As a result, the scenario development stages took longer to implement and finalise.

The scenarios appear to be of normative type. Passive involvement is observed. The choice of scenario planning methodology is intuitive logics.

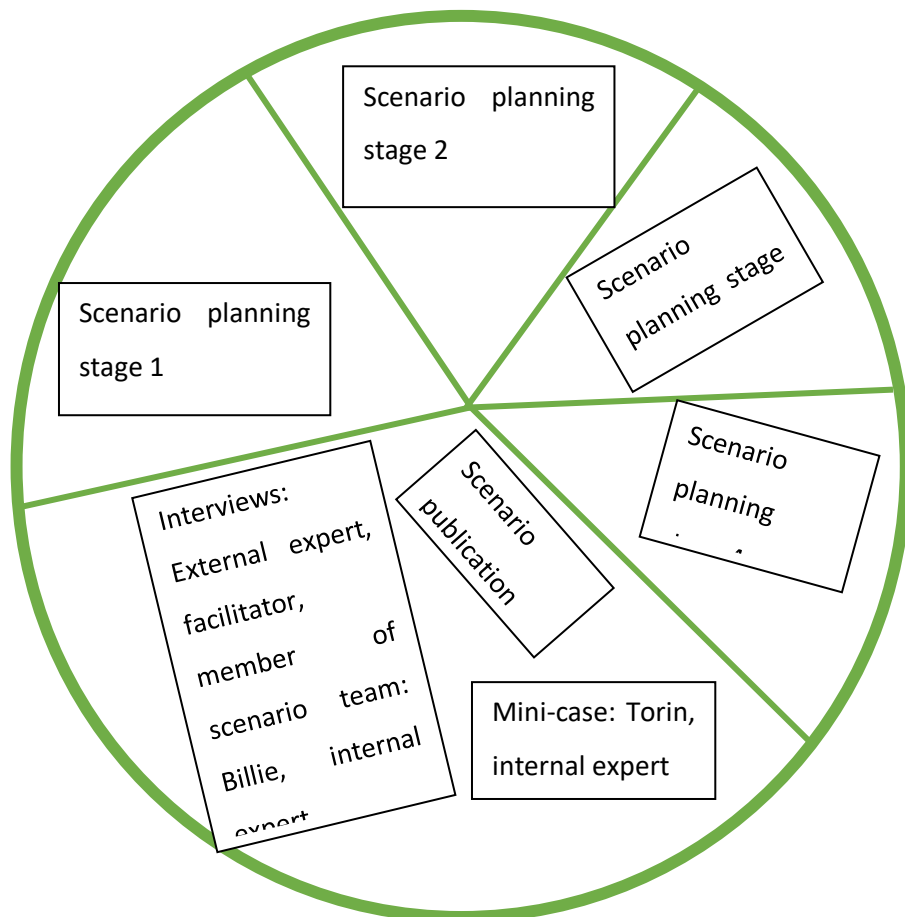


Figure A. 2: Graphic design of Case Study 3

Source: Adapted from Stake (2006, p.5).

A.8.2. Case 4

Port of Groningen is a public limited company with one shareholder, which is the Dutch Government. They are a development company that serves the industrial area via two ports. The ports were initially built to serve the petrochemical industry. The port of Delfzijl was developed in the 1950s following the discovery of gas and salt in the area. The depth of the port was only nine metres. Following the port of Delfzijl, the Port of Eemshaven was constructed in Eemshaven. It is approximately 20 kilometres away from Delfzijl. The port of Emmshaven was constructed as a deep seaport, and the original idea was to build a port as competitive as the port of Rotterdam. However, when the port of Eemshaven was finished in 1973, the world faced an energy crisis that started in 1974-1975. Adrie described the position of the port as the following:

... the development as the port of Eemshaven was designed as the petrochemical deepsea port, it did not come through at all. So, we were left with a port, which had no goal which had no target and no success and despite of all kinds of developments, like the building of a banana terminal and whatever. It was so called sick child (Adrie, practitioner).

Adrie is an employee of the seaports, an internal expert-practitioner, and contributed to the case by interview. According to Adrie, they noticed that the Port of Rotterdam used scenario planning to build its vision. Groningen Seaports did not want to stay behind of Port of Rotterdam. At the time, Groningen Seaports were looking for ways to grow. They previously realised that they had the land and renewable energy to offer. Datacentres turned out to be the right fit for the port. The ports had the space to rent, well-connected internet infrastructure and renewable energy to match datacentres' needs. After attracting big names to the ports, such as Google, Groningen Ports started to look for other means of attracting businesses. They also felt the need to increase employment and add value to the region. The scenario planning project was mainly developed due to those reasons. The project started in 2011.

The scenario project started with reviewing the literature on other scenario studies, looking at what other ports did in strategy development and finalising the expectations

for the port's own scenario development process. A consultant was hired, but their name was not provided. Adrie and her colleagues were actively involved in the desk research process.

In the continuation of the process, 20 different meetings took place, aiming to answer the same questions with the same facilitators. The process aimed to gather an understanding of the future of the seaports. Internal and external expert knowledge was sought and gathered at this stage, leading to the scenario development stage. A scenario workshop was hosted, and 168 participants from different maritime sectors joined (Groningen Seaports, 2012b). The scenario development stage followed the scenario axis approach. Scenario workshop participants – practitioners – agreed on key drivers and uncertainties. Finally, four scenarios were created.

The scenario creation stage was followed by vision development. Finally, Groningen seaports chose the green growth and built their vision on it. The process from the idea to finishing the report Port Vision book took over two years.

The following key uncertainties were chosen for the scenarios' construction:

- Economic growth
- Green society

Issues encountered:

- Hosting over 150 participants in the workshop was an extremely challenging task which involved heavy administration work,
- Hydrogen was missed out entirely in the scenarios,
- The literature review part was found bias-inducing as Adrie felt that she was looking at the elements that might come along just as reported by others.
- The timespan of the scenarios was 20 years, but they're already outdated
- If scenario planning outcomes get outdated this quickly, it might be seen as an issue
- Scenario planning may not be used again as its not considered modern science anymore

- Port of Rotterdam did scenario planning, but they missed digitalisation
- Most scenario plans are similar.

Groningen Ports have looked out for opportunities for years. The initial defeat period while they were unavailable to attract cargo in the traditional seaport sense resulted in looking out for unconventional options. The organisation is competition driven and looks for unique offerings to differentiate itself from other ports.

The scenario type appears to be of descriptive type with plausibility orientation. The scenario planning methodology is intuitive logics.



Figure A. 3: Graphic design of Case Study 4

Source: Adapted from Stake (2006, p.5)

A.8.3. Case 6

European Union changed its political control mechanisms by restructuring its maritime department in the past decades. Directorate General Fish (DG Fish) was transformed into DG Mare in 2008 (politico.eu, 2008). Another reconfiguration of the department followed it to emphasise and support cross-border cooperation in the union (Mot, 2011) and broaden its scope. The process resulted in creating the DG Maritime Affairs and Fisheries. Following the process, DG Maritime Affairs and Fisheries called for tenders for a project. A research-based consultancy company won. Two company consultants, Maheen and Lamar, contributed to the case by interview.

According to Lamar, DG Maritime Affairs and Fisheries aimed to open up and recognise the maritime activities as there was much more out there. Looking at the seas as a broader domain and focusing on maritime activities would help them achieve their goal. DG Maritime Affairs and Fisheries had the idea of thinking ahead into the future in relation to the maritime economies that might develop. However, their side did not think clearly about what scenario planning approach could be used. Both Maheen and Lamar applied scenario planning on different projects before. Two consultants – external expert- facilitator – and their colleagues started working on the project in December 2010 (Wolters *et al.*, 2013).

They applied two methodologies in the project. The first methodology was “a trend extrapolation mainly based on EUROSTAT data” (Maheen). The second methodology was based on the scenario planning application suggested by Van der Heijden (2005). This case study is constructed based on the second methodology, the long-term plausible future scenarios that they developed. The research stages the consultants applied were as follows:

The first stage was desk research, where the consultants selected 13 marine sub-functions based on top rankings by size, recent growth and future potential. This stage was concluded with a draft scenario logic. Two key drivers were chosen to build the scenarios: sustainability and economic growth.

The second stage was conducting in-depth studies on subsectors through reviewing the literature and conducting in-depth interviews with key stakeholders. The in-depth interviews supported the scenario development stage. Finally, a team workshop concluded the stage based on the literature review and interview findings. The workshop was used to develop the scenarios, but they remained unfinalised.

The third stage was looking at the future potential of 11 maritime economic activities. This was the stage where the consultants were enabled an intermediate hearing from the EU commission. The scenarios were presented to DG Maritime Affairs and Fisheries. Two findings that came out of two different methodologies were presented. The meeting also served as a means of elaborating the long-term future scenarios' narratives and discussions on the findings. The consultants also aimed at stakeholders' ownership of the scenario through their contribution. It was a one-day meeting. The meeting included around a hundred people from the maritime sectors that the project investigated. The project ended in 2012.

The consultants observed the following issues:

- Difference between academic and the political approach was an issue. This was further explained as the following "... because what you see often is that policy makers are not interested in uncertainty. They want to present a plan and say 'hey this is going to help us out in the future'" (Maheen).
- The consultants fulfilled the "less uncertainty" demand given by DG Maritime Affairs and Fisheries. The development of "micro- futures fulfilled the request". It was a trend exploration mainly based on EUROSTAT data.
- The consultants said they would have done a workshop with DG Maritime Affairs and Fisheries and maritime stakeholders. However, they did not do it for this project. Instead, they presented the unfinalised scenarios to them and asked for their input for their completion.
- The consultants were unsure whether the clients – scenario users – got the message the scenarios were expected to deliver.

- Scenario users with agendas caused difficulties in the process, e.g., not being open to the ideas about the industry's future for instance, where possibility X was not favourable to group A's future expectations.
- The scenario users did not "or did not want to" understand that they could not determine which scenario might actualise because of the exogenous factors. The consultant perceived the attitude of EU Maritime Affairs and Fisheries as they thought they had to power to control the exogenous factors.
- Understanding of the scenarios varied among the scenario users due to cultural differences.
- One consultant observed that the scenario users fixated on one scenario only and did not consider the other three.
- Scenario users' time constraints were perceived as an issue by one consultant.

Politics appeared to be one reason the consultants experienced difficulties getting the long-term future scenarios' messages across to the European Commission. According to the consultants, taking policymakers along with scenario planning was a struggle. Lamar explained:

... it was not easy actually to get across the methodological messages. Because they didn't always fit well the policy agenda of the European Commission.

Culture was also brought up by Lamar. He compared his previous experience with another scenario planning project that was done in the Netherlands. He referred to the scenario planning approach by Van der Heijden (2005) as the Shell method and explained:

... and I think that the experience was different realm in Dutch context. Because as I mentioned before probably there's a bit more openness or use in the Netherlands to scenario planning than in in some other countries.

The scenario type appears to be of the normative type with passive involvement. The scenario planning methodology is intuitive logics.

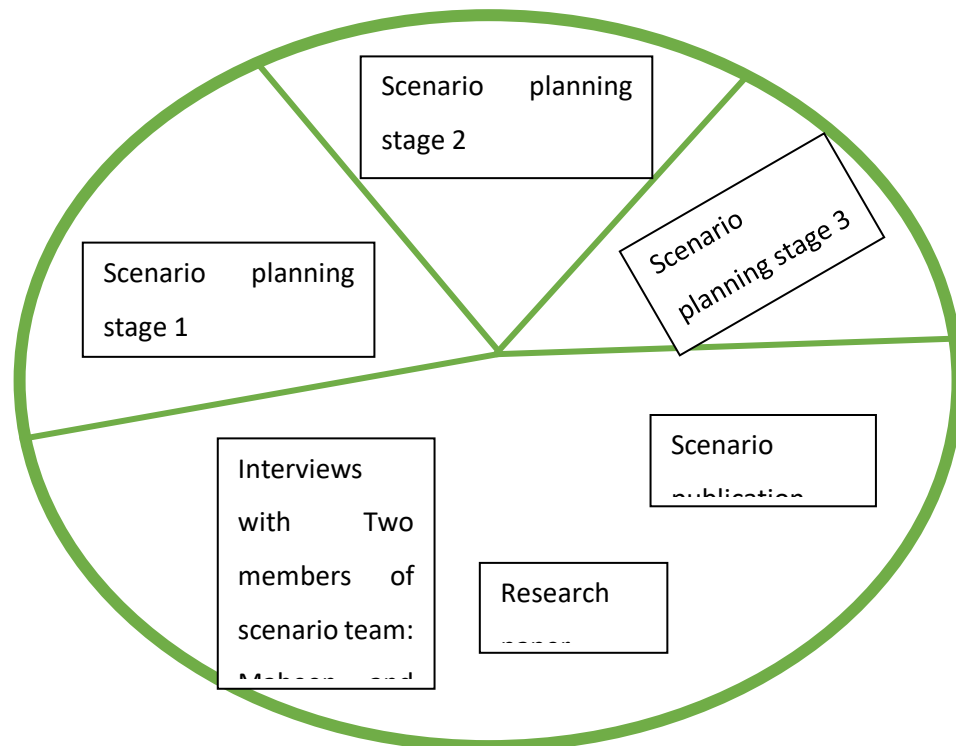


Figure A. 4: Graphic design of Case Study 6

Source: Adapted from Stake (2006, p.5).

A.8.4. Case 7

The CEO of Port of Rotterdam at the time of the scenario planning project requested a consultancy firm to apply Limits to Growth scenarios in the Port of Rotterdam context. The scenario adaptation (Akker *et al.*, 2013) was published in 2013. Several consultants teamed up for the project. One of them, Zi, contributed to the case through an interview. Zi is referred to as a scenario team member in this case.

As a negotiator, the consultancy firm previously helped the Port of Rotterdam on a land-extension project. The relationship between the port and the firm later continued with the scenario project. The founder of the consultancy firm was a member of the Club of Rome. Limits influenced the CEO of Port of Rotterdam to Growth by Meadows and Randers (2012). The firm's founder and the port's CEO got together and decided to adopt the Limits to Growth into the port context. The port at the time was in the process of updating its port vision covering 2030. The scenario project was

expected to contribute to their vision development. Zi further explained that internally the port also had the chance to think about its core functions and question them, asking questions such as “who are we as a port of Rotterdam? Are we only about moving boxes or is there role in the world different from the one we have? What would that look like?” Zi explained:

“So we decided not to follow a very strict mathematic approach, but more... use very different sources to interpret the outcomes from Limits to Growth into a context that was relevant for the Port of Rotterdam and try to make some recommendations”

The first stage of the project was reviewing the literature. At this stage, the consultants dove into the Limits to Growth scenarios. The strategy team of the port also collaborated at this stage, discussing the scenarios with the consultants. The literature review involved looking at other scenario studies from different fields such as energy, e.g., Shell, international energy, and publications from independent research groups. The purpose of doing a comprehensive literature review was to explore the fields the Limits to Growth did not cover, for instance, energy types. The literature review also helped give the port context to the scenarios.

The second stage was conducting interviews with experts. Experts’ backgrounds included climate change and circular economy.

The third stage was choosing the scenarios from Limits to Growth. Again, the choice was made by the consultants – scenario team – taking the findings of the past research as well as their expert judgement. Zi explained:

“... the kind of standard scenarios that any company might want to use. So simply extrapolate growth. So that's the reason for choosing these scenarios. And then of course, there's always the question, okay, “but can't efficiency and technology save us?” So that was the reason for including that one. And I think the original nine or ten, or even more scenarios, that's academically may be interesting. But if you're advising a company or a client, then you should never make nine scenarios because there will be too much.”

They decided the ideal number of scenarios would be three. Considering the port context, they chose three Limits to Growth scenarios. Previous desk research findings were used to interpret the chosen limits to growth scenarios.

The fourth stage was running the scenario model and interpreting the findings for the port. The report was presented to the port at the end.

Issues they faced:

- Having a broader group from the port of Rotterdam would be better. The consultant felt that they did a great job with gathering and analysing external input. However, from the port side, the number of people joining the process was not large.
- The process started top-down, and the consultant thought that interviewing the employees of the port would be a better approach.

According to Zi, the project fed into the port's vision development but factored other knowledge and experiences while working on the new vision. For instance, the port also conducted its scenario studies and had conversations with its stakeholders. Zi also explained that the report was published, and it had generated some attention in the industry. According to Zi, the report helped them in the public relations and sent the message, "okay, we are a forward-looking port, we think ahead, we do this sort of thing no one else is doing." Considering the number of other ports in Europe and the region, Zi interpreted the effort of Port of Rotterdam's effort to brand itself as a future-thinking company and support its competitive position.

The scenarios were adapted from Limits to growth scenarios which are descriptive and

hypothetical orientations.

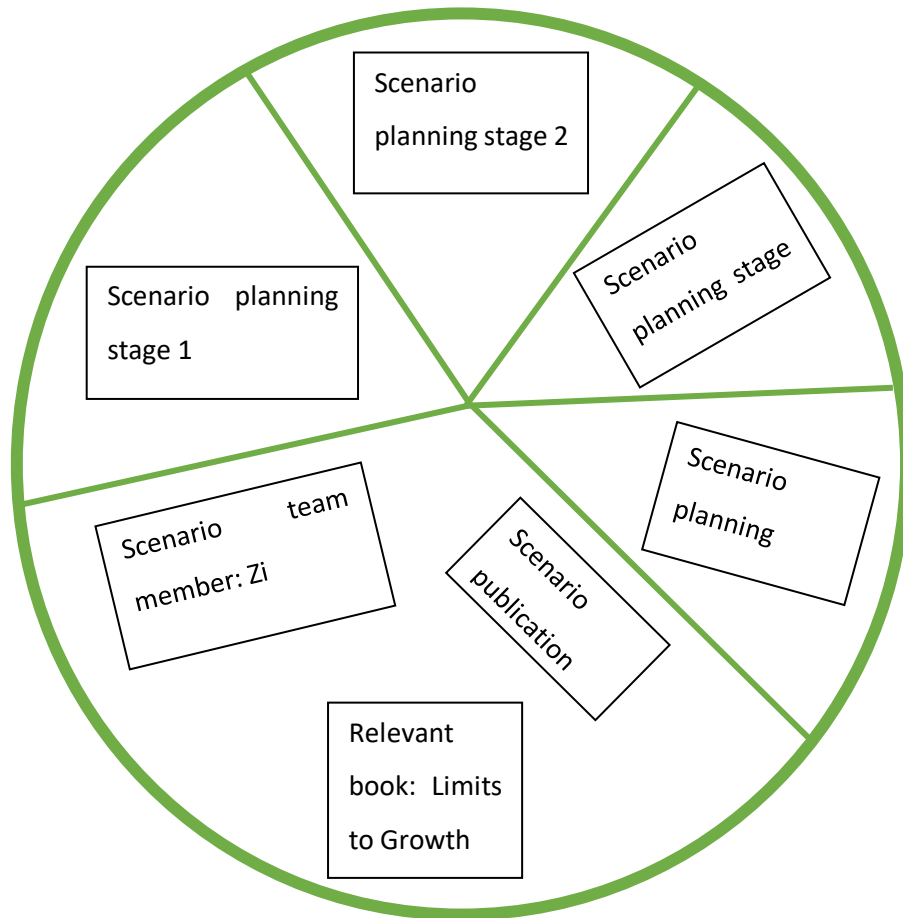


Figure A. 5: Graphic design of Case Study 7

Source: Adapted from Stake (2005, p.5)

A.8.5. Case 8

The scenario project aimed to understand how industrial strategies are created for the maritime sectors. The project started with three authors getting together and creating a scenario team. One of them, Jay, contributed to the case by interview. He is referred to as an internal expert, a scenario team member and a scenario user in this doctoral work. Another interview was conducted with Esmond, who was not part of the scenario creation. Esmond was working at the same company as Jay. Esmond's function in the project was to distribute the scenario publication and connect with an

audience the company does business with. Esmond constitutes the mini case of case 8. He is a scenario user.

Jay explained the motivation behind the scenario project:

The three principal authors needed to understand what was driving our future and what was likely to influence it. And we, so we wanted to understand for ourselves. And then as the more we worked on it, the more we understood that other people wanted to understand that future as well. And so we ended up publishing the book about it. But the in the first place, it was a small project for the three of us. So myself, Strathclyde University, and I had a colleague from Lloyd's Register, who wanted to understand it.

The collaboration allowed them to bring some organisational resources together, e.g. human resources and budget. According to Jay, scenario creation was not a process in their case. They knew it was just a tool available to them, and they used it. Jay further explained:

We didn't work out the full definition of the scenario. We didn't test that scenario for sensitivity against the other factors. We didn't consult widely on the definition of the scenario or how relevant it was.

They applied the scenarios to an economic model. The purpose of creating the scenarios was to drive an economic model. External expert contribution was not sought in the scenario development stage. Jay said that they utilised the company and organisational resources instead. The development of the scenarios relied on the three authors' – the scenario team – brainstorming and discussion sessions. The time frame of the scenarios was from 2013 to 2030. The publication is accessible online (Fang *et al.*, 2013).

Issues they associated with the scenario project:

- Time and resource constraints meant not being able to consult with other people,

- The authors did not “go an awful a lot of depth on the scenarios”,
- They were aware there were much more thorough examples of how to write scenarios,
- They did not see climate change as a top priority, with hindsight recognising that it was very important,
- Scenario planning was not a process but a tool for them,
- They did not work out a full definition of the scenarios,
- They did not test scenarios for sensitivity,
- They did not carry out the thinking processes around the implications for each of the parts of the marine sector,
- Scepticism and criticism received from the maritime journalists: “one or two cynical journalists who wrote about it and said, the maritime sector says the maritime sector is going to be successful”.
- The naval section of the report was relatively slim.

Jay, a member of the scenario team, and Desmond, a non-member of the scenario team, both assessed the scenario project as a success. Jay reported that at the end of the project, they had a much better understanding of the maritime industry and the elements driving it.

Desmond contributed to the case as a mini-case. His interest in the project was mainly around the company's collaboration opportunity with two other organisations the other two authors were affiliated with. He evaluated the project's effectiveness in terms of how much it allowed the company access to maritime stakeholders. Jay and Desmond later heavily promoted the publication by sending digital and hardcopies to many potential clients. They also tracked the web traffic, allowing them to see how many times the publication was downloaded and from what countries.

Three main scenarios made up a big part of the publication. However, the publication also included several disruptive scenarios detached from the main ones. Jay associated them with black swan events, adding “...they were just going to be points in some sort of future, but we couldn’t easily pin them to that spectrum.”

The publication later led to follow-up studies. Some of the follow-up studies utilised the same scenarios. One of the authors proposed the next follow-up study and Desmond jumped on. He said the thought leadership aspect of the first publication was precious. It increased their exposure globally, especially with their naval customers. This time around, Desmond also focused on the inclusion of naval technology.

Scenarios appear to be of descriptive type with plausibility orientation. There is no scenario planning methodology especially followed.

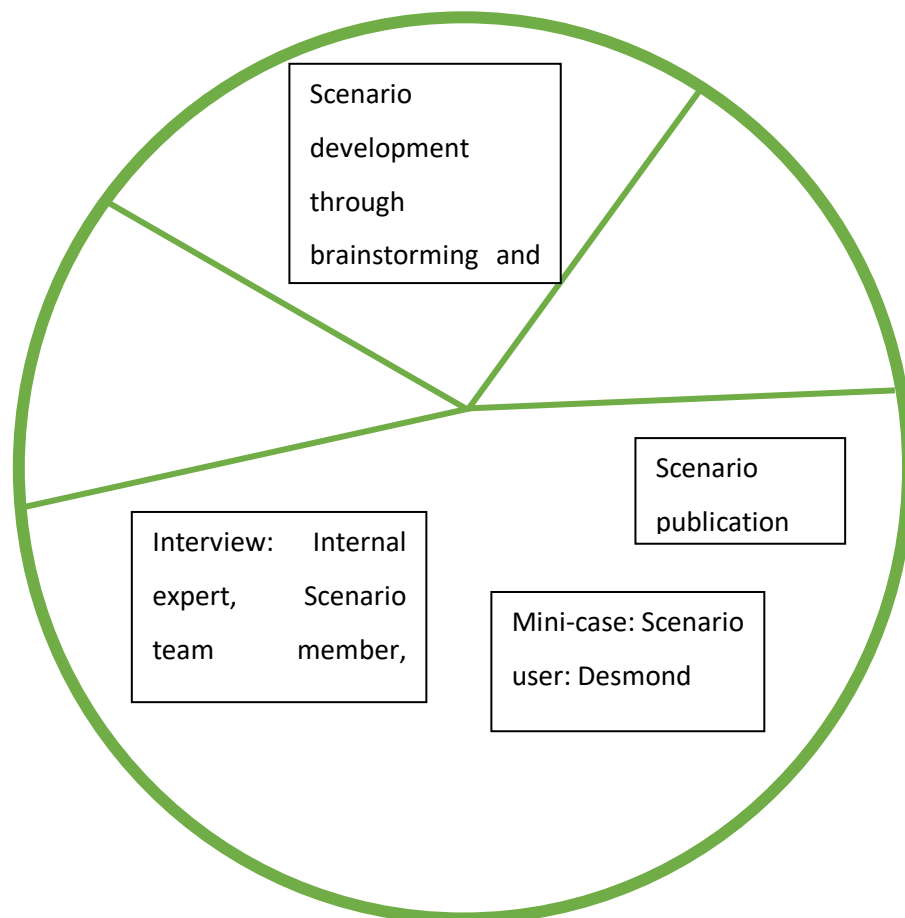


Figure A. 6: Graphic design of Case Study 8

Source: Adapted from Stake (2006, p.5).

A.8.6. Case 10

Directorate General MOVE (DG MOVE) called for tenders to a project. It wanted to review and revise its maritime port strategy for the future. By developing the scenarios, they aimed to channel the output into policymaking. It was seen necessary to identify the uncertainties of the future and the new elements in the future. DG MOVE, the scenario user, wanted to see how the new elements could evolve and how a policy from their side would respond to that.

Sam, a member of the scenario team, contributed to the case by interview. He explained that he and his colleagues, a group of consultants, submitted a proposal, which was accepted. They used scenario planning in the project “as a tool, but it was not end to them”.

The first stage was reviewing the literature. The scenario team – the researchers/consultants – reviewed the literature with a sectorial and policy focus. They also reviewed and analysed the OECD scenarios and translated them into the maritime context. The centre of the context was the shipping business and ports. Sam clearly stated the reason for choosing the OECD scenarios. Shipping is a derived activity; therefore, the scenarios heavily relied on economic development. The variables that might affect the industry's future were started to be collected.

The second stage gathered external expert knowledge from the experts abroad. Expert knowledge input served as a means of gathering additional variables and triangulating the desk research findings.

The third stage was an internal group meeting where the consultants agreed on the impact of the variables.

European Commission, the scenario user, was not involved in the development of the scenarios. Instead, they were involved “in kind of steering group from their site”. It meant the finalised scenarios were presented to them.

According to Sam, the consultants dealt with the key variables that impacted the port and maritime sectors' evolution in the future. So, from that point of view, the European Commission was happy.

The issues faced:

- No client involvement in the process
- No in-depth feedback, e.g., “they never communicated on what they actually did with the scenarios”.
- Consultants did not ask for feedback on the use of the scenarios “We did not take the opportunity (...did not ask them – about the study’s effectiveness, what did it do for them)”
- “It’s really hard to say to what extend they took everything into account”.
- EU Commission was involved in a kind of steering group from their sites.
- The scenario team was familiar with the scenario planning schools however, scenario planning was not their research topic; they used scenarios. They applied the scenarios and developed scenarios but did not research scenario development. For them, it was a tool rather than an end.

The scenarios appear to be of a normative type. With an active narrative, the scenarios stimulate strategic conversations discussing policy options. The scenario planning methodology is undefined, resembling the French School approach.

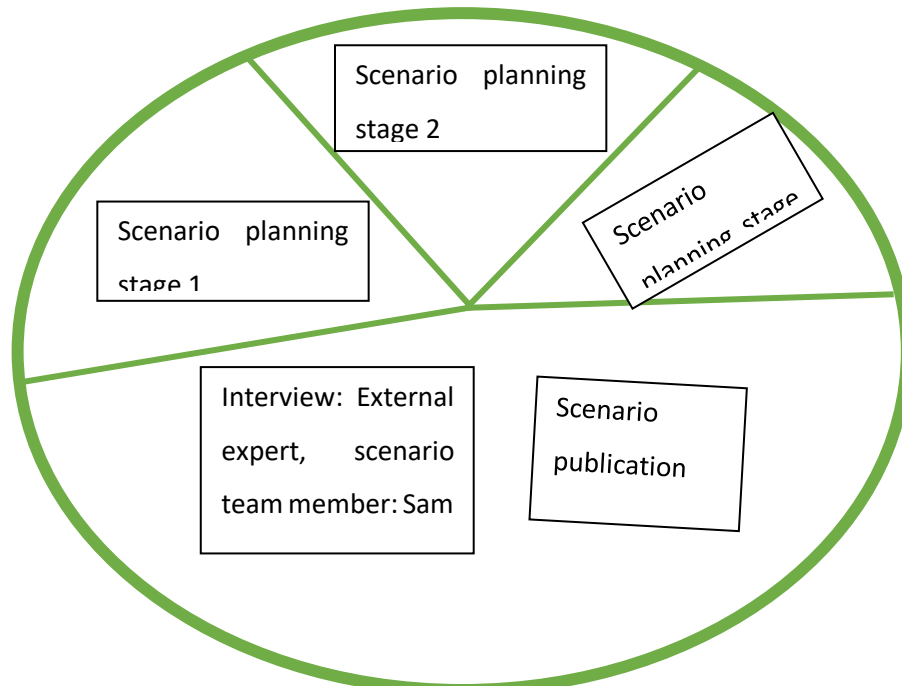


Figure A. 7: Graphic design of Case Study 10

Source: Adapted from Stake (2006, p.5)

A.8.7. Case 13

Two organisations developed the scenario planning project. One of them is an international institute, financing shipbuilding for over sixty years. It publishes market review reports and is well-known in the maritime industry. The other organisation is a consultancy company. The case study identifies the organisations as the scenario teams and the users. It provides consultancy services around entrepreneurship. An employee of the first organisation, Joel, contributed to the case by interview. He led the scenario development, cooperating with the second organisation. Joel is an internal expert, a

member of the scenario team and the scenario's⁵² user. He explained the starting point of the scenario creation:

...the reasons why we reached out to ... was... to try to understand how is the venture capital landscape, and how is the start-up landscape evolving around digital space in the shipping industry?

Joel further explained that the interaction between the two organisations started in 2018, and it was the early days of the shipping industry's interaction with the start-up and digital new technology scenes. However, the difficulty with the shipping industry was that the vessels were highly divided in terms of the shared standards, which also applied to data generation and recording aspects.

The scenario teams from two organisations aimed to understand how the shipping industry applied new technologies and how the industry worked together with the start-ups. From the ship finance institute's perspective, the retention rate of the loans was an issue. After the 2008 financial crisis, the return of invested capital decreased in the shipping industry. Therefore, the scenario teams aimed to identify the new ways of doing business by discovering other business models new to the industry. They felt that helping their customers see a way forward was their responsibility.

The scenario report was not completed by following the academic literature on scenario planning. Instead, since the motivation was trying to understand how other industries used digital technologies to upgrade their business models, the scenario teams decided to investigate other industries.

The first stage was looking at other capital-intensive and global industries, e.g., airline, real-estate, automotive, and locomotive. The key factor chosen for the scenario was digitalisation.

⁵² The scenario development process produced only one scenario.

The second stage was reviewing the literature. It was done by reading a variety of studies. Two teams from two organisations completed the second stage.

The following stage was writing the scenario narrative. The process generated one scenario and therefore, there is one scenario narrative. Joel wrote it.

Issues detected by the interviewee were:

- Report structure-related issues, e.g., writing it simpler would have been a better approach,
- The outcome of the research findings was not immediately published as the findings were considered “too digital”,
- Two organisations did not initially agree on the degree of digitalisation’s influence on the scenario; this was solved by finding a common path,
- The publication was “less forward” than they would like to say today.

The scenario appears to be of the descriptive type with plausibility orientation. The scenario planning methodology is an unidentified version.

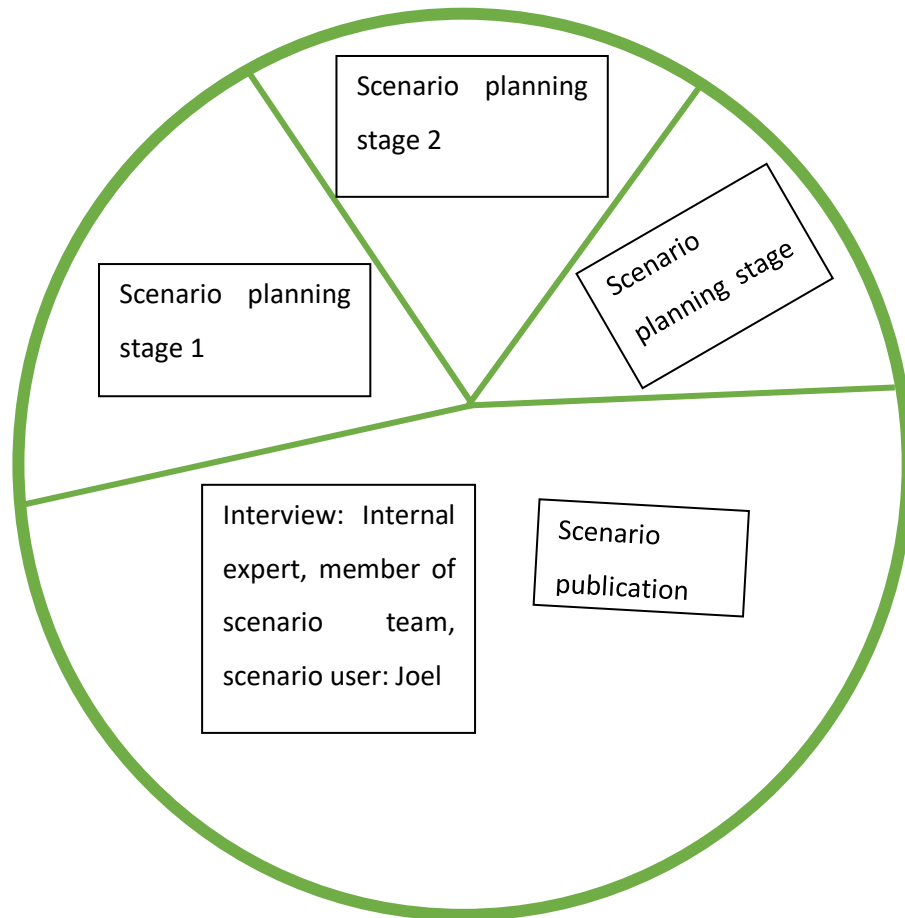


Figure A. 8: Graphic design of Case Study 13

Source: Adapted from Stake (2006, p.5)

The maritime industry lacked technological advancement, mainly from the digitalisation perspective. One reason for that perception was the decision-makers in the industry. They were perceived as lacking sufficient knowledge about digitalisation and what it had to offer. The industry's pressure on the researchers manifested itself in the form of not writing the scenario as directly as they had hoped. The reason for this was the thinking of being unable to publish it because the scenario narrative was too digital for the industry in 2018.

A.8.8. Case 14

The European Commission and the European MSP platform, the scenario users, started a project to understand and support the maritime sectors in the Gulf of Finland and

Archipelago Sea areas covering Finland and Estonia in 2016. The project consisted of four work packages, Work package 1 involved scenario development aiming to demonstrate the region's potential for sustainable blue economies (European Commission and European MSP Platform, 2019). The project, including work package 1, was conducted to support the efforts of maritime spatial planning in Finland, considering cross-border agreements. Two researchers, external experts- the scenario team, were responsible for the work package 1 part of the project. Work package 1 aimed to discover the future of maritime activities in the Gulf of Finland and Archipelago Sea areas covering Finland and Estonia from a maritime spatial planning perspective. Work package 1 from thereon will be referred to as the project since the other work packages are not in the case's scope. The project produced 4 scenarios looking as far as the year 2050. Despite its focus on maritime spatial planning, the logic behind sampling this scenario project is that maritime transportation makes up a considerable chunk of the scenarios.

The project started with the identification of blue economy sectors. A Delphi survey followed it. The Delphi survey sample was chosen from various stakeholders living in the projects' geographical coverage. According to the scenario team, the purpose of applying the Delphi method was to get a glimpse of what participants thought about the area's future. The survey was chosen as a data collection method because the project was responsible for covering a large stakeholder group. The scenario team explained:

We did not want to start the scenario building from scratch because there was a really large stakeholder group (because the scenarios had to include all actions affecting MSP in the Gulf of Finland). Therefore, we needed a grasp of dozens of people's opinions (representing different fields of expertise) from an extensive set of issues rather quickly to build the base for the scenario workshops (Dane and Whitney).

The following stage of the project was continued in a workshop setting where 'learning café' method was applied. Practitioners were chosen from various stakeholders living in the projects' geographical coverage. At the same workshop, practitioners were also

introduced to map drawing phases of the project. Drivers were evaluated in this stage of the project as well. The workshop ended after completing the scenario team's instructions.

The project's next phase was implemented in another workshop where the participants helped the development of future images. The scenario team used the term " future images " synonymously for future scenarios. Futures table was used to construct the scenarios. Scenario axis method was not preferred by the team. According to them:

We rejected them because they provide a rather narrow ("old-fashioned") approach to the complex regional planning topics with multifaceted, overlapping, and interconnected issues. Instead, futures tables, futures images and paths as well as backcasting fit better to the regional scenarios (explanatory note added to the interview transcript document by Dane and Whitney).

Future images were later commented on by the stakeholders (practitioners). The information derived from them was recorded by the scenario team.

The last phase was the further development of the future images. In this phase, the scenario team members compiled the data they gathered from the workshops and the Delphi survey. They discussed the workshop and Delphi survey findings to finalise the future images. Several iterations were required in the process. The team created short narratives or short descriptions and then checked them against the findings. Iteratively, the phase continued until the team was satisfied with the version of the scenarios and agreed that they were fully developed. The phase was described as an artistic work. The last phase resulted in the development of four future images.

During the project, the scenario team experienced and reported several issues:

- Delphi survey was found to be too much time-consuming by both the survey participants and the scenario team,
- Combining the Delphi survey results, workshop outputs and future images was found difficult by researchers. The reason for this was mainly the future images that they were tasked with building were an "artistic work",

- Delphi dropouts were considered an issue,
- Due to the two countries' involvement in the project, the survey participants from Estonia and Finland were sent the questionnaire in English. During the workshops, the language barrier occasionally caused problems since both countries' practitioners needed to communicate in English.,
- Some practitioners were afraid of speaking creative ideas they had for fear of reputation – credibility loss,
- Practitioners' mindset and the time they committed varied and caused issues.
- Applying scenario planning to spatial planning was found difficult by the scenario team,
- Practitioners had their agendas to defend in the scenario development process,
- Work package 1 was not used in Finland's official maritime spatial planning. The team expressed discontentment about the decision, adding that the Plan4Blue project was “kind of a rehearsal project”.

The team brought up the Finnish culture as a differentiating factor of the region from other countries.

...in Finland we don't have that kind of class society or hierarchy, so if you are minister, then you are high in here too, but, otherwise, it was more about the people's personal properties, what kind of people they were...(Whitney).

The political context was brought up by the team and repeated throughout the interview. Stakeholders' lobbying activities and agendas were perceived as detrimental to the success of scenario planning.

The project was finalised and published in 2018. The publication included background information on the work package, the future images, and a summary. It can be accessed online (Pöntynen and Erkkilä-Välimäki, 2018).

The scenarios appear to be of dynamic type. The scenario planning methodology shares similarities to intuitive logics. However, the scenario team did not use the scenario axis method for scenario development. Instead, they opted for the futures table. The process was participatory.

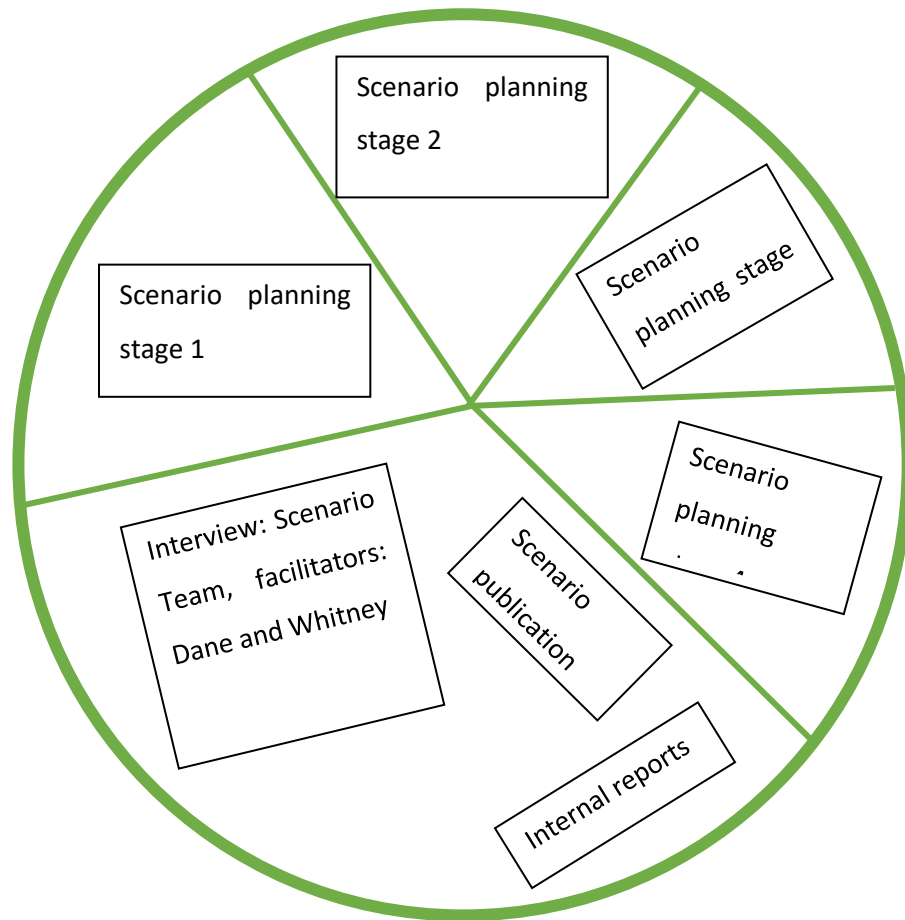


Figure A. 9: Graphic design of Case Study 14

Source: Adapted from Stake (2006, p.5).

A.8.9. Case 15

Three scenario developers, the scenario team, led the development of the scenarios. One of them, Kieran, contributed to the case by interview. Kieran is an external expert, facilitator, and member of the scenario development team. He also shared supporting

materials with the author with the condition of not quoting them in the doctoral work⁵³. The project was mixed-methods qualitative and quantitative. The MATISSE-SHIP model accompanied the qualitative scenarios. The model functioned as the simulator of the four scenarios. Further information about the model was published in scientific journals and as a book chapter, e.g. Köhler (2020); Moallemi and Köhler (2019). Kieran illuminated the author about the project as the following:

The project was initiated when an organisation, a private marine engine producer company, approached Fraunhofer to conduct a scenario study in 2019. The organisation wanted to position itself as a forward-thinking company by looking at the shipping industry's future in a general way. It also wanted to illustrate future possibilities for propulsion technology. The scenarios covered a long-time span until 2050.

The project started with the researchers exploring the STEEPL factors. The process produced 47 factors. The following step was the prioritisation of initially identified factors. Factsheets accompanying per key factor were then produced.

The second stage eliminated some of the initial factors through expert interviews. The interviews were aimed to investigate the participants' future assumptions for 2050. The interviewees' expert validation of future assumptions was also sought. The interviews were detailed and conducted with a large range of stakeholders. 20-30 participants were interviewed. The number of factors was reduced to 15.

The third stage was the scenario-building phase. It was an internal workshop with the scenario team members of Fraunhofer. In the third phase, key factors' influence analysis was conducted to develop ranking. Fraunhofer's scenario building tool is similar to the futures table tool that is popular in Finland. Following the analysis,

⁵³ The author adheres to his request and only use provided information to triangulate the interview data to ensure his understanding of the scenario development process is accurate.

scenario drafts were developed. The drafts included narrative descriptions and a quantitative model.

The final stage was the scenario interpretation and finalisation. A final external expert-practitioner involvement in the workshop was a platform to identify challenges for every future scenario presented. The workshop lasted a whole day from 9 am till 5 pm. It was an intense day with scenario presentations and small group discussions. The discussions around the scenarios were followed by finalising the scenario descriptions. The final descriptions were reflected in the scenario narratives and model. Four scenarios were created.

The following key factors were chosen for the scenarios:

- Environmental awareness and regulations
- Global economic development
- Climate change chose as a critical element in the whole system
- Naval architecture and electricity storage technologies as dormant and buffering factors

Digitalisation was a factor considered essential by Kierean but not by scenario practitioners. Kieran stated that digitalisation should have been included, but the participants did not think so.

The following issues were experienced:

- Practitioners' poor understanding of the model
- The model was not built with the practitioners,
- Due to time and budget constraints, re-iteration through discussing the results and running the model again was not possible which might potentially reveal the mistakes if there were any
- No sufficient feedback was received from the client– the scenario users.

Other issues that were raised relevant to the doctoral project's research design:

- Kieran found remembering every conversation that he had with the participants difficult, and making a judgement on participant relevant questions challenging
- The scenario planning project was finalised 16 months before the interview with Kieran. The interviewee reported that more time was necessary to understand the success of the scenario planning application.

The culture of the maritime industry was reportedly conservative, and narrow thinking was prevalent. Kieran also considered policy implementations as the main factor that can change the industry tremendously. Recent talks about sustainability and potential regulations were brought up in the interview. The scenarios were completed and published in 2019 (MAN Energy Solution and Fraunhofer ISI, 2019). It can be accessed electronically. The scenarios appear to be of the normative type with passive orientation. The scenario planning methodology resembles the French School.

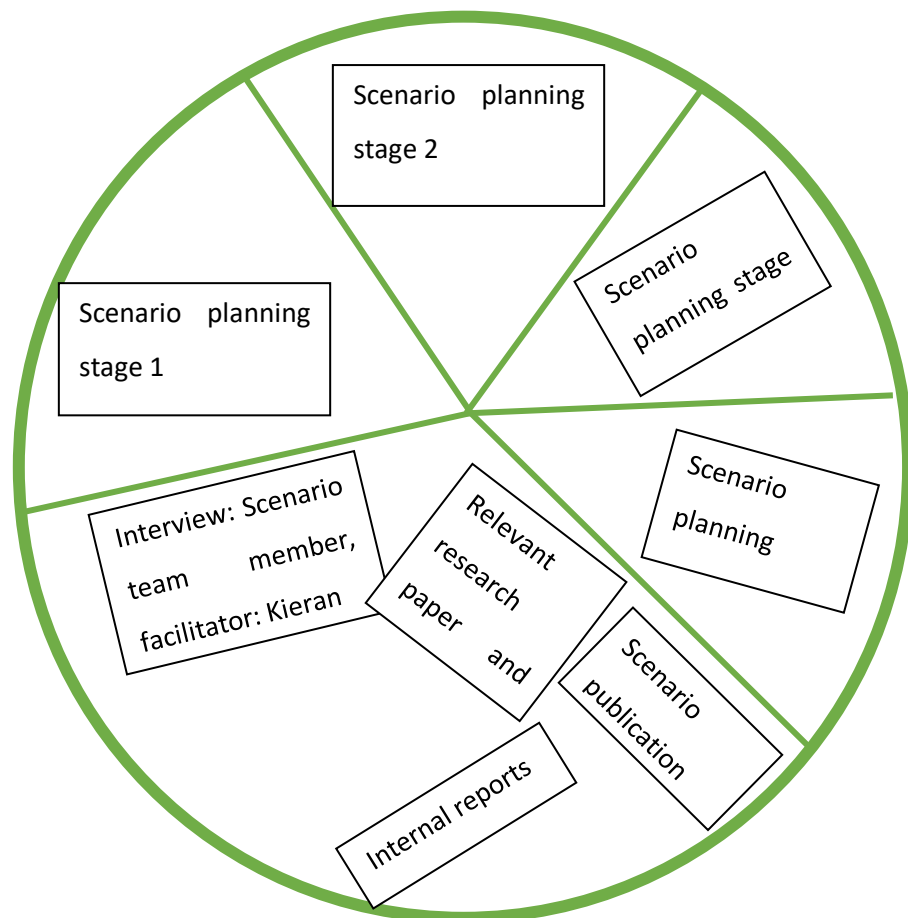


Figure A. 10: Graphic design of Case Study 15

Source: Adapted from Stake (2006, p.5).

A.8.10. Case 16

The Ministry of Environment of Finland, the scenario user, decided to officially commission a scenario project to support Finland's maritime spatial planning practices. The project was open to tenders and a consultant company secured the project. One consultant, Cassandra, contributed to the case study by interview. She was one of the consultants responsible for the background research and scenario planning workshop facilitation. She and the rest of the team also finalised the scenario narratives. The consultants make up the scenario team. They are the external experts and facilitators of the scenario planning project. The interviews with Cassandra were conducted in two sessions.

The Ministry of Environment of Finland's motivation was to understand the region's state at the time. The questions they raised were:

- Who were the different actors in the scene?
- What were the differences in the regions might be in the future?

The consultants, the scenario team, aimed to understand different stakeholder trends and the factors that would influence the environment, considering that the maritime spatial plan was planned to be made for 2050 for the region. The facilitator-scenario team member further informed that the main goal was analysing the operating environment, and the scenarios were a tool for this purpose. However, another important aspect was that the scenario planning allowed broad participation in the project.

The first stage was visiting regional councils, getting a glimpse of understanding the situation at the time in the regions. Then, a literature review was conducted by sampling the reports about the states of the maritime sectors. Finally, a SWOT analysis followed it.

The second stage involved external expert interviews. The scenario team conducted between 20-30 interviews. The interview questions aimed to understand the main

outcomes affecting maritime spatial planning (MSP). For example, what different options did they have? How well the offshore wind power develop in the sea area?

The third stage aimed to develop the futures table. It required bringing different factors into the analysis. The following step was choosing the factors that resulted in different outcomes for different scenarios. Finally, three scenarios were formed. The scenarios were in draft form at this stage.

The fourth stage was conducted in multiple workshops. The workshop participants , practitioners, were provided with reading material informing them on the project aims and scenario planning. Discussions with stakeholders were around the scenarios and the questions such as “what do you think about the scenarios?” “Is it possible?” “What points can be here?”, “What other things would affect the MSP?” were asked. These questions helped assess the scenarios for plausibility and consistency. The scenarios were finalised after this process. Multiple workshops in different regions in Finland were hosted.

“Cassandra: One was a national one, a really big one. And then we had three workshops, each one on each of the planning areas, so far in total, to get that like, for picture, and what are the differences in the areas?”

The author: So all these scenarios were presented?

Cassandra: Yeah, yeah.”

The fifth stage was the vision phase. This phase aimed to build a shared vision after each group of stakeholders wrote down their visions. The scenario team and another consultancy company were responsible for this phase.

The participant, Cassandra, reported the following issues:

- Practitioners did not understand they were not forecasting:
“... maybe they did not know the process and did not read the material, or they did not listen (Cassandra)”
- Report structure: too long and detailed,

- Lobbyists and activists with their agendas were considered problematic by the participant,
- Not everyone in the process felt they were counted and voices heard,
- The scenarios missed out on the black swans.

A mini-case is also created for the case. Ashanti constitutes the mini-case as a practitioner and scenario user. She was one of the maritime spatial planners working on applying the spatial planning of the regions. In addition, she was a participant in the scenario planning workshop.

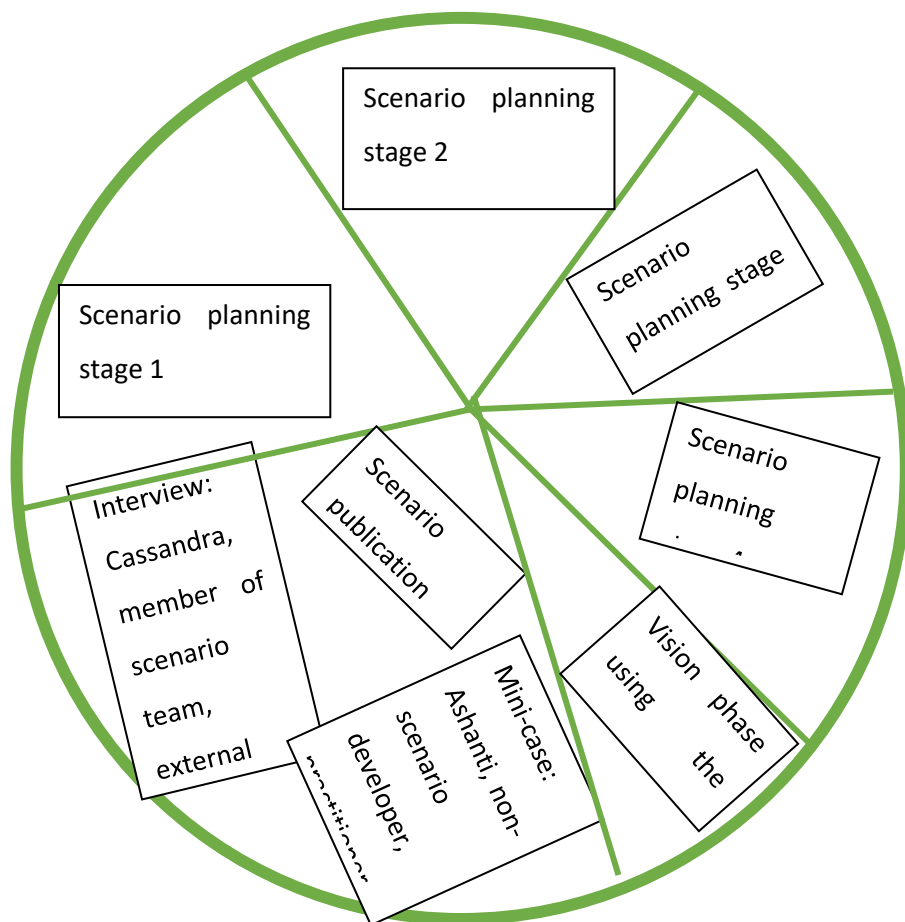


Figure A. 11: Graphic design of Case Study 16

Source: Adapted from Stake (2006, p.5)

Both participants who contributed to the case development strongly observed the political context. Lobbyists and activists were identified in the scenario planning workshops. It was observed to be stronger in the vision phase following the scenarios' conclusion. However, the vision phase is outside of the scope of the work.

Scenarios appear to be of dynamic type. The scenario planning methodology resembles intuitive logics; however, the scenario team used the futures table for scenario construction. The scenario development process is participative.

A.8.11. Case 18

Scenario development was not at the centre of case 18. A research project investigated the Finnish ports, aiming to understand what problems existed in the ports in terms of data exchange and what applications of digital technologies might help solve the problems. Two academics/researchers – the scenario team – contributed to the case by interview.

According to them, the scenarios were created because the whole background project's main goal was to indicate the future developments of digitilisation in port environments. The scenarios served the purpose of presenting the indications and potential futures. In addition, they served as a classification tool to communicate the project's outcomes.

Due to the abovementioned reasons, the project's next stage was scenario development. First, the scenario team identified the megatrends, key drivers and variables, choosing the most relevant drivers and variables to the port sector.

The following stage was the construction of the futures table. Futures tables resulted in the initial development of the scenarios. After that, the researchers prepared a draft version of the scenarios.

The next stage was conducting interviews to ask external experts what they thought about different drivers and what they saw as probable. The interviews supported scenario elaboration and testing.

The scenarios were perceived as successful. Their function in the research was to illustrate the research findings and expand them on positive, neutral, and negative categories. The neutral category was also referred to as business-as-usual.

Issues:

- A fourth scenario was discarded – a surprise scenario –due to the difficulty of constructing it. One researcher stated that it was a “ science fiction kind of a thing... But I could not make it work... so it was discarded.”
- Researchers agreed they could do follow-up research which they did not. One researcher stated “maybe going into more detail into these technologies and different kind of digital technologies and their future, possible uses and so on, might be interesting. Because this is developing very rapidly now”.
- The final version of the scenarios was not sent out to the ports for further feedback.

The project was a developmental one. Considering the philosophy of scientific work the researchers undertook, they stated that the scenario development was kept straightforward as there was no reason to overcomplicate the process. One researcher further explained that the “main point... of scenarios is that they’re combined with SWOT analysis and with PESTEL framework”. The research article (Inkinen, Helminen and Saarikoski, 2021) can be accessed online.

Scenarios appears to be of normative type with passive orientation. The scenario planning methodology is unidentified. The futures table is used for scenario development

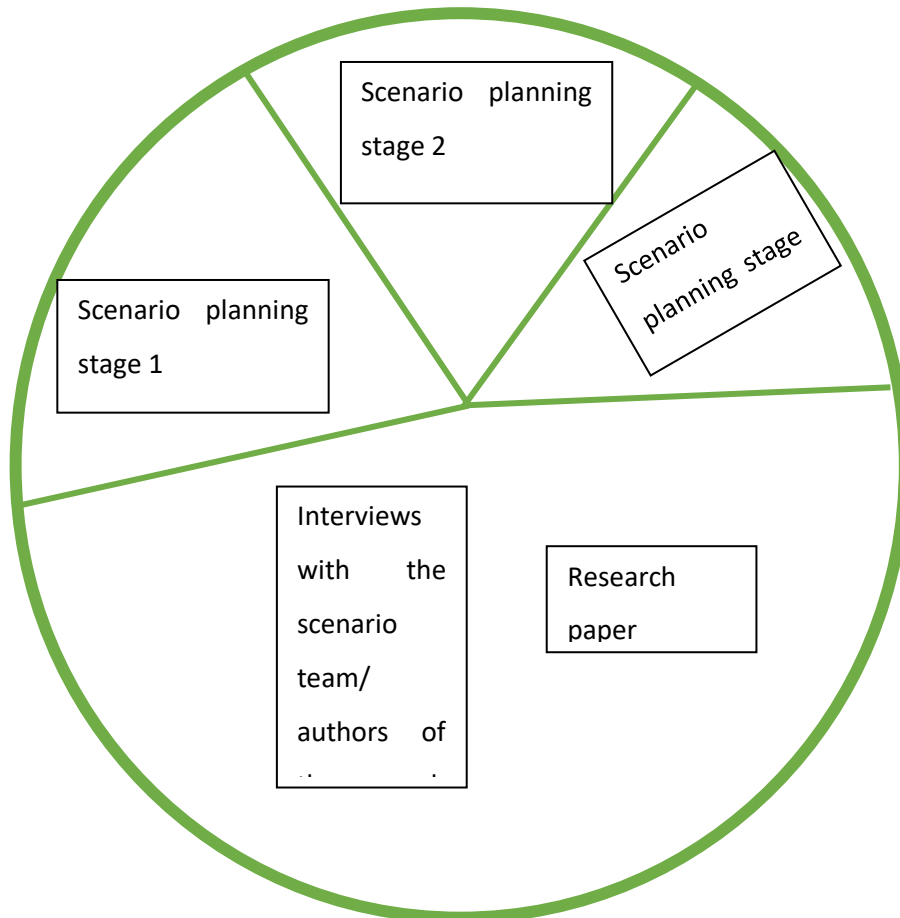


Figure A. 12: Graphic design of Case Study 18

Source: Adapted from Stake (2006, p.5)

A.9. Appendix 9: Deductive and Inductive Qualitative Content Analysis Findings

Foreshadowed Issues

Stake suggests approaching case studies through foreshadowed problems to focus on issue-related problems (Stake, 2006, p.10). Foreshadowed problems provide researchers with "a guide to what to explore but do not constrain the research process to these problems only" (Simons, 2009, p.32). Furthermore, foreshadowed problems may change or be redefined throughout the case study (Simons, 2009, p.32) as data patterns are interpreted and issues are reformulated continuously in the analysis (Stake, 2006, p.10).

Mainly Chapter 2 findings drove foreshadowed issues. The CIS of the scenario planning effectiveness literature resulted in a theoretical framework.

The framework consisted of four synthesising arguments:

1. scenario planning as an enhancing process
2. change
3. requirements and drawbacks of scenario approach and research
4. scenario planning practices and its comparison with other strategy tools.

Twelve synthetic constructs constructed four synthesising arguments.

The author expected to encounter the third synthesising argument in the case studies as foreshadowed issues. It was because the doctoral work continued investigating the effectiveness of scenario planning and the third synthesising argument was developed following:

- adverse/ unexpected effects/ no influence conditions,
- scenario planning may not be for everyone,
- requirements of scenario planning, and
- measurements issues.

The author approached the findings from the quintain perspective – the role of creativity in scenario planning effectiveness. Based on the CIS findings and his creativity literature review, the author’s expectations established the initial foreshadowed issues. It meant that some of the synthesising constructs would be prominent in the cases. However, other synthetic constructs would not be as significant, given that the findings were not based on empirical studies investigating the role of creativity scenario planning. Therefore, a general scenario planning and creativity literature was the second source of foreshadowed issue identification. The third source was the author’s subjective creativity assessment findings of the cases. The following foreshadowed issues were finally identified:

Scenario planning practitioners should be able to make their voices heard for creativity to impact scenario planning positively.

Creativity’s role is questionable in making any desired impact on policymaking scenarios considering the lack of creative ideas in the scenario policymaking scenarios and previously reported ineffectiveness of SP in policymaking.

At the end of the scenario planning application, the practitioners are less likely to be surprised by the outcome of the scenarios in which the author did not identify any surprising ideas. It is also because scenario planning was also found ineffective for the degree of surprise in the literature.

The cases where the author did not identify creative ideas are unlikely to challenge the scenario planning practitioners' and developers' status quo thinking. The scenario planning literature is already slim in terms of evidence supporting the “breaking free from normal thinking” phenomenon.

The scenario developers are afraid of creativity. It is caused by the fear that it can lead to dysfunction in the scenario development process, and the bias against creativity contributes to it.

Plausibility and consistency concerns as well as the novelty and usefulness trade-off lead to an overemphasis on plausibility, usefulness and consistency, leaving novel ideas aside to be discarded.

Multiple case study findings were further analysed using deductive qualitative content analysis. The synthetic constructs were assigned as the main categories in the analysis. The remaining interview extracts were analysed inductively after completing the deductive analysis process. This appendix presents the framework in light of additional evidence gathered through the multiple case study interviews.

The synthesising Arguments

A. Scenario planning as enhancing process

This synthesising argument was constructed around the perceptions of participants on the effectiveness of scenario planning. Multiple case study findings are presented below.

The Perceived Role of Scenario Planning

Previously, several perceived roles of scenario planning were presented. This construct is further developed following the interviewees' articulations on scenario planning. Ten interviewees talked about their perception of what scenario planning does for its users and what SP contributes to based on their experiences and observations. While the interviewees' responses were aligned with the literature review, additional and new insights were also gathered.

The interviewees reported the following roles:

- thinking about the future,
- vision development,
- developing policies,
- cross-border co-operation,
- understanding the maritime industry,
- giving room to think and understand others,

- democratic future building,
- creative thinking,
- capacity building, and
- reaching the sense of ownership.

The SP's role was perceived as a space for people to think about the future.

I think that the scenarios are important in, as we said to give people room to think and understand other parties so, even though they are not very useful when you are actually planning something. They had the opportunity to think about the future, and that was what we wanted them to do (Case 14, scenario team member/facilitator, external expert, Whitney).

And also I think because of some literature review, we have done. You have been... forced to think about the future as the producers of the Port Vision (Case 4, internal expert/practitioner/scenario user, Adrie)

... it's (SP) helped them also internally, in thinking about the future, so that's I think the reason also why we call to report updating the future it was for them also a way to internally update their forward looking (Case 7, scenario team member, external expert, Zi)

SP outputs also served as a sales and marketing tool. It was achieved by improving the company image and repositioning the company as a forward-looking company.

Desired Impact of Scenario Planning:

Several desired impact areas were observed. They were as follows:

- Abilities gained,
- Thinking/ learning
- Discussions
- Enhanced understanding,
- Transformed understanding

- International Attention, Brand Promotion and Sales

Another desired impact of SP was its ability to capture potential futures. The scenarios were reportedly able to capture the future changes:

... we see in a little bit, the whole three of them (scenarios) happening is in today's society. So they did pick up on a lot of, of these trends. I mean, you look at the geopolitical tension has grown quite a lot. And we see more kind of nationalist countries pulling out basically securing their own thing (Case 3, mini-case, internal expert, Torin)."

Abilities gained:

Analysis revealed several abilities that were gained through applying scenario planning. These were:

- Ability to label certainties and uncertainties
- Ability to develop scenarios
- Ability to think about the future in scenarios

Thinking – learning:

Analysis revealed that SP improved thinking and learning aspects through:

- broadening horizon: the barrier to thinking about uncertainties were lowered, the mentality was changed, and assumptions were challenged,
- changes in thinking: not thinking in silos, complementing thinking style,
- thinking outside of normal box, promoting thinking about what needs to be done,
- feedback loops through the process – part of a continuous motion of thinking
- questioning their roles in the industry

Learning during the scenario processes happened in the form of participants learning from each other. Additionally, learning and personal growth were associated by an interviewee:

... the learning was sure that a number of people that were engaged in the programme, in the process really became much more strategically mature. They learnt a lot, they grew a lot... and as one of the guys in the core team, Leonardo Sonzio is today... at AP-Moeller Maersk Yeah. Okay. So if you are there in that position, you have learned something on the way... So other people in their team has got very senior positions in Wartsila also. So that is one learning that people grow, and people start to see much more options. Scenarios really help you to see options (Case 3, Billie).

Discussions

In some cases, SP facilitators reported conflicting viewpoints among scenario workshop practitioners leading to fierce discussions which were perceived as fruitful. Discussing the consequences of the impact of each scenario appears to contribute to strategy making in the later processes. Discussions during SP workshops also were considered “discussions would not have happened otherwise”. However, discussions did not happen in every case, and encouraging discussions did not always pick up by every crowd. Openness, conflict management skills, and the level of discussions appeared to be associated.

...and to be honest, I don't think that they could build any good connections during both phases (scenario and vision) either. So in that area, for some reason our planners, they didn't even though they met face to face these people, they weren't able to collaborate. So, to say this is up to the persons and how they act and they're not trained to handle conflicting situations. So although I am I couldn't do it by myself, I tried to collide our planners to fishermen and fish farmers, but for some reason, there was no development between those, this marine sector and planners during the whole planning (process). (Case 16, mini-case, practitioner, external expert, scenario user, Ashanti)

In other workshops, discussions and brainstorming in a participative platform were observed.

For example, some industries that were maybe most pessimistic towards the future... so they were like, we have done this in the same way for 100 years, the industry won't change. And then you have a few advocates for the change, maybe participants from the actual firms, or the other ways, very futures thinkers. So it's not just the facilitators and me like telling them, it will change, but it is also the people that we gather around... and then they also spread... information (Case 16, scenario team member/facilitator, Cassandra).

Enhanced Understanding

Analysis revealed two closely linked forms of understanding through the analysis of multiple case studies. Transformed understanding was observed due to the involvement of creativity in the process, as presented in Chapter 6. However, enhanced understanding, in general, was also observed. The following examples of enhanced understanding areas are a summary of both types:

- accepting there were many things that could have different outcomes
- showing change is inevitable
- understanding the industry of focus better
- overcoming conservatism through diverse participant
- participants becoming more understanding about the issues
- participants (might) understood different viewpoints and reached a common understanding
- Drawing the future to see it (you have to draw something to see it).

And the second round of the scenarios was that we presented that this is what we come up with, and this is what the possible futures might look like. So what are the consequences and impacts that it has for maritime spatial planning, but also for the industries that took part in the project. So it wasn't the end call wasn't just to create the best possible maritime Spatial Plan, so strategic plan, but also to create understanding of the possible and wanted future for these different industries. (Case 16, scenario team member/ facilitator, Cassandra)

Transformed Understanding

The theme transformed understanding came out of the thematic analysis of cross-case findings answering the quintain. Three subthemes made up the major theme. The subthemes were discover beyond usual, combine creatively, and common understanding and taking ownership. An illustration of the transformed understanding based on a different scenario planning process outside of the case study publications was shared:

"...that on one of the previous scenario exercises, they (top level managers) were in a workshop having a discussion about which countries would have been the biggest shipbuilding country in the world by 2010. So this was in 2002... and in that moment, in 2002, apparently in a full room, there was only one person who saw or said, China is going to be there as a one of the top shipbuilding countries, and the rest of the audience was... laughing... China's not going to be a shipbuilding country. Right. And then, you know back in 2008, China was in the middle of its explosive rise as a shipbuilder. They were clearly taking the leap ahead (of) Korea, Japan, and so on. When, when we decided to go into the scenario process, that president of the division, he was saying to his management team, we're going to do this because many years ago, nobody believed that China was on the horizon, and it's because of that scenario process and one person disagree and so on, that some people started to ask themselves, oh, what if China and so on? So we need to sit down right now and have that type of China moment again. (Case 3, internal expert, scenario team member, scenario user, Ingrid).

Another transformed understanding example was the following:

"I think the China moment for us was, was the fact that we, when we went into the process, we tend to think that natural gas has a future within this industry, only within a very specific set of boundaries of (inaudible) conditions, then our or China moment was to realise that it was actually not true, and probably the uptake of gas within the maritime industry, would have been something...happened under a series of other different conditions. So that was,

I think, a very powerful moment for us that helped us realise that or assured us that our investments into developing technology for use of natural gas and in the in the maritime industry, and so on, where we're sort of good, better place into the future." (Case 3, internal expert, scenario team member, scenario user, Ingrid).

A warning about transformed understanding is that it should not be confused for a groups' lobbying activities to actualise a future for the benefit of the group. Observed lobbying activities are presented in the synthetic construct Requirements of Scenario Planning Applications and Research.

Transformed understanding is a future building activity after going through the stages of discovering beyond usual, combining creatively and reaching a common understanding of the issue and taking ownership of the decision. A wide range of stakeholder involvement and collectively agreeing on "the" future they want to achieve together is a part of it. The cases that helped build the theme transformed understanding were those that successfully completed the rollout of a strategic plan or in the application process of a rollout.

International Attention, Brand Promotion and Sales

Another reported effectiveness area of scenario planning that was not discovered in the literature is its ability to promote the companies publicly. In some cases, it was a welcomed effect of SP, which was not anticipated until the completion of the project. In other accounts, brand promotion through practising scenario thinking and making the outcomes publicly available was part of the project aims. For instance, according to its developers, GMT 2030 project, case 8, started with a genuine interest in exploring a set of plausible futures for the maritime industry; however, promoting the company brand and engaging with potential clients were also aimed.

"I mean, it was very effective, in terms of promoting that the actual document at various public fora, so, conferences and exhibitions, and within the UK, there's the society of maritime industries. And so, you know, we were promoting it there. And really to increase exposure of our name and what we

do for, you know, new, potentially new clients. So that was that was quite a good platform. And I think, again, Jay will be able to recall this more, because he was heavily involved with it, in promoting it politically, with government. And, in fact, again, he may be able to recall, the global marine trends document has been referenced by many other government departments in some of their work and reporting. So it did have a thought leadership impact on other departments in thinking through their policy. And, of course, once we've done that, and we've got the document, both online, and in hardcopy, you know, it was sent to many potential clients. There were many, many people all around the world, who clicked on the link to our website and downloaded a copy or look at our website. So we monitored basically, the activity on our website in terms in response to the activity, and it was very positive. So in terms of return on investment of our time, it was well worth it." (Case 8, mini-case, scenario user, Kennedy).

A similar observation was done for the Port of Rotterdam:

But also helped them in the public relations and showing, okay, we are forward looking, we think ahead, we do this sort of thing no one else is doing. And then, of course, a very proud company that the biggest in Europe, and they develop new things. So they also use this to show we can only be a very large port in Europe, if we also have an integral plan for the future. Because there's no specific reason why so much cargo should flow through Rotterdam, there's other ports as well. So it's important for them as well to show, Okay... we have a vision. (Case 7, scenario team member, external expert, Zi)

Attracting potential customers through the image of thought leaders in the industry appears to be another positive impact of using the future scenarios as a sales tool.

...towards the end of the work. Before we started to present it, I engaged with a number of our major customers in the Navy, and said, look, you know, we're kind of thinking about publishing this, we want to make sure that it resonates with you. And so we had some dialogue with the, you know, certain naval planners in the UK, to just test their understanding and thinking and what work

they'd done. And they found it a really useful provocation to the work that they were doing so they'd benefit benefited from the dialogue and also, you know, our credibility, I think increased in terms of our thinking broadly around the subject...And, again, we've had approaches from a range of navies in those areas in the know in Asia Pacific, who were interested in the work. So that had a big impact. (Case 8, mini-case, scenario user, Kennedy)."

A scenario consultant's observation on sales was:

... to be honest, I think there was a bit of fashion, it was good to do scenarios, you showed your business stakeholders that you were at the forefront of thinking. Actually, one very important aspect that came out from the set of scenarios that we did for the power division was a conclusion they made. And they said like this, when they had done the scenarios, and documented them, and written up a small leaflet on that they had very much easier to engage in new sales discussions" (Case 3, scenario team member/facilitator, external expert, Billie).

Previously, evidence synthesis of scenario planning effectiveness literature suggested improved financial performance outcomes. Multiple case study findings suggest that scenario planning effectiveness on financial performance is not solely restricted to successfully developing future scenarios and generating strategy options and successful implementation. Producing impactful research and being considered a thought leader in the industry also come with increased recognition and potentially increased sales. In this sense, the publication of scenario planning projects serves as a sales tool.

International attention is also associated with the networking/collaboration synthetic construct, and new findings are discussed further under it.

B. Change

The synthesising argument 'change' was developed based on the changes among practitioners/ subjects following scenario interventions and attempted to answer how

scenario planning affected them after the intervention and what changes occurred.

Multiple case study findings did identify further evidence for increased self-resilience. Indirectly, organisational resilience in the form of coping with future uncertainties was observed following vision development and implementation of the visions successfully. The success was aiming for sustainability and attracting new clients by offering green value-added services. Such services were developed following the outcomes of the scenario planning projects.

Have voice

The synthetic construct have voice was developed based on research evidence pointing out the impact of SP on creative organisational climate (Chermack et al., 2015), and empowerment (Haeffner *et al.*, 2012). In addition, the SP participants' statements such as they felt that their voices were heard (Totin *et al.*, 2018; Johnson *et al.*, 2012) also contributed to it.

Similar to the CIS findings, further observations were made on how scenario planning practitioners had an opportunity to have their voices heard during the process.

Fishermen and fish farmers were the focus of the synthetic construct. Case 14 and 16, two different scenario projects were conducted to support maritime spatial planning projects. Case 14 and 16 interviewees stated that fish farmers' opinions were often neglected.

Differences of different stakeholder groups like fishers who are underdogs and then maritime industry, which is very powerful... (Case 14, scenario team member/facilitator, external expert, Whitney).

I had a table with the fish farmers and fishers. And they are usually, they tend to be the group that are kind of, they feel neglected and they feel that they are not...that planners don't notice their needs, so to say traditionally, this is the it is placed. And it was a challenge for us (Case 16, mini-case, practitioner, scenario user, Ashanti).

Analysis revealed a mixed bag of results about the role of scenario planning in having their voices heard. Although multiple case analysis findings explained the fishermen's situation and how they had their voices heard in some instances, it was not observed on every occasion. Scenario planning workshops were conducted in different regions in Finland. Ashanti, a practitioner/ scenario user, provided a detailed account of where the fishermen did and did not have the opportunity to openly talk about their ideas on the future of the region that they are part of:

... we have two regional Councils and they, as I said that they didn't have established connections to fishermen. And to be honest, I don't think that they could build any good connections during both phases (scenario and vision) either. So in that area, for some reason our planners... even though they met face to face these people, they weren't able to collaborate. So, to say this is up to the persons and how they act and they're not trained to handle conflicting situations... But when I go to the Gulf of Bothnia... they have a different kind of way of doing things and they will, as I said it's up to the persons and the planners. They handle easing the conflicting situations in a better way. So maybe because of that, maybe I can't be so sure, of course, maybe this is because they could kind of understand the needs of this marine sector better, so they could place them better in the map and the fisherman so that they are noticed. And the livelihood is noticed... So they (fishermen) were more happy... (Case 16, mini-case, practitioner, scenario user, Ashanti)

Ashanti's perception illustrated that the conflicts between different stakeholders in the SP workshops were one reason one group of stakeholders did not have their voices heard.

As reported in the CIS findings in Chapter 3, the impact of SP on creative organisation climate elements of trust, play/humour, conflict and risk were reportedly increased. Although the study by Chermack *et al.* (2015) focused on SP impact on organisations, similar findings from participative SP applications were observed in the multiple case study findings. However, it is also worth emphasising that giving credit to scenario planning for conflict management and neglecting other factors would be a reductionist

view. For instance, the function of scenario planning facilitators in the process appeared to be another factor assisting conflict management and relating to the have voice construct. Stakeholders such as fishermen need support mechanisms to make sure their voices are heard and not suppressed by influential stakeholders. Further discussion is presented under the requirements of effective scenario planning synthetic construct.

The construct "have voice" was developed by synthesising evidence on SP and several related subjects. The cross-case analysis included various scenario planning practices, e.g., a single organisation, participative SP practice across regions, and desk research-based SP. Empowerment was explained as the perception of employees' involvement in setting the agenda, taking ownership in decision-making, and feeling accountable to the collective vision (Haeffner *et al.*, 2012).

"...But it (the aim of the project) was more like that the participants also took ownership, like I was planning, I was also doing this. So it was very much a participatory process in that way." (Case 16, scenario team member/facilitator, external expert, Cassandra)

Participants' contribution to the scenario planning process was also perceived to legitimise the outcome. However, in Kieran's case, it did not happen.

It also helps to confirm that it shows them that you've taken their ideas into account, so... the legitimacy of the model results is increased (Case 15, Kieran).

The cause of some of the conflicts in scenario workshops were the stakeholders' agendas and lobbying efforts. It is further discussed under the synthetic construct unexpected conditions.

A final note to this construct was an interesting observation from a scenario developer in case 16. During the scenario development phase in the workshops, two different groups of people discussed a region's future. According to her, one group was quieter and the second group was loud. She perceived the loud group as opinionated and the

quieter ones as not. According to her, the latter group was the ones who gave something to the process.

...let's say 20% of participants were really like, opposing the ideas in the scenarios. And usually, those are the most vocal ones as well. So the ones who are like...yeah this is interesting, and give something to the process are a bit more quiet... I remember those vocal, opinionated people. But in the end, I think it was really fruitful to have that discussion with these people." (Case 16, scenario team member/facilitator, external expert, Cassandra).

Networking – Collaboration:

The multiple case study findings identified instances where networking and collaboration resulted from scenario planning applications. In addition, the cases that published the scenario planning outcomes reported new networking and collaboration opportunities.

... we were not having such an active role in industry organisations because we were just the equipment supplier, not directly within the industry. The scenario work is something that I can say... opened the door to, to me, my team personally to a project that was being born that moment that was called the sustainable shipping initiative, which today continuous, we got to know the organisation that was basically kicking off this sustainable shipping initiative via by a discussion on the scenarios, and then we got actually on board of that initiative, as a company. So we got a seat as permanent members in the initiative, sitting basically with other ship owners and industry players, in a context that was very unique to us, because we haven't been participating in this kind of industry. think tanks or associations beforehand (Case 3, scenario team member/practitioner, internal expert, scenario user, Ingrid).

Lamar, case 6 reported another example of scenario planning being a collaboration opportunity. The scenario study they prepared, DG Mare (2012), later continued as the blue growth agenda.

...and what is really nice in this maritime area is that previously there was much more silos, the fishermen were you know, busy fishing and... the shipping guys were busy on their thing, and the oil and gas guys were doing their thing. The whole spirit of blue growth and also maritime spatial planning is "hey guys, we're all in the same sea. Let's see what we can do together."... So, I think the type of scenarios sessions for that we started were useful also because they brought together actor that previously did not work together." (Case 6, scenario team member, external expert, Lamar).

International attention is also associated with the Networking/Collaboration synthetic construct as the publication of the scenarios generated international attention, and the scenario publishers engaged with new stakeholders in the industry. Joel explained his experience:

... We've been quite surprised to be reached out by both of course equipment manufacturers, ship owners, private equity investors, authorities... maritime authorities, rating agencies, other banks, consultancy companies like McKinsey. So, many different entities reached out and not all of them would be natural for us to have a dialogue without this kind of report (Case 13, scenario team member, scenario user, Joel).

None was observed in terms of organically developed further collaborative activities among scenario project participants.

Taking Action

Further actions and projects later followed scenario planning projects. For instance, case 3 reported that the intelligence team monitored the themes that came out of the scenario planning project. Case 6 output by DG Mare (2012) was later followed by several research papers under the Blue Growth title. Case 3 output by Fang *et al.* (2013) was also continued with a series of scenario-based research publications, e.g. Lloyd's Register and UMAS (2019); Lloyd's Register and BIMCO (2019); Smith *et al.* (2014); Lloyd's Register and UMAS (2017); Lloyd's Register (2016).

Kennedy, who oversaw the GMT 2030 project, case 8, said that the scenario project kick-started a series of scenario-based marine trend publications:

"..... so Lloyd's Register, having been involved in the first one and the second, I think they were, to be honest, they were really driving the second publication. And they approached me. Professor Fai Cheng, contacted me and said, you know, are you interested in being involved in a follow up on technology? And I said, without hesitation, yes. (Case 8, mini-case, scenario user, Kennedy).

Jay, who was actively involved in case 8, later supported Kennedy's above statement.

In two other cases, the scenario projects were followed by the visioning phase. Case 4 successfully rolled out its vision. Case 16 vision development was completed and is currently in implementation.

Not every scenario planning application is aimed at vision development. Insights that scenario planning actors gained through the SP process led to decision-making and were put into action. For instance, case 3 reported:

... basically, fuel tanks, fuel to fuel gas supply systems, and so on, which we didn't have at the moment and we started investing more and more after that period of time... Another part of the very important discussions that we had in that moment regarding the future of fuels, highlighted the importance of LNG as a fuel for maritime use already in 10 - 12 years ago, started to become more and more clear, partly also supported by the discussions that were happening around the scenario work and that's a moment also when we as Wartsila decided to develop a fuel gas supply system basically for LNG (Case 3, scenario team member/practitioner, internal expert, scenario user, Ingrid).

In terms of policy making, case 6 enlightened us on what happened after the completion of the project:

They found their way into that communication and as a consequence that a range of policy and initiatives were taken. (Case 6, scenario team member, external expert, Lamar).

C. Requirements and Drawbacks of Scenario Planning Applications and Research

This synthesising argument was developed from the evidence on adverse-unexpected effects, ineffectual conditions, measurement issues and requirements of scenario planning.

Adverse/unexpected effects/ no influence conditions

Multiple case study findings identified several unexpected effects. Lobbying activities were observed in scenario planning processes where the outcome was aimed to support policy development. Every case study that was part of policymaking reported stakeholders' lobbying activities. Lobbying stakeholders and their agendas were perceived as detrimental to achieving the aims of scenario planning. In those situations, open discussions about plausible alternative futures did not occur as expected by the scenario developers.

...I think this was the same for the environmental activists who only have like one important goal to keep the ecosystem viable. And that's really important, but it's really hard to discuss, like, what if it gets worse, when they are just like, it can't get worse, it's the end of world if it gets even worse (Case 16, scenario team member/facilitator, external expert, Cassandra).

Scenario planning practitioners who joined in the process with pre-set outcome expectations were resistant to discussing the alternative futures in the workshops. It resulted in different stakeholders focusing on a convenient scenario for them and neglecting the others.

... when we created let's say the world... it could go this way, it could go that way, they were actually not open to that kind of thinking because they were only interested in projecting a bright future where you know, there will be many many more offshore winds installations is a lot of employment." (Case 6, scenario team member, external expert, Lamar).

Similar concerns about the practitioners coming to the SP workshops with their agendas and seeing the scenario development platforms as a means of defending their interests were reported by other scenario developers. Conflicts were not always observed, but lobbying stakeholders with agendas was considered a reason for preventing learning among SP workshop participants.

...but it was kind of lobbying... I think they were defending their sectors, opinions and their aspirations, how to develop in future so, even though there were no conflict but still so... We hoped that it would be a learning process, but I didn't get that feeling then back then, no (Case 14, scenario team member/facilitator, external expert, Whitney).

Other scenario developers reported discussions about the maritime industry's future stemming from the participants' established thinking. The future scenarios did not always align with the participants' future views.

I would say it's full with... industry lobbies, dare I say so, and they all have a very very specific agenda and I think. Not only we're looking at this study but also when they look at subsequent studies that I can see a pattern. And the pattern is that those sectors that were quite established at the time. umm... participants... they were quite critical to our work and we just have quite some fierce discussions." (Case 6, scenario team member, external expert, Lamar).

Regardless of the source of motivation that led to discussions, SP participants discussed the created scenarios. It is part of the scenario planning process and has the potential to enhance the practitioners' understanding of the issue. "Fierce discussions" were perceived as fruitful, but whether the practitioners' thinking changed or not, the scenario developers could not comment.

A solution to the stakeholders' lobbying efforts and resistance to discussing the futures that were not desirable to them was proposed. The offered solution was to introduce scenario planning in greater detail and repeatedly explain to the practitioners that the SP process was about discovering multiple plausible futures and offered other benefits.

...but I think we could have taken more time at the beginning of the process to introduce the participants the benefits of this process... what do we... mean by scenario planning? Obviously, we did this, we didn't just come up and yeah, let's workshop and we come up with something... But I think we could have emphasised it even more, and come back to these basic ideas of scenario planning in more parts of the project... we would have been more clear that this is not our desirable future, what we are now planning, but this is possible, a future so emphasising these kind of basic elements (Case 16, scenario team member/ facilitator, external expert, Cassandra).

Even if SP practitioners are informed about the aims of SP, they may forget about the principles and objectives of SP during the process. Defending an agenda and envisioning different futures are conflicting activities. Reminders about the reason for doing scenario planning throughout the SP process might be helpful to nudge the participants in the right direction.

The relationship between the practitioners' agendas and taking ownership of the SP outcomes was perceived as a problematic situation.

...you are an activist, or then you're a lobbyist, when you have just kind of one agenda. And if this... our scenario doesn't fit that or it doesn't support your stand up, and it's kind of hard to take ownership of that." (Case 16, scenario team member/ facilitator, external expert, Cassandra).

Another impact of lobbying and stakeholder agendas in the workshops resulted in unchanged opinions according to the scenario developer/ facilitators' observations. Two scenario developers agreed on the aspects of the unchanged opinion and observed a poor learning experience.

... they didn't change their opinions a lot...our stakeholders and our respondents and participants... they had their standpoint... someone presented fishers and other energy sector and so on, I think that they didn't, even though the discussions were quite good, they didn't change their opinions much... I think that my feeling is that these professionals (scenario workshop

practitioners) didn't change their opinions much and it wasn't a learning process for them, but it was kind of lobbying... I think they were defending their sectors (Case 16, scenario team member/ facilitator, external expert, Whitney).

Interestingly, the lobbying activities and their negative impact on SP were only reported by policy supporting SP projects. On the other hand, the cases that implemented SP for vision development and to enhance their understanding of the maritime industry's future did not report the same issues. The policy support cases had more participants than other cases. However, a contrary example to the above was also observed in one case. Case 4 is helpful to illustrate the lobbying stakeholders with agendas issue. Case 4 had over 150 participants at the SP workshop. Case 4 was developed for a public limited company with one shareholder, the Dutch Government. The interviewee who contributed to case 4 did not interpret the involvement of the stakeholders in the SP process as lobbying activities. According to her, after creating four scenarios, most stakeholders supported the green growth scenario as a vision to pursue. Hosting a scenario workshop that included an extensive array of stakeholders and the stakeholders' agreement on the vision was considered a success. The case 4 interviewee reported that the vision was decided on considering the stakeholders' support. However, findings can not differentiate the case 4 practitioners' interior motives, if there were any. For instance, the stakeholders might have had their agendas and interests and considered the SP workshop a platform to defend them. On the other hand, most stakeholders might have supported the scenario because it was beneficial to most parties, including the port's interests. The author is not able to form an opinion of the stakeholders concerning the lobbying and the agenda's point of view is unclear.

Ineffectualness conditions

The scenario planning practitioners were reportedly put outside their comfort zone through discussions about the maritime industry's future and their thinking was challenged. However, an interviewee from case 3 reported that the impact was limited to the participating employees as there was not "a massive roll out of scenarios" in the company.

... I would say that the group of people who participated in the work in the workshops... were definitely put outside of their own comfort zone and asked to think about dynamics that are that would beyond much beyond our own industry... that helped people to challenge their own ideas... Apart from that, I wouldn't say that there was because there was no massive internal rollout of scenarios and scenario thinking within the company. So it was just the... our work that pretty much stopped at the level of the people who participated in the project (Case 3, scenario team member/practitioner, internal expert, scenario user, Ingrid).

The literature review previously presented that SP was unsuccessful at continuous learning (Haeffner *et al.*, 2012). Case 3 and 4 are examples of ceased learning after the completion of SP. In two cases, the SP aims were achieved. Some outputs of the process, e.g. themes to monitor, were pursued a while by intelligence teams, but eventually, it was stopped.

Regarding the scenarios' application in policy or strategy support, case 14 was not used in the official MSP process. It was explained:

... they created their own scenarios and I kind of understand, but they are totally different types of scenarios, even though... kind of data and the issue was the same... I was a little bit disappointed that they were not used in the official process, but then again so processes official process and then that was kind of rehearsal project (Case, 14, scenario team member/facilitator, external expert, Whitney).

An interviewee who contributed to case 16 explained the situation about case 14:

We (MSP authorities) were aware of the scenario work as a few maritime spatial planners participated in their workshops. However, the scenario work didn't cover the whole marine area, and it was not part of the official MSP. We had a call for tender to conduct the official scenario work, but another consultant was selected. That is the reason why we didn't utilise the Plan4Blue scenarios (Case 16, mini-case, scenario team member/practitioner, internal

expert, scenario user, Ashanti).

The officialness of the scenario planning application appears to be a reason for not utilising the scenario outcomes. Another interviewee who contributed to case 16, one of the scenario developers, informed the author that she was unaware of the case 14 scenarios.

Going back to unchanged opinions, as reported by the scenario developer of case 16, case 6 findings revealed similar experiences. Two interviewees who contributed to case 6 perceived the process as ineffective regarding SP users' opinion change. Case 6 was prepared for the EU commission (DG Mare, 2012) to explore the future of the maritime industry and its sectors from a broader view.

... we (scenario developers with each other) had a lot of discussions about it and in the very end, I do not think that they (SP users) really changed their customs; I hope that I have at least raised the idea and showed that this is relevant..there are two parts, so the extrapolation scenarios, they are interested in it because... that is also more practical for them (Case 6, scenario team member, external expert, Maheen).

The scenario developers also gave examples from their previous scenario planning involvements. One example was the application of SP on climate change for the regions in Holland. Scenario planning part of the project aimed to understand the potential future climate change and water management developments and ideally prevent unnecessary investments. A shared understanding of what SP does for its users appears to differentiate the example project from case 6. The example that was given was perceived as more effective in terms of the scenarios' use for the projection of water management.

... scenarios were developed and then they were discussed and explained and they were used in calculation models for that, for the hydrology for the water management, and then ... let's say a function as a common ground it's a shared idea. Okay, we use these four and we know that it's not a complete truth but it gives more or less the corners of what we can expect in the long term, so that

works. I'm afraid for these scenarios the maritime scenarios that was not so much the case (Case 6, scenario team member, external expert, Maheen).

The project partner of Maheen also expressed similar observations:

When it comes to the scenarios... I'm more critical on the impact of the study. because I'm not sure whether we managed to convey that all of these beautiful growth scenarios because of course there was also... in the later communications from the client there was a push towards, look, you know, there are now five million jobs in the seas, but that can grow to seven yes, but there was I think insufficient recognition... (Case 6, scenario team member, external expert, Lamar).

The findings presented so far were unexpected by the researcher. Interviewees perceived them as issues related to their scenario planning application. The synthetic construct "scenario planning may not be for everyone" is able to explain some of the experienced problems presented above.

Lastly, the case 4 interviewee perceived the scenario planning as biasing. The literature review part caused the bias, according to her. She explained:

...I think because of some literature review, we have done. You have been... forced to think about the future as the producers of the Port Vision, and because of that. Then your mind is a little bit biased and you are looking just for those elements which can come along (Case 4, scenario team member/practitioner, internal expert, scenario user, Adrie).

Scenario planning may not be for everyone

The synthetic construct "scenario planning may not be for everyone" was developed after recognising the research evidence on unchanged opinions (Glick *et al.*, 2012; Phadnis *et al.*, 2015; Zegras and Rayle, 2012).

The multiple case study findings revealed similar experiences across the cases. Instances of unchanged opinions were observed during the scenario planning workshops and after presenting the final scenarios.

... sometimes you find people have very strong opinions on the scenarios, and then, but that is exactly what happens. Many people have an idea well, I know something about something, and this is the way it's going to go that's my opinion that's my conviction (Case 6, scenario team member, external expert, Maheen).

The following example given below was a discussion on the future of the European Union experienced in a project different from the maritime scenarios. The scenarios were presented to the people working in the EU commission.

... I remember one interview, and we discussed the European Union. And we had in that scenario as a Union which would fall apart and they said well it's impossible completely impossible, the Union is there... so people are so... they are in a certain mindset. Sometimes, not always but... that's an example that people are not willing to go along with you, exploring uncertainty... (Case 6, scenario team member, external expert, Maheen).

Not grasping the aims of scenario planning was considered one reason why the future scenarios did not receive attention equally and SP participants did not explore the future uncertainties.

... we talked about the four scenarios in the maritime study, the top right one is called sustainable growth. Our client was saying "we're interested in only that one". And you develop that scenario more because that's the one we like. And what they didn't... understand or they didn't want to understand... is that you cannot determine what scenario are because these are exogenous variables. So it was very difficult for European Union commission officers that it will be anything exogenous that they cannot influence themselves.... (Case 6, scenario team member, external expert, Lamar).

As stated by an interviewee, not understanding what was aimed with scenario planning was one source contributing to the problem. When SP workshops participants did not genuinely understand the process, an interviewee shared her observation interpreting what she experienced. She concluded that it might be linked to individual differences, e.g. some people are more visionary than others:

People were very interested in the work with the scenarios... usually most of the people, were very, very happy to work with the scenario some of... maybe some people who get it... Basically, they kind of didn't maybe understand ... and ... we had some comments that this is... just kind of that some people are maybe more visionary than the others... for some people, it was difficult think about the future (Case 14, scenario team member/facilitator, external expert, Dane)

The second source was the lobbying activities and agendas that were previously discussed. Therefore, it appears to be more relevant to "...or not wanting to understand" statement. Similar to case 6 interviewees, case 16 interviewees reported unchanged opinions in SP workshop participants. They perceived the issue as connected to the stakeholders' agendas and lobbying activities. Additionally, emotions emerged as a factor influencing the relationship between "not wanting to understand the purpose of scenario planning" and "stakeholders with their agendas and lobbying activities" in the SP workshops.

... I don't know in the UK, but here when you do spatial plants in general, whether it is for the city or the sea. It raises a lot of emotions. So I think it wasn't preventable... totally because it is there were people who had cottages by the sea and then you talk like, where would you have offshore wind power? Obviously, raises emotions. So that's kind of resistance in towards the thinking about the futures (Case 16, scenario team member/facilitator, external expert, Cassandra).

A scenario developer offered a solution for the emotional barrier of not being able to think about future possibilities. She experienced a strong reaction from the stakeholders when she presented the scenarios to them to gather their opinions. The scenarios were not fully drawn out at that point. The first workshop where the scenarios were still being built also received some tension.

... So the first workshop was... there will not a lot of like, (be) a bit of tension (not) like having you present a scenario where you say... in this scenario, there is no wind power... So there were these like really strong, opinionated people who didn't believe in the scenarios at first, one thing that I would do differently would be really to explain where we are going with this at every step of the way, and... really emphasise that this is not the wanted future picture of the maritime spatial planning.... So if I would have known that (if I had know, then) I would have said, this is more like a game. And let's play and this is not what the government or the municipalities are planning (Case 16, scenario team member/facilitator, external expert, Cassandra).

Disconfirmation bias - a condition of scenarios being inconsistent with the participants' ex-ante beliefs (Phadnis *et al.*, 2015) was previously reported and captured in the CIS of the literature. An example of ex-ante belief and their negative impact on scenario planning was also identified in the findings:

... For instance, the organisation at that time was called (REDACTED) was already quite large it was preparing for a large-scale rollout of offshore winds. And they had prepared their own reports and they had very optimistic... well, not scenarios but forecasts as to ... the rollout of offshore wind installations. And we found them to be very optimistic. ... they were based on you know, some work that they had commissioned themselves... we had quite some debates but as they were very well informed and they had the resources. To defend their case, it was not easy to influence their thinking... when we created let's say the world of said it could go this way, it could go that way they were actually not open to that kind of thinking (Case 6, scenario team member, external expert, Lamar).

Measurement Issues

The synthetic construct measurement issues was formed around two types of measurement problems. One of them was rooted in scenario planning applications. The other was rooted in the study design of sampled research papers. The construct is expanded by the case study findings in this section.

One way of measuring SP "success" by a scenario developer was the turnout rate. In this context, success indicates effectiveness since the researcher asked the case study participants to evaluate their scenarios in terms of their ability to achieve the desired outcomes.

...if I start with the participation, if I think that's the most like measurable one, you could easily measure the participation was very good throughout the project (Case, 16, scenario team member/facilitator, external expert, Cassandra).

However, the findings have indicated that the participation rate itself does not indicate some of the desired impact areas. For example, openness and the participants' commitment to the process were perceived as the elements making a desired impact on the scenario planning process and outcomes. Therefore, the participation rate could be complemented by measuring participant openness and commitment since counting the number of participants does not necessarily indicate effective participant contribution.

Client satisfaction appeared to be a means of measuring the effectiveness of scenario planning, and the interviewees reported client satisfaction. Not receiving a complaint was another means of assessing effectiveness. In other instances, the measurement was not possible since the scenario planning applications were new at the time of the interviews. As illustrated in the interview extracts, the scenario developers used positive, successful and effectiveness synonymously. It was because the researcher asked the interviewees whether SP achieved what was desired by its application. Some of the statements about the scenario's evaluations were as follows:

... I think we were very successful; I think we achieved the aims. They were certainly very pleased with the results. This is a very nice report, thank you very much let's publish it. So they were certainly very happy with that they had achieved their goal of producing a scientifically leading study. (Case 14, scenario team member/facilitator, external expert, Kieran)

... So that was a very positive process, which I will say, we achieved what we were expecting throughout the process, basically. (Case 3, scenario team member/practitioner, internal expert, scenario user, Ingrid)

... we made sure that every single word was what we really what we understood and who concluded from the analysis. Yeah. So it was really successful, I think, in terms of the aims (Case 8, scenario team member, internal expert, scenario user, Jay)

... we actually got very, very good feedback from these workshops. All workshops, and we have to throw the whole scenario work phase that they had the feeling that this was really good, good job... in many times, public hearing.... if you're not happy with the plan, then you complain, and it's kind of way of way of complaining official way of complaining... So people at least didn't complain. So I'm not sure whether I can then say that they were happy or not but for my experience, and the implication is that right word, how I saw that was that it was kind of success. (Case 16, Mini-case, scenario team member/practitioner, internal expert, scenario user, Ashanti).

what was happening, the planners when they are planning the strategic plan for Maritime what it basically is, what are the kind of different scenarios they need to be prepared for, in some ways, even if it's not during this planning round for the next time next. So I think that's an objective that we can't really measure at the moment, but the feedback with what we got from the project was very positive that it really helped help the whole process what it was meant to do (Case 16, scenario team member/facilitator, external expert, Cassandra).

Well, they were very happy with it. So they in the end, they were, of course, very lively debates and discussions...it helped them making the Board Vision (Case 7, Zi).

As one of the consultants in case 7, Zi was not able to comment on the project's contribution to the port's vision development. The researcher approached the port to receive further information on the matter. However, he was not able to gain access to the organisation.

...Well, I think the outcomes in general were (inaudible) as respect to what the European Commission had in mind. So as said, we dealt with the key variables that are impacting on the port and maritime sectors evolution in the future. So from that point of view, the commission was happy (Case 10, scenario team member, external expert, Sam).

Sam also noted that they did not receive any direct feedback on the study outcomes. He suggested assessing the success of the scenarios by looking at the later EU policies to determine if the scenarios were used or not. Although, he later added that the approach he suggested was insufficient to come to a concrete conclusion.

...maybe also not maybe it just comes from other talks they had to other people or well, lobbying by sector associations, you never know, of course, so it's very hard to make a one on one link between result that you deliver and the policy that they have set up in the end." (Case 10, scenario team member, external expert, Sam).

Case 6 was difficult to assess for its effectiveness. Two methodologies were applied in the project. The first methodology was a trend extrapolation application. The researcher analysed the second methodology, which was a scenario planning application of intuitive logic school.

...so the extrapolation scenarios, they are interested in because. This is shorter than that because that is also more practical for them, because there were recommendations that if this develops that way, then you must be sure that you

adjust your policy attendees and try to find out things and all that so that is more practical let's say the short term. So that part Yes, that was followed up because the blue growth is still going on...I think it is quite a successful project but particular this part. well. I mean this long term uncertainty part. It is. Well it's more difficult... (Case 6, scenario team member, external expert, Maheen)

... When it comes to the scenarios, I think, I'm more critical on the impact of the study. because I'm not sure whether we managed to convey that all of these beautiful growth scenarios... but there was I think insufficient recognition (Case 6, scenario team member, external expert, Lamar).

The scenarios were tested against plausibility and consistency by case 15 through debate, assisted by graphs. In case 3, a plausibility check was conducted by asking the scenario participants' about their opinion. In case 7, plausibility was checked through discussions. In case 16, a set of scenario quality criteria, including plausibility, consistency, and coherency, were tested by asking the spatial planners their opinions. In case 6, the scenarios were checked for plausibility and consistency through iterations and cross-checking the descriptions of the Delphi questionnaire results by the scenario developers. Participants' opinions were also sought in the process.

Requirements of Successful Scenario Planning Practices

This construct attempts to explain and discover the "right way" of practising scenario planning. The CIS of the literature previously identified several issues within the practice:

- Increased optimistic prediction bias (Min and Arkes, 2012; Sedor, 2002),
- the presence of overconfidence bias (Kuhn and Snizek, 1996; Schnaars and Topol, 1987),
- the emergence of the disconfirmation bias (Phadnis *et al.*, 2015),
- inability of SP to accommodate continuous learning (Haeffner *et al.*, 2012),
- ineffectiveness in policymaking (Totin *et al.*, 2018),
- ineffective in terms of challenge and involvement, idea-support, and debates measurement (Chermack *et al.*, 2015), and

- poor customer satisfaction (Phelps, Chan and Kapsalis, 2001)

were reported.

Furthermore, the following were associated with less successful scenario interventions:

- lacking diversity in SP participants (Johnson *et al.*, 2012),
- scenario planning participant group composition - too convergent or divergent (Zegras and Rayle, 2012)
- uncaredful selection of scenario planning participants (Totin *et al.*, 2018).

Multi case study findings supported some of the literature findings stated above and enriched the construct.

A scenario developer stated that "the art of making scenarios" was finding a way to make the scenarios equally interesting. Based on his experience, there was often one scenario people tended to focus on and the other scenarios were neglected.

... it always happens very quickly that you when you develop scenarios there's one scenario that nobody wants to go into and another one that everyone prefers. I think the art of making scenarios is not doing that but showing in any case in all of the scenarios showing the pros and cons (Case 6, scenario team member, external expert, Maheen).

However, the research findings revealed that the SP participants may still be inclined to focus on one scenario regardless. Therefore, showing the pros and cons for every scenario may not be sufficient to prevent the issue he raised. The reasons for the scenario planning participants' inclination for one scenario was previously explained under the adverse/unexpected effects/ no influence conditions construct. The lobbying activities of the SP participants and their agendas prevented them from considering all of the created scenarios equally.

Analysis revealed that case 6 was an example of not reaching a common understanding taking ownership of the scenarios. The scenario developers did not evaluate their scenario planning project as successful. The reason behind their logic was that during the scenario development stage,

- participants did not reach a common understanding of the scenarios in terms of accepting that the future was uncertain, and all scenarios, not just one, were potentially a reality in the future, and
- the participants did not take ownership of the scenarios.

The issue with not taking ownership of the scenarios appeared to be more prominent when the key actors were not part of the scenario development process. The literature review findings previously reported evidence on the same issues. For instance, scenario planning was found ineffective when subjects received scenarios that other parties prepared. As a result, subjects partially or entirely rejected the scenarios (Kuhn and Sniezek, 1996). This phenomenon was observed by other researchers and articulated as disconfirmation bias - a condition of scenarios being inconsistent with the participants' ex-ante beliefs (Phadnis *et al.*, 2015).

Another requirement that the scenario developers brought up was the importance of the scenarios' plausibility. A scenario developer stated that he saw the existence of miracles in the scenario publication he read over the years:

... My experience is that you should not try to introduce any if I could call them miracles, no. Keep development to such things that you can in a way explain why this might happen. You must be trustworthy. Don't think about miracles, miracles don't happen (Case 3, scenario team member/facilitator, external expert, Billie).

However, the scenario developers also distinguished between the miracles and the element of surprise. Almost all scenario developers in the case studies perceived surprise as a dimension that the scenarios should have, except for two scenario developers who did not comment on it. Black swans and surprise were considered associated and recommended for effective scenario planning practices by three scenario planners. An example of black swans was the COVID-19 pandemic.

Previously, several authors recommended the temporal aspects of scenario planning for further research (McKiernan, 2017; Phadnis *et al.*, 2015). Scenario planning was considered a time-consuming activity. Balancing the combination of methods used in scenario planning for an efficient SP application was a problem. Neither of the scenario planners had an answer for it. The consultancy industry was scrutinised for its efficiency-oriented scenario planning practices:

... because there is a tendency for us to be so bloody effective and that is saying that we don't give ourselves time to reflect when you don't reflect you do not understand the complexity. scenarios are not based on a huge excel sheet where you do your calculation (Case 3, scenario team member/facilitator, external expert, Billie).

The budget constraints of the scenario planning applications were another reason why some SP applications were done too quickly. The duration of the SP process was also considered from the participants' perspective. The work overload of the participants was seen as a factor that should be taken into consideration before conducting SP. From the creativity point of view, scenario planning was perceived as a creative process, a process that should not be rushed. One scenario planner explained his logic for the SP process:

... it is crucial that you give the process time and the people time to really have the new ideas to sink in (Case 3, scenario team member/facilitator, external expert,, Billie)

Billie's suggestion can be assessed from different aspects, leading to further research directions.

As covered under the construct, "scenario planning may not be for everyone", the case study findings revealed that the SP participants had problems understanding the purpose of doing SP. This was raised as a requirement for effective SP applications by the scenario developers. Participant specific requirements were also discussed around the cultural, group and individual differences. The availability of multiple scenario schools was also perceived as a reason for the confusion among some SP participants.

Several interviewees reported that some SP participants fixated on quantitative scenario-based modelling approaches and did not grasp the point of the IL school of scenario planning. A group of scenario developers also observed a lack of motivation among participants. It was observed when the subject of scenario planning was not directly concerning their field of work. One last requirement finding was simple: scenario planning should respond to the client's demands.

Conclusion and Multicase assertions

The author revised the initial foreshadowed issues based on the findings presented above. He assessed the findings for their utility in explaining the quintain and ability to shed light on the issues. Finally, the following multicase assertions were developed.

Reaching a shared understanding is important for effective scenario planning practices but crucial for creativity to aid transformed understanding.

To reach a shared understanding, scenario planning practitioners needed to understand what the scenario planning application aims at. SP practitioners in two categories are perceived as detrimental to reaching a shared understanding:

- 3) SP practitioners do not understand the purpose of scenario planning (practitioners are eager; however, they do not understand it), e.g., a practitioner with PMT school of scenario planning understanding in an Intuitive Logic school-based scenario planning workshop, individual differences, e.g., some people are more visionary than the others.
- 4) SP practitioners do not want to understand the purpose of scenario planning (practitioners are not eager) because:
 - h) practitioners have an already set mind about the future due to various reasons, e.g., previous research on the issue was investigated by another party and their results taken for, practitioners are lobbyists and have their agendas to defend,
 - i) practitioners do not understand that they do not have control over the exogenous factors, and they cannot control the future,

- j) practitioners do not care about scenario planning, e.g., lack of motivation, the subject is not of interest to them, practitioners do not have sufficient time and overloaded with tasks at work

Conflict management in the scenario planning workshops was the second most important aspect of reaching a shared understanding. The SP facilitators' ability to manage the conflicts and use humour and playfulness supported resolving the conflicts.

Participatory scenario planning practices are preferred over non-participatory designs to reach a shared understanding and legitimise the outcome.

Speaking openly and trust, and creativity feed into each other. The relationship is necessary for reaching a shared understanding and discovering beyond usual.

Scenario planning effectiveness is measured in three ways:

- d) practitioner turn-out rate,
- e) client – scenario user – feedback, and
- f) SP practitioner feedback.

However, clients did not always give feedback on SP effectiveness, and the developers did not always pursue one. In addition, the practitioner turn-out rate is not a healthy indicator of SP effectiveness due to the two types of practitioners listed previously, e.g., a practitioner might be present but not eager to contribute.

Scenario validation criteria for measuring the quality of output are mostly ignored. The criteria were limited to plausibility, consistency, and coherency whenever applied. Plausibility was the highest criterion applied for scenario validation.

The scenarios were not assessed for novelty and surprise. The scenario builders were hesitant to support novel and surprising ideas in the scenario development process and include them in the final scenarios. Scenario builders' had a slightly different understanding of creativity.

Efficiency concerns on budget and time prevented the scenario developers from reiterating the scenario development. Same concerns also lead SP practitioners towards applying a systematised scenario development that is proven to be fast which may hinder the creative process.

No lobbying or stakeholders with agendas were reported in scenario planning practices that were conducted for private companies. However, considering the secondary SP objectives of the private companies included “being thought leader”, “promoting the brand” and “increasing sales”, the companies might have been the lobbying parties with agendas in their scenario development workshops.