Circular Futures: an interdisciplinary approach based on Circular Economy principles and Futures Studies methods to support Small and Medium-sized Enterprises (SMEs) transitioning to circularity and a futures-oriented organisation.

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A thesis submitted in partial fulfilment of the requirements of Edinburgh Napier University,
for the award of Doctor of Philosophy

School of Engineering and the Built Environment

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March 2023

Declaration

I hereby declare that the work presented in this thesis has not been submitted for any other degree or professional qualification, and that this thesis is the result of my own independent work.

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Abstract

The Circular Economy (CE) is conceived by many as paramount to decoupling economic growth from environmental impacts. Implementing this paradigm in the private sector is challenging, as it requires substantial changes at the strategic level. However, while Small and Medium-sized Enterprises (SMEs) represent 99% of all businesses and 67% of employment in Europe, the available support for a CE transition has been mainly focused on large corporations. Therefore, the backbone of the European economy might be left out by the CE if tailored solutions are not designed and implemented for SMEs.

Through a bibliometric review and a snowballing technique, I reviewed the available CE and Futures Studies (FS) approaches and analysed further the most prominent of these frameworks. As the CE and FS approaches and methodologies lack guidance for their implementation, I developed a systematic method called Circular Futures Approach (CFA). An in-depth two-year-long case study approach tested this methodological tool in the context of a Dutch SME.

The combination of CE principles and FS methods could contribute to organisations' successful transition towards sustainable futures by exploring possible pathways for better decision-making in the present and equipping teams with relevant skills to survive unexpected events and stay future-relevant in uncertain times. Furthermore, the developed participatory process provides a customisable approach to SMEs, contributing to both (CE & FS) disciplines' literature.

The results of my research demonstrate that the CFA can significantly enhance the potential of SMEs to transition to circularity and reach their preferred future. I hope the work in this research will influence the interface between top-down policymaking and bottom-up business decision-making as a valuable hands-on guideline. Furthermore, the approach could enhance the policy developments that support the vast number of existing and future SMEs in Europe and around the globe.

Publications associated with this research

Weigend Rodríguez, R., Viero, G., Schindler, T., Guadarrama, G., & Pomponi, F. (2021). Size matters in a Circular Economy: a practical framework applying Futures Literacy to support Small and Medium-sized Enterprises (SMEs). In *Proceedings of the 27th Annual Conference, International Sustainable Development Research Society* (696-718). Available at: https://www.researchgate.net/publication/353822383_Size_matters_in_a_Circular_Economy_An_introduction_to_the_Circular_Futures_Approach_to_support_Small_and_Medium-sized_Enterprises_SMEs_transitioning_to_Circularity_and_to_a_Futures-oriented_organisati

Logtens, E., & Weigend Rodríguez, R. (2021). Futures Thinking: The case of DSME. *Journal of Futures Studies, 25(4),* 97-110. https://doi.org/10.6531/JFS.202106_25%284%29.0009

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Acknowledgements

I am grateful to God for His love, strength, and guidance, which have helped me achieve this milestone.

Le dedico esta tesis a mis padres Veronica y Ricardo, y a mi hijo, Richo, en agradecimiento por su apoyo, amor y por ser mi ejemplo. Sin ustedes este logro no habría sido posible. Espero que esta tesis les traiga orgullo y satisfacción.

Ringrazio, Francesco, Bernardino e Achille per il loro sostegno, indispensabli consigli, e per aver accresciuto le mie conoscenze in ambito accademico e personale durante questo mio percorso.

I want to thank Consejo Nacional de Ciencia y Tecnología (CONACYT), Alianza para la Formación e Investigación en Infraestructura para el Desarrollo de México (Alianza FiiDEM), and the Dutch SME participants that collaborated with the development of my research. I am truly thankful for the insights, feedback, and recommendations provided by Karla Paniagua, Ken Webster, Patrizia Ghisellini, and Sohail Inayatullah. In particular, I would like to extend my deepest gratitude to Giulia Viero, Graciela Guadarrama, and Tanja Schindler for their invaluable contributions to this work.

I am grateful for the emotional support I have received from my brother Johann, my sister Cordelia, my cousin Eugenio, and my friends David, Sthella, Israel, Soufya, and Aneurin Paul during the most challenging times. Their support has meant a lot to me.

Funding

My PhD studies were supported by Consejo Nacional de Ciencia y Tecnología (CONACYT) and Alianza para la Formación e Investigación en Infraestructura para el Desarrollo de México (Alianza FiiDEM).

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Glossary of Key terms

Approach:

The taking of preliminary steps toward a particular purpose (Merriam-Webster Dictionary, 2022).

Black Swans:

Unforeseeable events with significant impacts (Taleb, 2007).

Business Intelligence:

It is inward-looking within an organisation and used to analyse business performance. It is centred on internal factors that the organisation can affect and the impact that may result from altering those factors (Fed Savvy Strategies, 2022).

Circular Economy:

An industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models (EMF, 2017, p. 7).

Competitive Intelligence:

It is the analysis of all the external components of the business environment that impact an organisation and the impacts that these components might have. A SWOT (Strengths, Weaknesses, Opportunities, and Threats) is an example of an analytical tool for this type of analysis (Fed Savvy Strategies, 2022).

Corporate Foresight:

A practice-oriented foresight activity serves strategic decisions, whose main task is to complexly explore possible futures and channel them into strategic decision-making (Portaleoni et al., 2013).

Dynamic Capabilities:

The capacity to sense and shape opportunities and threats, seize opportunities, and maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets (Teece et al., 1997).

Emerging issues:

Reflect on the potential impacts of changes and trends occurring in the wider business or policy context. They are often unclear, complex, and uncertain (Olavarrieta et al., 2014, p. 120).

Foresight:

Implies action in the present in light of anticipated future states of affairs (Nelson, in Sardar, 2010, p. 179).

Framework:

A conceptional structure (as of ideas) that determines how something will be approached, perceived, or understood (Webster Dictionary, 2022).

Futures Literacy:

The capability to understand the role of the future in influencing the present and the skills to generate imaginary futures to catalyse change today (Weigend Rodríguez et al., 2021, p. 696).

Futures Studies:

The systemic study of possible, probable and preferable futures, including the worldviews and myths that underlie each future (Inayatullah, 2013, p. 37).

Grounded theory:

A method that enables the researcher to generate systemically a substantive theory grounded in empirical data (Walker and Myrick, 2006, p. 548).

Interdisciplinarity:

Combining two or more disciplines to a new level of integration in which component boundaries start to break down. Interdisciplinarity is no longer a simple addition of parts

but the recognition that each discipline can affect the research output of the other (Caldwell, 2015).

Market Intelligence:

It is the surveillance of a larger field than competitive intelligence. It expands to other aspects that may directly impact the organisation. For example, a major market intelligence technique is STEEP+V (Social, Technological, Economic, Environmental, and Political/Legal+ Values) analysis (Fed Savvy Strategies, 2022).

Method:

Means or modes of data collection (Howell, 2013, p. ix).

Methodology:

The research strategy that outlines the way one goes about undertaking a research project (Howell, 2013, p. ix).

Multidisciplinarity:

Involves little interaction across disciplines as it contrasts disciplinary perspectives in an additive manner, meaning two or more disciplines each provide their viewpoint on a problem from their perspectives (Caldwell, 2015).

Organisation:

A group of people who work together in an organised way for a shared purpose (Cambridge English Dictionary, 2022).

Outputs:

From a CFA perspective, the outputs are two-fold: tangible and intangible. Tangible outputs would include the range of options generated by the approach implementation. Intangible outputs would include the changes in thinking produced by the whole process (Voros, 2005, p. 11).

Pattern:

Identifying a signal from a field of what would otherwise be considered noise (Olavarrieta et al., 2014, p. 277).

Plausible Futures:

An image of the future that seems possible and does not unduly stretch credulity (Olavarrieta et al., 2014, p. 281).

Possible Futures:

The range of possibilities that might happen, including a future influenced by wildcards (Olavarrieta et al., 2014, p. 282).

Preferable Futures:

Imagined depictions of wished-for futures, normative futures. In the extreme, utopias (Olavarrieta et al., 2014, p. 106).

Probable Futures:

Likely to be or to happen in the future, but not necessarily so (Olavarrieta et al., 2014, p. 289).

Systematic:

The words systemic and systematic are both adjectives that come from the noun system. While they can each be used to broadly mean "relating to a system," their usual jobs are distinct. Systematic is the more common of the pair. In current English, it is most often used to describe something that uses or applies a careful system or method, or that is done according to a system. A systematic approach to organizing one's books, for example, would involve establishing a system—say, determining if fiction and nonfiction will be separate, or if genres will be grouped, or if all the books will be arranged alphabetically by author's last name, etc.—and then implementing that system, perhaps by making piles and then by putting each pile’s books in a chosen final location. The term can also imply a thoroughness that comes from using or applying such a system (Merriam-Webster, 2022).

Small and Medium-sized Enterprises (SMEs):

Enterprises can be classified into different categories according to their size; for this purpose, different criteria may be used, but the most common is the number of people employed. SMEs employ fewer than 25 people (OECD, 2022).

Transdisciplinarity:

It occurs when two or more discipline perspectives transcend each other to form a new holistic approach. The outcome will completely differ from what one would expect from adding the parts. Transdisciplinarity results in xenogenesis, creating output due to disciplines integrating to become something completely new (Caldwell, 2015).

Trend:

A measurable or observable transformation in a given system (Olavarrieta et al., 2014, p. 369).

Visioning:

It is the action to imagine the futures desired and, among them, the vision of the preferred future (Olavarrieta et al., 2014, p. 389).

Weak signals:

Indicator of a change to come that it allows initiating a work of anticipation and characterisation of its future evolution. It is an indicator of impeding change built on the basis of environmental scanning (Olavarrieta et al., 2014, p. 391). Examples of weak signals are available at: https://www.sitra.fi/app/uploads/2022/02/weak-signals-2022_web-1.pdf

Wild card:

An unexpected event that would have enormous consequences if it actually occurred (Olavarrieta et al., 2014, p. 393). Examples of wildcards are available at: https://millennium-project.org/wp-content/uploads/2020/02/10-Wild-Cards.pdf

Wicked problems:

Because of complexity, uncertainty and interdependencies, efforts to solve one or a collective of problems often create a plethora of new problems (Churchman, 1967).

Introduction

1.1 Motivation to pursue a PhD degree

After graduating with my master's degree in 2015, I resumed my professional career at Heineken México. My Master's studies and previous work experience equipped me to design and implement substantial changes to the sustainability strategy and teach the whole organisation the new concept of Circular Economy (CE).

I also orchestrated a self-assessment to measure the level of advancement on circularity in the different areas within the organisation and set goals, and more importantly, to transform from knowledge to practice the principles of CE by building specialised teams working on actionable projects to progress on CO_2 reduction, water mitigation, renewable energy levels, and sustainable packaging among others. I never contemplated the idea back then of continuing my academic career as a PhD student.

During one of these projects, as a multinational brewery, Heineken needed to partner with an SME since Heineken did not have the technology to transform their cellulose fibre waste from beer into a sustainable material for packaging and other applications for their business. So Heineken partnered with the only organisation in early 2016 that could do this for them, a Dutch SME (henceforth referred to as DSME). However, while the DSME had the technology to address one of Heineken's strategic challenges (sustainable packaging), it had minimal staff and financial resources.

This set of facts caught my attention significantly as the project unfolded because it jeopardised its execution. For example, the expectations from Heineken, which usually works with more prominent organisations, were unrealistic in terms of time frames for the execution of the project and the economic burden that the DSME needed to invest upfront in meeting Heineken's wishes of demands. This evidenced the importance of the size of the organisations concerning a transition to a CE. I let this reflection settle while the execution of the process continued. After a year of working on this project, I was fortunate to lead the team at Heineken and co-create the first circular packaging and merchandising material for Heineken México made with Heineken's beer process waste and the DSME clean technology.

Personal circumstances led me to end a 13-year career at Heineken México and start working as an independent entrepreneur. Since my previous collaboration with the DSME and Heineken was an iconic CE project in México, I collaborated on other projects with this DSME independently, focused not just in México but also in Latin America.

In one of the first gatherings of CE professionals in Latin America, held in Medellin, Colombia, in 2017, I had the chance to meet a small group of CE professionals from the region. During this two days event, we discussed the progress, challenges, and current projects we were involved in concerning CE in our countries. As it is used in conference settings, there was a small group of keynote speakers whose level of CE expertise was noteworthy. These speakers were mainly from non-Latin American countries, and I knew of them by reading their CE publications. Two of these speakers were Ken Webster and Dr. Julian Kirchherr. During one of the lunch breaks, I sat next to Dr. Kirchherr and greeted him for his most recent publication (Kirchherr et al., 2017). During the following minutes, we had a conversation about our backgrounds, and the thing that surprised me the most was how young he was to hold a PhD. and how experienced he was on CE through projects that he was working on at the moment in collaboration with organisations and with the broader CE community.

After this experience, I started to be motivated to go further in my academic education. I wanted to become an integral professional and expert on CE. For this reason, I started my PhD studies the year after, in October 2018.

1.2 Motivation for my research topic

I proposed the initial research topic focused on sustainable materials to my director of studies, Professor. Francesco Pomponi, specifically on designing a road-to-market strategy for sustainable building materials that could penetrate the market successfully and compete against traditional materials such as High-Density Fibreboard (HDF), Medium Density Fibreboard (MDF) or Plywood, among others. I proposed a methodology and steps for implementing this initial research topic in my application for the research position.

Some months later, once I arrived in Edinburgh to start my research, I changed my research topic. The new topic was the intersection between CE and FS. Before starting my PhD, I was interested in exploring the potential of an interdisciplinary collaboration between these two disciplines. I had a temporary job at a design agency in México City. My responsibility was to open a division in CE where we could work with companies interested in implementing this economic paradigm. In parallel, an existing area within the company was the division of Futures Studies. A well-known futurist, Dr. Jorge Camacho, led this division to help organisations launch their long-term strategies and new products. During my day-to-day job, I conversed with Dr. Camacho about CE and FS

concepts. We often would debate and find conceptual similarities in how we believe both disciplines had mutual goals. Based on these discussions, there was agreement on the potential for collaboration between CE and FS.

I took a more active approach to this research topic as soon as I started the literature review on CE. I was trying to find the knowledge gap based on my initial research topic, sustainable materials. While I progressed on my literature review, I considered this potential for collaboration between CE and FS more relevant, underexplored, and utmost attractive to me as a research topic. However, there was no discussion or dialogue between these two disciplines in any of the publications reviewed. These acknowledged limitations were conducive to this research gap and the consequent aim and objectives. In what follows, I lay the theoretical and empirical groundwork for the argument that FS can complement the CE.

1.3 Background

The world has been in a pandemic mode for more than two years due to the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), leading to the coronavirus disease (COVID-19), the fastest-growing global pandemic in human history (Our World in Data, 2022). COVID-19 showed that the past is no longer a reliable compass for understanding what comes next. The pandemic has exposed a series of global vulnerabilities. Going beyond its terrible human toll (this pandemic has caused more than 6.31 million deaths worldwide at the time of writing), the impact of COVID-19 on the economy has severely affected the business environment.

For organisations, the most acknowledged effects of the virus outburst have been supply chain and transportation disruptions, raw material shortages, cancellation of orders, and decreased market demand (Shafi et al., 2020). If present pressures continue, these could result in an unprecedented and significant group of organisations being left behind in future markets (World Economic Forum, 2021).

Small and Medium-sized Enterprises (SMEs) have been impacted the most (Shafi et al., 2020). The primary causes are more economic vulnerability of SMEs than large multinationals because of reduced financial and managerial resources, more dependency on business transactions, and more limited customer volume than large enterprises. Acting upon this crisis, in addition to more silent but systemic and pressing worldwide issues, such as global rising temperatures, ocean pollution, loss of biodiversity and food, as well as water security (United Nations, 2021; IPCC, 2014), demands recognising and

interpreting new information, as well as immediate and efficient decision-making to navigate current and future challenges (Foer, 2019) and choosing a pathway that aligns with the organisation's dynamic capabilities and resources is crucial (Atasu et al., 2021).

To navigate and address these and new 21st-century challenges, it has been argued that the CE has the potential to increase resilience in organisations whilst bringing about positive impacts in several other spheres related to society and planet Earth compared to the current linear model of production and consumption (Prieto-Sandoval et al., 2021; Wuyts et al., 2020). At the organisation level, this paradigm shift could catalyse improving, sustaining or keeping their enterprises alive. However, in the absence of solid evidence of its promises, the CE requires more in-depth scrutiny (Lazarevic and Valve, 2017).

Other studies demand a greater focus on reflecting on and exploring the different potential, possible, plausible and preferred futures under a CE paradigm (Voros, 2005). However, the current body of literature pays no attention to how organisations could benefit from combining CE principles and FS methods to explore and achieve transformation towards preferred futures (Weigend Rodríguez et al., 2019).

Furthermore, the risk of not including an FS perspective as part of any methodological CE work is that it could increase circularity for products, processes, organisations, cities and regions. However, this increase could lead to social and environmental negative consequences. For example, at a materials level, several life cycle assessments demonstrate that some alternatives to plastics perform poorly from an energy and resource standpoint. In this case, the solution could cause more harm than the original problem (Global Citizen, 2019).

At a product level, as the renewable energy wind industry grows, so does the number of ageing and damaged turbine blades that get replaced with more efficient ones. The solutions to this waste are looked up at the end of the pipe; this is evidence of how wind turbines are not designed with a foresight perspective (Bloomberg, 2020).

Lastly, there could be negative externalities directly towards people. A case in point is in Saudi Arabia, where a $500 bn megacity project, 'the line', is being built. This ambitious project claims to use CE principles while planning to accommodate 9 million residents in a city of 200 meters wide, 170 kilometres long and 500 meters high, aiming at using significantly less land when compared to other cities of similar capacity. However, this project is being built at a high social cost as approximately 20,000 people will be forced to relocate to accommodate the planned city (The Guardian, 2020).

Unfortunately, as it is occurring in practice, a CE study has yet to take a concrete FS perspective and investigate the potential benefits of its adoption by the CE community, the public and private sector, and the wider society (Gebhardt et al., 2022).

Since there is a clear need for more methodological support, to address this void, I undertook empirical research to develop an approach that provides organisations with a systematic and interdisciplinary methodology to study the future and reach a preferred future using CE principles and FS methods. My main research contributions are twofold:

(1) A new paradigm to reach a preferred future in the context of SMEs. To make this concept actionable, I have turned it into a methodological approach, which I defined as the 'Circular Futures approach' (CFA).

(2) A pathway to implement the developed approach effectively.

1.4 Research aim, objectives and research questions

1.4.1 Aim

This thesis aims to formulate and test an interdisciplinary systematic approach based on Circular Economy (CE) principles and Futures Studies (FS) methods for Small and medium-sized enterprises (SMEs) that would guide them to define and reach their preferred future. My thesis takes FS methods as examples to demonstrate how they contribute to the development of the CE discipline. Since CE practice reveals a high level of uncertainty (Gebhardt et al., 2022; Finn et al., 2020), the underlying hypothesis behind this research is that without an interdisciplinary approach that integrates FS methods in the CE, collective efforts from SMEs toward achieving a successful transition from linear to a circular economy would be ineffectively or incompletely addressed.

1.4.2 Research objectives

Five distinct but interlinked objectives underpin this research and have represented the milestones that ultimately allowed me to fulfil the research aim.

- A bibliometric and critical literature review of CE and FS covering both overlap and collaboration between the two and existing methodologies and potential synergies on analytical as well as practical levels.
- To integrate and build on various CE and FS concepts and methods and incorporate them into a new approach.
- To integrate the developed approach into a collaborative operational framework for SMEs.

- To apply, test and refine the developed approach.
- To evaluate whether the Circular Futures Approach (CFA) is a valid, reliable and valuable instrument for SMEs in a transition to Circular Economy.

1.4.3 Research questions

I have formulated the following research questions abductively during the literature review, data collection, and analysis of my research:

- What does the CE lack to help organisations transition to their preferred futures?
- How could FS complement CE and help SMEs transition from a linear to a CE?
- What approaches, steps and activities within the CE and FS disciplines could guide organisations in this transition?
- How the developed approach could contribute to SMEs for a successful transition to CE?
- Based on the approach implementation. What are the learnings, and how could the approach evolve based on these learnings?

1.5 Structure of the thesis

The thesis consists of seven chapters, namely 1. Introduction, 2. Literature review, 3. Conceptual approach, 4. Research design, 5. Circular Futures Approach implementation, 6. Findings and discussion, and 7. Conclusion.

Chapter 1 – Introduction:

Provides my reflection on the motivation for doing a PhD and why I chose my research topic. The research aims, objectives and research questions are listed, and the knowledge contributions this thesis will make to the field of Circular Economy are articulated.

Chapter 2 – Literature Review

This chapter discusses the antecedents, origins, and how the concept of the Circular Economy has evolved, building on the fundamental contributions of eight schools of thought, followed by an analysis of the current debate in this field of study. This chapter also highlights the unexplored topic of methods to explore alternative futures in the CE literature. It further provides a critical analysis of the relevant literature on Circular Economy and Futures Studies and their application in SMEs. Finally, this chapter demonstrates the need for more interaction between bot communities and analyses the

few publications where the two fields interact. I have used selected material from my published papers for this chapter, listed on page iii.

Chapter 3 – Conceptual approach:

The key terms and approaches in both fields are discussed, and the four frameworks that I got inspiration from to develop my approach are explained. Next, the principles of CE and Futures Studies methods in which my approach is structured are established. Lastly, my developed Circular Futures approach is described in detail in its seven stages: 1) surveying, 2) mapping, 3) exploring, 4) cruising, 5) encountering, 6) landing and probing, and 7) transforming. I have used selected material from my published papers for this chapter, listed on page iii.

Chapter 4 – Research design:

This chapter introduces the research strategy and steps in the data analysis, including the SME characteristics in which the CFA was implemented. The data collection, s methods and quality standards are explained.

Chapter 5 – Circular Futures Approach implementation:

The CFA implementation in the DSME is explained in detail, phase by phase. This chapter describes how each activity was implemented and the most relevant contributions of each FS method.

Chapter 6 – Findings and discussion:

The results of the CFA are examined and discussed. The improvements to the approach are explained based on the implementation learnings. This chapter also discusses the main findings and answers to the research questions.

Chapter 7 – Conclusion:

The implications, strengths, possibilities and limitations of the research are discussed. Finally, the contribution of my thesis to the Circular Economy and Futures Studies disciplines are listed as well as the opportunities for future research.

2.1 Methodology for the literature review

To ensure the value, validity, and reliability of my literature review, a systematic process was carried out to understand the level of interdisciplinary research between CE and FS in SMEs. The first approach used to gather information was a bibliometric review. Data was sourced from Dimensions, an interlinked research information system provided by Digital Science (Dimensions, 2022). Due to its dynamic research data platform, I used this software to explore connections and develop meaningful data. However, to corroborate my findings, I also searched three additional academic search engines: Google Scholar (2022), Research Gate (2022), and Connected Papers (2022). Data collected for this study was last updated in June 2022. The keywords used were "Circular Economy", "Futures Studies", and "Small and Medium-sized Enterprises (SMEs)". However, when these keywords were used to search for titles and abstracts, I found just a small number of publications. Therefore, a snowballing technique (Jalali and Wohin, 2012) was adopted to build my bibliometric analysis.

To start using the snowballing procedure, I identified a set of papers that focus on CE, FS and SMEs that were either high on the number of citations or deemed highly relevant for my research topic, for example, Kirchherr et al. (2017), Geissdoerfer et al. (2017), Pomponi and Moncaster (2017) and Pauliuk (2018). Mainly articles written in English were reviewed. The snowballing procedure was stopped when no new publications relevant to this research were found. Furthermore, I reviewed the remaining article's abstracts to ensure their relevance, checked if the focus of these articles were CE, FS and SMEs, and critically assessed the quality of these publications.

A total of 592 publications, including books, journals and consultancy publications, were analysed using this approach. In the next section, I discuss the findings of the snowballing technique.

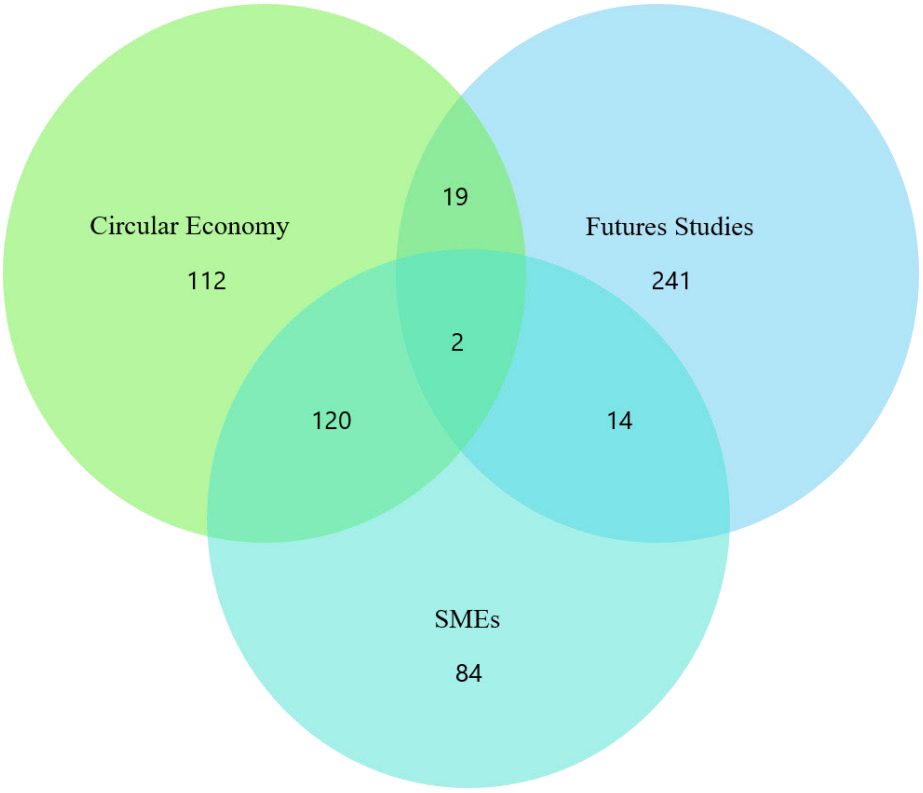

Figure 1. Venn's diagram literature review.

2.1.1 Publications where both fields interact

This subsection includes the few publications where both fields, CE and FS, interact found during the literature review and snowballing technique stages, and the publications focused on SMEs from these two disciplines; I start with the two publications at the centre of the Venn diagram:

1) In De Jesus et al. (2019), the central argument is similar to my research as the authors argue that CE lacks a structural process to transition from a linear to a CE as a field of study. As a solution, they propose to use FS methods alongside CE, especially "for envisioning the end state (bringing the CE into sharper focus) and the 'pathways' of transition in helping decision-makers and business actors to explore and prepare their future CE efforts" (p. 1495). This publication also stresses that both fields of study seldom talk to each other, and they try to fill this gap by deploying the Delphi method. However, in their implementation of the Delphi, De Jesus et al. (2019) only invited CE experts and practitioners to participate. I believe the analysis and conclusions reached by De Jesus et al. (2019) could have been richer had they included experts from other fields in the panel.

Furthermore, their study did not combine at least two FS methods or translated findings into possible scenarios, which FS experts usually recommend (Glenn, 2001).

2) Kuzmina et al. (2019) envisioned the future of the fast-moving consumer goods (FMCG) industry within a CE context. However, while these authors have contributed to the field of CE by constructing futures scenarios and illustrating the benefits of FS, they did not describe the process or the FS method used to arrive at those scenarios.

It is also worth emphasising that the created scenarios should have considered the contrasting possibilities of where the FMCG industry could be heading. For example, the five scenarios 'rinse and reuse', 'cycling of pure materials', 'the rise of the circular retailer', 'a world without supermarkets' and 'connected living' are just aspirational snapshots of what a circular future may hold. However, less favourable or dystopian scenarios could have been used to alert decision-makers on what needs to be done to avoid those outcomes. As Gabriel (2014) mentions, participants may explore alternatives that none of the experts believes will happen but could be plausible under certain reasonable conditions when implementing an FS method. This specific example shows how CE research can benefit from FS methods.

Neuvonen et al. (2014) and Mont et al. (2014) created broader scenarios, focusing on understanding a low-carbon future and more sustainable lifestyles for societies living in 2050. Dufva et al. (2016) proposed integrating FS into the everyday activities of organisations rather than as a separate process when it is already too late to react to the perceived challenges. These authors focussed on the role of 'gaming' within FS and proposed 'foresight games' to be used by CE practitioners to generate new insights about alternative futures. I agree with their conclusions about what should be the right motivation for CE to use FS: "the focus is not on how open or closed the futures are, but rather what can be learned from them. The learning process is not about learning to predict the future but about orienting towards the future. This means being open to alternative futures, sensing weak signals of change and proactively working towards a preferred future" (p. 569). Lastly, it is worth noting that a handful of the publications referring to CE have started to use FS methods, especially at the micro-level (e.g. Sinclair et al., 2018; Seidel et al., 2017).

2.1.2 Derivative works

Three of my publications (Weigend Rodriguez et al., 2019:2020:2021) have been referenced by various authors in the field of CE and FS. There have been especially two publications, one from each field, worth sharing. On CE, the publication is *Circular*

futures: What will they look like? By Bauwens et al. (2020). This manuscript aims to qualitatively conceptualise four potential circular futures narratives to help generate strategies for a transition towards a more circular economy. This publication references Weigend Rodriguez et al. (2019) at the beginning of their manuscript as support for their argument on evidencing the dearth of research about what the future of a circular economy may look like, the importance of addressing this gap and on formulating their four plausible scenario narratives for a circular future. Other publications followed this logic and referenced Bauwens et al. and my publication as important influences in developing their arguments. For example, *Circular food futures: what will they look like?* Liaros (2021a) and *A network of circular economy villages: design guidelines for 21st century Garden Cities* by the same author (Liaros, 2021b).

The other publication influenced by my work in the FS field is *Anticipation to Emancipation: toward a stage theory of the uses of the future* by Inayatullah (2022). Similarly to the CFA, this publication introduces an approach that deepens the Six Pillars approach (Inayatullah, 2008) and moves towards a stage theory of the uses of the future. Specifically, the manuscript inquires about which methods and tools are appropriate depending on their implementation context and offers a structured step-by-step process. As Inayatullah's newest published approach came after mine, I was honoured that the CFA had influenced his proposed research, especially as he is one of the most prolific FS authors and the author of one of the approaches (Inayatullah, 2008) that inspired the CFA backbone, as explained in section 3.2.4.

2.2 Circular Economy & Futures Studies: literature review

2.2.1 Circular Economy defining contributions

Humans' approach to production and consumption has contributed to world problems in past decades, such as the inefficient allocation of resources, social inequity, extreme weather conditions, ocean pollution, and biodiversity loss. These issues are expected to expand and reach crisis levels (Stockholm Resilience Centre, 2019). Moreover, the current economic "take-make-use-waste" model leads us to use more resources than the earth can replenish (Stockholm Resilience Centre, 2019), leaving the financial yields to the lucky few and the social and ecological devastation to the many.

It is time to rethink how we operate and transition to a more sustainable future (Geissdoerfer et al., 2017) and open our minds to new and radical ways to reach an equilibrium between economic prosperity and social equity while at the same time living

within the earth's providing capacity. Amongst the available paradigms is the concept of CE, a new economic and development paradigm that has gained traction in recent years (Ghisellini et al., 2021; Kirchherr et al., 2017)

This section outlines the authors, concepts and schools of thought (SoT) from which the concept of CE has evolved since the late 1960s.

The earliest author who significantly influenced the CE was Boulding (1966), who wrote the seminal essay *The economics of the coming spaceship Earth.*

The relevance of this author is twofold. First, Boulding wrote over 56 years ago about the two types and contrasting models (i.e. linear and circular) of extraction, production and consumption that are debated nowadays. What Boulding called the 'cowboy economy' is now called 'linear economy'; a "reckless, exploitative and violent behaviour towards the environment" (1966, p. 7), to which he proposed the "spaceman economy" (now called circular economy) as a solution, where humankind "must find his place in a cyclical ecological system" (p. 8). The second reason for the relevance of Boulding's work, and that none of the other SoT considered, is the importance this author sets on the concept of the future. Boulding (1966) evidenced a great deal of historical evidence suggesting that a society that loses its connection with the past and its positive image of the future also loses its capacity to deal with the problems in the present and soon falls apart.

Stahel (1982) is also a significant author that influenced CE. This author discussed the extension of the use life of goods to transition towards a sustainable society and proposed a 'performance economy' based on a spiral-loops system that "minimises matter, energy-flow and environmental deterioration without restricting economic growth or social and technological progress" (p. 74). Stahel (1982) also proposed product-life extension activities (e.g. reuse, repair, reconditioning, upcycle, and restore) that are now part of CE's core activities at the CE micro level for materials, components, and products.

The third influence on CE is the concept of 'industrial ecology' by Frosh and Gallopulos (1989). These authors contributed with a strong argument on how the traditional industrial model back in 1989, which has failed to change substantially till this day, is mainly preoccupied with maximising the immediate benefits for producers and consumers rather than the economy as a whole. Therefore, Frosh and Gallopulos (1989) proposed an 'industrial ecology' for a holistic approach that seeks a sustainable balance between economic benefits and environmental needs. Furthermore, these authors introduced a novel concept of 'waste equals food', where residues from one industrial

process can serve as raw materials for another, reducing the industry's environmental impact.

The fourth influence, 'regenerative design', coined by Lyle (1996), is described as a means of "replacing the present linear system of throughput flows with cyclical flows at sources, consumption centres and sinks" (p. 10). Lyle also described this proposed regenerative system as one that "provides continuous replacement, through its functional processes, of the energy and materials used in its operation" (p. 10). This author proposed using energy from renewable sources, minimising the use of fossil fuels, maximising the use of materials by reusing them, and keeping waste volumes within the environment's capacity to reassimilate them without irreversible damages.

The notion of a CE also has its roots in 'biomimicry' (Benyus, 1997). This concept goes beyond the previous ones in its value on nature by making a case for the significant importance of learning from it to solve human, business and technological challenges. It relies on three fundamental principles: nature as a model to solve human problems, nature as a measure to judge human innovations, and nature as a mentor (Webster, 2017). Biomimicry argues that, after 3.8bn years of existence, humans are not in complete control, and nature knows better than us what works or not, what has longevity on Earth and how it should be designed. CE's core metaphors are essentially, like biomimicry, taken from the ecological system (this is a major plank of interest in the CE, and also resistance).

'Natural capitalism' by Lovins et al. (1999) also influenced CE in a practical sense rather than a philosophical one. These authors criticise the effects of pure capitalism on nature and propose instead a paradigm shift where "the economy is a wholly-owned subsidiary of the environment, not the other way around" (p. 1). They proposed a new set of four principles: to use resources more productively through new design practices (1); to redesign production on biological lines with a closed-loop approach, that is, no waste and no toxicity (2); a shift of business models from selling goods to leasing a continuous flow of services according to customers' evolving needs (3); and to reinvest business profits into restoring, sustaining and expanding natural capital (4). The concept of natural capitalism is also relevant because it proposes a shift from taxation on jobs and income to taxation for depletion and pollution, and the revenue from this is later used to repair damages to nature.

The penultimate significant influence on CE is 'Cradle-to-cradle', a concept developed by Braungart et al. (2007). This work outlined how products should be designed by differentiating between two types of metabolism in an industrial process, biological and

technical, to keep the value of materials and components as high as possible for the next use cycle. This would cause a shift from efficiency to effectiveness, aiming to have a good effect instead of a “less bad” effect on the ecological system. To be effective, CE, like all living systems, must be "dynamic but adaptive, neither courting disaster by over-extending efficiency (brittleness) nor becoming too resistant to change (stagnation)” (Webster, 2017, p. 21).

The latest significant influence on CE is the ‘blue economy’ concept from Pauli (2010). Blue economy proposes an open-source movement and an innovative business model that uses local communities to bring competitive products and services to different markets, fulfilling the communities’ basic needs while building social capital and living in harmony with nature. If biomimicry puts nature at the centre of everything, the blue economy promotes a balance between nature and humankind. This SoT, perhaps more than all of the other significant influences, radically questions the current economic model. Its approach is eudaemonic and is preoccupied not with scale but with adding value to well-being with what is available. It favours local economies, cultures and traditions and uses the available resources in cascading systems, where the waste of one product becomes the input to create a new product with its new cash flow.

As a term, ‘Circular Economy’ was mentioned for the first time by Pearce and Turner in the *Economics of Natural Resources and the Environment* (1990), referring to the economic benefits of this paradigm and the direct relationship of CE with the concept of sustainable development and how could be addressed by CE. Moreover, Wassily Leontief also mentioned it in *The Economy as a circular flow* (1991).

To explain how CE's main characteristics, principles and aspirations connect to the schools of thought mentioned earlier, I have outlined the key relationships in Figure 2 below.

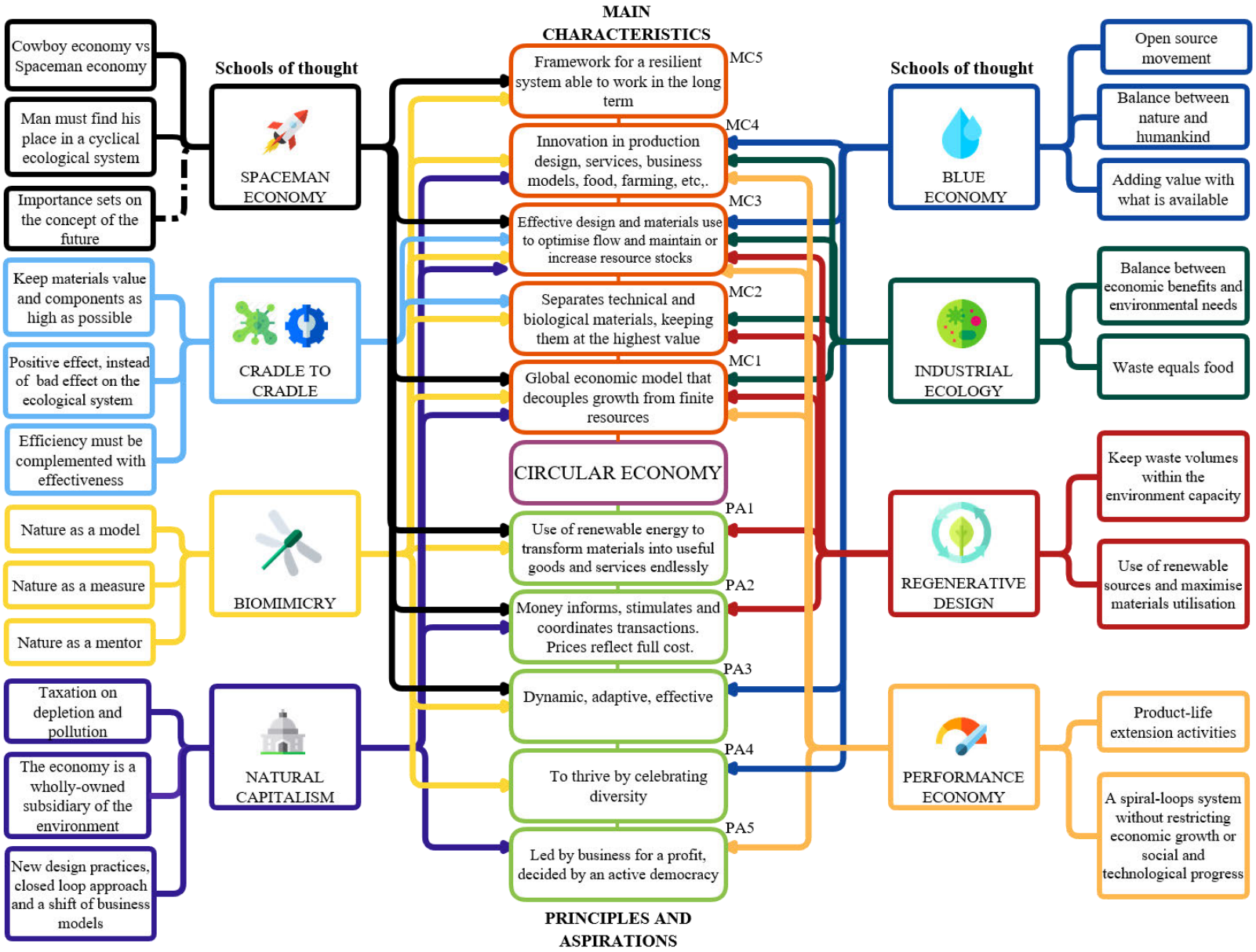

Figure 2. CE dynamics (Weigend Rodríguez et al., 2020).

According to Beaulieu et al. (2015), CE also builds on preceding thinking and related concepts such as Ecological Transition; Green economy; Functional Economy; Life Cycle Thinking; Shared Value; Extended Producer Responsibility; and Eco-design.

Because all of these supporting concepts vary in concreteness and scope, it leads to a fragmented understanding of what CE is, making the definition challenging and measuring and monitoring its performance.

Given CE's transversal and multidisciplinary nature (Johansson et al., 2021; Ruiz-Real et al., 2018), this lack of unanimity about what CE means comes as no surprise because CE is an umbrella concept that is based on a core 'metabolist', 'living systems', 'effective systems' metaphor group (Webster, 2017) which evolves from the eight SoT explained and summarised in the previous section.

For this reason, CE has been defined in numerous ways (Johansson et al., 2021; Ruiz-Real et al., 2018), yet, no single definition of or consensus about what CE means has been achieved hitherto (Kirchherr et al., 2017; Merli et al., 2018).

Kirchherr et al. (2017) found qualitative and quantitative data in their analysis of CE through written definitions from peer-reviewed journals and not peer-reviewed publications since an essential contribution to CE is driven by non-academic players (e.g. reports from the Ellen MacArthur Foundation (EMF) and policy papers from the European Commission). Results from this analysis identified 114 CE definitions and showed that the definition from the EMF is, numerically, the most used definition in the analysed publications. As reported in the glossary, this definition describes CE as:

"An industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models" (EMF, 2017, p. 7).

Based on this definition, CE is regarded as a new economic paradigm applied via-à-vis the linear take-make-waste extractive industrial model. A CE aims to redefine growth, decoupling it from excessive resource extraction and exploitation while focusing on positive society-wide benefits. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: (1) design out waste and pollution, (2) keep products and materials in use, and

(3) regenerate natural systems by returning or retaining the biological and technical nutrients in the system (EMF, 2021).

The CE concept is debated mainly by academics, policymakers, practitioners and professionals as a branch of sustainability science. Mainly entrenched in principles of industrial ecology (Erkman, 1997), Cradle-to-Cradle products and systems design approach (Braungart et al., 2007) and cleaner production (Fresner, 1998).

However, when this definition from the EMF is evaluated against the mentioned main schools of thought that CE has evolved from, it clearly lacks more elements. This definition, for example, describes CE as an industrial system, however, because CE is challenging the current economic model—linear economy—it should also be recognised as an economic system. Another problem is that this definition does not differentiate between the levels CE that could be implemented (e.g. micro, meso and macro levels). Furthermore, last, it does not describe the reason or ultimate goal behind using this system, which could cause confusion when it is described, promoted, or implemented. Therefore, Kirchherr et al. (2017) proposed a new CE definition instead, describing CE as:

"An economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro-level (products, companies, consumers), meso-level (eco-industrial parks) and macro-level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations" (p. 224).

This definition clarifies that CE is an economic system, not a design technique, a framework or a model. It includes different levels of operation, micro, meso and macro, which help within the scope of this research as it focuses on the meso-level, particularly SMEs. It also defines the aim of CE, which is to accomplish sustainable development. Lastly, it clarifies that operating within CE implies not just seeking environmental quality but that it is equally important to accomplishing economic prosperity and social equity for the current and future generations. However, as a critique of Kirchherr (2017), CE is not based on business models. I have explained in the previous section the schools of thought that CE is inspired from, and none of these schools of thought emphasises this element. Lastly, Kirchherr is misaligned by proposing a definition in which Sustainable Development —a polysemic and comprehensive concept that attempts to reconcile and

fuse three dimensions of development: economic, environmental and social— (Beaulieu et al., 2015) is the final aim for the CE. I have explained during the SoT analysis how CE is an umbrella concept and that while the CE contributes to Sustainable Development, it is not the aim.

2.2.2 Critiques of the CE

While the CE is promoted by its advocates in business and has been incorporated into local, national and regional policies (Huang et al., 2022), some of its arguments and postulates have been subject to criticism (Gibbs, 2021). Moreover, CE conceptually still lacks consensus, and it also needs to be critically questioned and validated operationally (Suarez-Eiroa et al., 2019; Cullen, 2017; Hobson and Lynch, 2016) to ascertain its ability to be the most suitable economic paradigm.

Recent literature has focused on addressing the need for increased resource efficiency at the core of organisations' action plans, exploring more sustainable ways of conducting business (Garcés-Ayerbe et al., 2019; Salvador et al., 2020).

In their critique of CE, Gregson et al. (2015), particularly in the context of Europe, reviewed publications from public and private entities (e.g. European Commission, 2020; and Ellen MacArthur Foundation, 2015; 2013). The evidence presented by these authors suggests that CE literature tends to be “uncritical, descriptive and deeply normative” (p. 219) and less concerned with analysing potential negative aspects or whether the CE can deliver on its promises (Gibbs, 2021).

Similarly, a more recent study by Johansson et al. (2021) critiqued the CE based on nearly a hundred publications and reports. These authors argue that the CE has room for improvement on theoretical, practical, and ideological grounds and social and environmental impacts. They also develop their argument based on the complexities of a CE implementation at a corporate, consumer and policy level and explain why most organisations fail to translate the CE concepts and principles into their business operations. Moreover, these authors evidence a lack of means to measure how circular a business is.

It was emphasised by Pomponi and Moncaster (2017) that CE must take a future-oriented and multidisciplinary approach. It was also stressed by Johansson et al. (2021) that the CE needs a renewed, enlarged, and transdisciplinary research agenda. However, CE is currently very limited, and there is still significant room for conceptual improvements and being more receptive to other research fields (D’Amato et al., 2017; Geissdoerfer et al., 2017). Furthermore, most academic and practitioner literature appears

too optimistic and approbatory (Gregson et al., 2015; Leising, Quist & Bocken, 2018). Relevant studies (Lazarevic & Valve, 2017; Petit-Boix & Leipold, 2018) argue that CE must be subjected to deeper examination to avoid leading policymakers erroneously.

A consequence of CE limitations is that even conflicting conclusions have been found in recent publications, particularly regarding decoupling economic growth from environmental resources (Kjaer et al., 2018; Mayer et al., 2018; Ward et al., 2016). For example, while CE as an economic system promises to decouple economic growth from environmental impacts and resource extraction, Gibbs (2021) and Ward et al. (2016) indicated there is no historical evidence that CE can lead to achieving this in absolute terms. As Dzhengiz et al. (2021) demonstrated, only a few scholars address the trade-offs, tensions and paradoxes for the CE to advance (e.g. Frei et al., 2020; Frishammar & Parida, 2019; and Perey et al., 2018).

The leading think-tank on CE, the EMF, predicts that by 2030 a full adoption of CE could produce better welfare, environmental and social outcomes than the current economic linear model. Interestingly, it was found by Lazarevic and Valve (2017) that this forecast is highly optimistic because it presupposes that innovation will have a higher pace than what has been observed in the past. Moreover, higher rates of innovation do not necessarily result in increased welfare. Furthermore, as Centobelli et al. (2020) have reported, the assumption from CE practitioners that technological progress would help build the CE is shared by the CE research community.

Within the CE (Brandao et al., 2020) and the FS research community (WFSF, 2020), there is a critical, normative stream that potentially sees the CE just as dangerous and threatening to the planet as the linear economy since both are based on ideas of growth and industrialisation. Therefore the CE could be implemented partially or worse than the current system.

A similar approach has been followed by the World Business Council for Sustainable Development (e.g. Thelen et al., 2017), leading strategic design studios specialised in CE (e.g. Dourma et al., 2018) and journal publications such as Kuzmina et al. (2019) and Mont, et al. (2014). Suggestions from these publications are highly approbatory and uncritical of CE. In addition, when these authors reference possible futures, they do so without explaining the process followed to arrive at those scenarios. The evidence demonstrates that a CE community is not proactively engaged in learning how to study the future and is closed-minded about accepting the possibilities of alternative futures (Dufva et al., 2016).

The few publications that have explained how they modelled the future (Neuvonen et al., 2014; Sinclair, Sheldrick, Moreno & Dewberry, 2018) ended up building highly optimistic versions, disconnected from accurate economic models and without reflecting realistic global considerations of where the interconnected world is heading to. For example, Neuvonen et al. (2014) developed four low-carbon scenarios and forecasted that a considerable increase in fossil fuel prices would persuade people to transition to renewable energies without a substantial conflict. However, past events in France have proven this assumption inaccurate, as a 20% increase in diesel price has caused a significant and violent social mobilisation to fight against this policy immediately after it was implemented. This incident is a manifestation of a broader problem, that is, the adverse effects of capitalism, combined with a lack of political courage to tax corporations (those who produce diesel) instead of the less privileged (those who drive the diesel trucks in France) and who ended up paying the costs. The government could have used the diesel revenue collected to aid those on whom this fuel tax fell the hardest by thinking in CE terms.

Korhonen et al. (2018) examined CE from an efficient perspective to point out the current limitations in the different levels of implementation. These authors argue that the CE theory has not been put into practice. Therefore, there are still important unanswered questions, for example, how to assess the actual environmental impacts of biomaterials, what are the barriers to the CE becoming mainstream, and how to have a positive global impact since the most significant environmental and social problems affect developing countries worse than in the developed countries and the CE is mainly moving forward in the later.

An interesting interrogative from these authors that CE cannot answer yet is the idea that because sustainable development is an inter-generational goal (present and future generations), investments in CE should also be considered for their contribution to the long-term goal of global sustainability in the future. One of the critical contributions from Korhonen and colleagues (2018) is their argument that CE compared to other innovative alternatives from the future, might rank very low when assessed against each other.

A broader perspective has been adopted by Miller et al. (2019). They argue that CE has not adequately explained how it could contribute to social equity, economic growth and the environment. In terms of biophysical barriers these authors point out that closed material loops are, in practice, impossible to achieve (e.g. recycling will everlastingly need energy and always create waste due to increasing entropy). Therefore, these authors state that CE only differs from the linear economy because a negative environmental

impact will take longer. These authors question whether CE can stimulate growth without degrading the environment due to rebound effects in economic terms.

Lastly, regarding equity, Miller et al. (2019) argue, supported by the evidence presented in their work, how the available body of literature supporting CE has been silent about the social dimension and has just focused, without empirical support, on saying that CE would boost job creation. Sauvé et al. (2016) are also concerned with CE's narrower focus than sustainable development. These authors believe that CE certainly has a set of tools for sustainable purposes, but what remains unclear is the final objective (e.g. the social objective is usually absent). A more recent study from Tsalis et al. (2022) corroborates these findings, reporting an increasing need to analyse CE's social impacts in detail.

From a different angle than the previous authors, Kirchherr et al. (2018) published the paper *Barriers to the circular economy: evidence from the European Union*. This publication is the first large-N-study on CE barriers and has been followed by similar but less empirical publications (e.g. De Jesus and Mendonça, 2018; Pheifer, 2017; Mont et al., 2014). Kirchherr and colleagues interviewed 47 CE experts and surveyed 208 stakeholders from businesses and governments in the EU. They categorised CE barriers into cultural, regulatory, market, and technological groups. Their most relevant findings identified 'lacking consumer interest and awareness and 'hesitant company culture' as the most critical cultural barriers to CE implementation.

These authors also identified possible connections between the four different groups. For example, ' low virgin material prices' can favour linear products resulting in 'lacking consumer interest and awareness', which leads to a 'hesitant company culture' (p. 270). Based on their findings Kirchherr and colleagues support CE as a promising concept for sustainable development. However, they also stress continuing with a careful analysis and discussion on CE barriers for its implementation. Furthermore, it is essential to mention that a similar analysis is needed for other regional contexts, as this study just focused on the European region.

Some writers (e.g. Elia et al., 2017) hold the view that while the concept of CE is being widely explored and several case studies have analysed its applications in a different context, the tools and criteria for measuring the level of circularity of products, companies or regions is still lacking.

CE also needs to be monitored from a systems perspective to avoid incoherent CE actions that do not contribute to sustainable development (Pauliuk, 2018). CE's lack of a tailored, systemic and detailed focus has also been highlighted by Pomponi and

Moncaster (2018) in their review and critique of the BS8001, the world's first standard on CE. Because of these limitations, it has become a common practice among CE practitioners' publications to encourage cities' managers to learn by doing, to ask them to experiment to know how CE works and at the same time to encourage them to lead in the transition to CE. This is evident from a passage from one of the publications reviewed:

"As of yet, no one has a complete view of the consequences and which actions have to be taken in the long term. Learning by doing and the formation of valuable networks are good first steps. However, we need to step up our efforts to make scaling up to the next phase possible. The transition to the next phase of the circular economy requires the Municipality to act —where necessary—to give direction, to be involved as a network partner and to work together with various stakeholders, in value chains, in sectors and at various scales" (Dourma et al., 2018, p. 15).

This CE approach could prove to be effective if the context is relatively simple or if it is focused on short-term perspectives. However, this is problematic because this is not the case with the problems the CE is trying to solve, which are highly complex, uncertain, and usually require a systems perspective, especially at the macro level.

Furthermore, Ken Webster made evident the absence of a developed approach to the future from the CE discipline.

"A linear economy has no real future. But a circular economy is assumed to be a long-term proposition; it makes a positive assumption about the future: well, simply that there will be one!" (2013, p. 547).

Webster's work came as a seminal milestone to avoid wasting time and effort in developing a theoretical framework for the CE from scratch, for he provided a compelling argument for all the things we do know already and acknowledged the vast theoretical basis, primarily on systems thinking, that is available to progress the CE. Nevertheless, he also recognised the lack of an operational tool, as if setting out on a nightly exploration to cross a forest, we embark on the journey without any torch or lights.

Similarly, Johansson et al. (2021) argue that the CE is the practical solution to the sustainability challenge, but CE's social imaginary underestimates the challenge and is silent on what a CE society might look like.

Even though the CE's objectives are framed, there is still high uncertainty regarding its future road map (Gebhardt et al., 2022). Considering that CE tries to improve and

advance the existing economic model, it should not make the same mistake of neglecting to develop a foresight capacity as the linear model did.

Therefore, is vital to be prognostic and ask: ‘what if the future is different from what CE anticipates?’ ‘How might it change?’, ‘what strategies will carry us to a preferred future?’ and ‘what are the assumptions taken for granted by business and management that are also reflected in the CE practitioner and research community?’ (Dzhengiz et al., 2021).

Abiding in these questions and drawing on the critiques listed above opens the possibility to look for other fields of study that have the theoretical framework and have developed suitable methodologies that CE could use to elaborate on and integrate the study of the future. By doing this, the CE could progress towards a CE discipline rooted more fundamentally and rigorously (Johansson et al., 2021).

2.2.3 Futures Studies

The consequences of the industrial period have progressively limited the planet’s capacity to support humanity. According to a recent global survey, global warming is now the world’s most significant concern for policymakers (Rosane, 2019). World problems such as global warming, ocean pollution, land degradation, and biodiversity loss are accelerating faster than humans' ability to solve them (Rockström et al., 2014; 2016). They grow in complexity without being challenged with transformative alternatives for the future. As Tonkinwise argues: “the futures we are getting hardly seem like the ones we explicitly decide on; they are more like the messed-up ones we are drifting unwittingly and implacably into” (2016, p. 570).

From an economic perspective, these futures revolve around explainable, yet self-destructive decisions, in terms of the creation and deployment of money as credit, subsidising fossil fuels, the failure to distinguish economic rents from the productive economy and the allied failure of tax systems to tax what is “bad” instead of what is ‘good’. I recognise that capitalism has achieved enormous benefits for humankind. However, the current linear approach toward the future has proven incapable of sustaining itself within planetary boundaries and, consequently, is ineffective and dangerous in its responses to global challenges.

I agree with Harari (2019) that images of the future should change over time to positively affect the future. This is where the contribution of FS to CE originates.

Futures Studies (henceforth referred to as FS) is understood as “the systematic study of possible, probable and preferable futures including the worldviews and myths that

underlie each future" (Inayatullah, 2013, p. 37). This school of thought is also known as futures research, foresight, or simply as futures (Fergnani, 2020). The purpose of FS is to maintain or improve the welfare and freedom of humans and the welfare of all living beings, plants, and the earth's biosphere for their own sake (Valciukas, 2003).

Although humans have been engaging with foresight in various forms for more than 2500 years (Loveridge, 2009), it became widespread in the 1970s because of the famous publication by the Club of Rome in 1972, *The limits to growth*, a report on the predicament of humankind (Meadows et al., 1972). As a discipline, FS has been a subject of inquiry with a body of literature, recognisable knowledge base, defined concepts, methods, methodologies, practices and processes for over 60 years (Sardar, 2010). However, Sardar (2010) argues that the FS field still needs a considerable dose of conceptual clarification.

Ramos (2002) has provided a compelling argument for the transdisciplinary nature of FS, as he describes FS as a growing field—during the last five decades—that has diversified through embracing fields such as systems thinking, hermeneutics, sociology, management, ecology, ethics, philosophy, planning and others. Ramos (2002) argues that this nature has given FS widespread use in numerous areas.

The seminal readings in Futures Studies literature (Bishop and Hines, 2007; Bell, 1997; Masini, 1993: Meadows et al., 1972), according to Bas (2022), unmistakeably demonstrate it is rooted in a historical period characterised by an extraordinary degree of uncertainty. For this reason, FS has been recognised by Slaughter (1998) as an evolving discipline with the most suitable tools to negotiate the turbulent conditions ahead and by Bas (2022) as increasing relevant to identifying and evaluating alternatives within complex, changing environments.

In principle, FS believes, as Derbyshire (2016) discusses, that human actions to build the future are partially limited by determinism but have agency to construct a preferable future rather than being passive responders. Medina (1999) and Bell (2009) suggest that the high value of FS is in its willingness to transform with actions the present for a positive future. Lastly, Dufva and Ahlqvist (2015) argue that by creating a diverse set of future images, we could be better prepared for how the future may unfold.

Organisations and institutions have adopted FS worldwide to support strategic thinking, organisational development and policy design (Habegger, 2010; van der Steen & van Twist, 2013). The governments of Canada, Finland, Japan, Singapore, South Korea, the United Kingdom and the United States, among others, have carried out structured approaches that incorporate FS methods, aiming to produce, implement, and

execute strategies toward economic growth, technological advancement and a more resilient future (Dawson, 2019).

FS should not be confused with the same task as planning, predictions, or forecasting. While forecasting is purely extrapolative, FS is naturally conjecturing (Bas, 2022). As Bas (2022) explains further:

"FS entails a change of mentality in relation to forecasting: the aim does not consist in ascertaining what the future will be like (which seems impossible within an ever-changing, complex global context) but to ask ourselves what the future might be like, integrating into the analysis not only the probable but also uncertainty and the potential actions of all the actors involved. This has nothing to do with blindly following certain scientific procedures, but rather with obtaining a broad range of useful information (regardless of its source) to make the right decisions, so that we can ultimately reach the preferred future" (Bas, 2021, p. 42).

Moreover, FS usually challenges the orthodox future and approaches longer horizons, from ten to fifty and even a hundred years (Inayatullah, 2008; Meissner, 2012). Furthermore, FS rests on the foundation that a plurality of futures must be investigated, not just a single future (Fergnani, 2020).

Other significant differences between FS and planning or forecasting are that FS practitioners are committed to building scenarios that contrast with each other and take unpopular perspectives, rather than having minor deviations from the conventional. For example, within FS' scenarios method, multiple interpretations of realities exist. FS is highly action-oriented, concerned with creating the most preferable futures and then taking them to action to avoid less-preferred or dystopian futures.

FS has been criticised mainly for not having an objective knowledge of reality (Vásquez, 1999). Still, this discipline has proven its capacity to cope with and deepen our understanding of uncertainty (Nováky, Hideg & Tóthné, 2017; Ladu & Quitzow, 2017; Vecchiato, 2012), its renewed methodologies to understand unstable situations, and the tools implemented to bring community and scientists together towards accepted future alternatives (Meissner, 2012).

Vásquez (1999) argues that the main task of FS would primarily be not just the study but also the assessment of visions of the future. I agree with this author as he considers that:

"No matter how better, attractive or participating the image of the future produced through the settings method might be, if it is not effectively shared by a society,

transformed into a vision, and put into practice in a systematic and sustained way by means of a set of projects, these huge institutional and methodological efforts might lose their power" (Vásquez, 1999, p. 339).

Similarly, Havas and Weber (2018) argue that visions often play a significant role in making long-term issues more palpable because they are a source of orientation and inspiration for prioritising actions.

I believe synergy with CE also contributes to FS by making this discipline best known, implemented, and proven accurate. Therefore, it is more reasonable to expect a better future to be reached by cooperatively creating and implementing constructed futures with FS methods and CE principles. Consequently, it is so relevant for humanity that these two communities start interacting as soon as possible and maintain an open and productive collaboration in transitioning towards a sustainable society.

In the context of my developed approach for SMEs, FS can be seen as a systematic way to develop a range of contrasting views and possible paths that describe how the future might unfold or how we would or would not like it to develop. The concept of FS should incorporate understanding these paths sufficiently well to clarify which decisions and actions should be made in the short-, medium- and long-term to create the best possible future (Horton, 1999).

FS includes qualitative and quantitative means of monitoring clues and evolving trends and development indicators. It is best and most helpful when directly linked to policy implications (Uotila et al., 2012).

I agree with Medina (1999) and Uotila et al. (2012) when they argue that FS's main challenges are becoming more effective at sharing the images of an interpreted future with a broader community and strengthening dialogue with other disciplines. This is hugely relevant because when these images of created futures are shared effectively, they can be transformed into a vision systematically and sustainably put into action (Medina, 1999).

This is where I believe synergy with CE also contributes to FS by testing, implementing and demonstrating the functionality of FS epistemology and methods for CE.

2.2.4 Futures Studies methods

FS blends a pluralistic epistemological viewpoint with practical methods to study alternative futures (Fergnani, 2020). FS is equipped with more than 40 heterodox methods

(Bas, 2022) developed by futurists in the last 60 years. According to Slaughter (1998), FS methods are the tools to respond to complex future challenges that most people could not deal with. These methods are classified into four categories: qualitative, quantitative, and normative or exploratory (Glenn, 2001). The latter two categories refer to how the method approaches the future. It is normative when the future is addressed by asking what future we want. In contrast, exploratory methods address the future, asking what is possible regardless of what is desirable. In this sense, my proposed CFA is normative and qualitative based on the type of question it contributes to SMEs to answer 'what is our preferred future' and the FS methods it incorporates, which are all qualitative.

The field of FS describes the different methods in the manual of Millennium Project (Glenn, 2001). A brief description of some FS methods is included in the next paragraphs, while a wider range of FS methods are explained in Chapter 3, as FS methods are one of the two main components of the CFA. The other main component are the CE principles.

Michael Godet developed the structural analysis method (also known as MICMAC) in the early seventies (Godet et al., 2007). This method seeks to analyse the relationship between the variables that form a system within an organisation (Anzules-Falcones et al., 2021). It has the advantage of stimulating reflection within the participating group, leading to thinking about counterintuitive aspects of the challenge being addressed. This method contains three stages: (1) to make an inventory of the variables that characterise the system being addressed (these variables should not extend beyond 80, and a distinction between which ones are internal or external variables must be outlined); (2) description of relationships between variables. There must be a linking up of variables in a double input chart and arranged in three subgroups: the global environment, the specific contest, and the internal system; and (3) the identification of essential variables. In this stage, any chart describing the logic behind interrelations can be put in the form of a graph to improve the system's understanding (Anzules-Falcones et al., 2021).

The Futures Wheel (Glenn, 2001) method resembles a three-ringed wheel, hence its name. The most important trend or event is written in the centre of the wheel, and small spokes are drawn wheel-like from the centre and filled in with the primary consequences or impacts caused by the main event or trend. This ripple effect must continue until a clear picture of the event's implications is unfolded.

The Futures Polygon method was inspired by the Futures Wheel method, and the main difference is that the former includes the concept of 'unanimity' as an indicator of the plausibility of events on which there is an agreement. In this sense, unanimity is

interpreted as a ‘guarantee’ that the impact will happen within a ‘realistic temporal horizon’ (Olavarrieta et al., 2014, p. 364).

The field Anomaly Relaxation method (FAR) was created by Russell Rhyne in 1981, who applied it to a wide range of social fields in which business and government policies might have to co-exist. The great advantage of this method is that it is a relatively agile way of ‘making sense’ of the future’s possibilities employing a tool for a rational and systematic approach. ‘Anomalies’ are eliminated from the ‘field’ by filling up first all plausible possibilities, ranking them in a matrix and testing their combined consistency. The ‘surviving’ configurations typically lead to four possible scenarios (Olavarrieta et al., 2014, p. 147).

The method of Causal Layered Analysis (CLA), according to Dator (2003), “is very sophisticated to categorise different views of and concerns about the futures, and then use them to help groups think about the futures more effectively than they could by using any of the layers alone, as most theories and methods do” (p. 1). This method considers three overlapping research dimensions: empirical, interpretative and critical. Subsequently, a fourth perspective emerges: ‘action research’ (this fourth perspective is discussed in section 4.3, as it is one of the bases of my research strategy). These dimensions have different assumptions about the role of the subject being analysed and the nature of the future. What makes this method unique, as Glenn (2001) reminds us, is that “hidden meanings and ideologies, structure and consciousness, and myth and metaphor are not seen as outside of foresight but as part of the enrichment process” (p. 5). This method is also recognised as a new conscious effort to open up the field of FS to other voices, especially to non-western perspectives (Sardar, 2010).

Delphi is another FS method whose purpose is to reach consensus within a core understanding of systems thinking. The main strength of Delphi is its ability to explore issues that require judgment from several disciplines objectively. As a result, this method is recognised as the best method within FS to collect and synthesise multiple positions on a subject.

Despite the importance of FS methods in exploring the future, organisations using these research methods are unusual (Gáspár et al., 2021). However, since FS methods aim is to bring existing elements together in new ways to generate richer insights, deepening, broadening and expanding the universe of human understanding, FS methods can assist in developing a wide range of competencies for SMEs (Gáspár et al., 2021). Furthermore, participatory FS methods facilitate and can expand the range of what employees can say

about the preferable future of the organisation they work at, collectively creating the future.

FS methods also facilitate creative data generation by research participants (Andrä, 2022). Nonetheless, using FS methods can enhance competencies, leading to more responsible and future-conscious economic actors in the long run (Gáspár et al., 2021).

2.2.5 Small and Medium-sized Enterprises (SMEs)

Organisations could play a critical role in addressing current and future environmental and social challenges, as this actor can trigger profound changes through strategic choices (Ghisellini et al., 2021). The SME's relevance as my research focus lies in the importance of this size of organisations to our planet. In Europe, SMEs represent 99% of all businesses and 67% of total employment (Ormazabal et al., 2016). Globally, the World Economic Forum (2021) estimated that SMEs generate around 80% of employment, while Garcés-Ayerbe et al. (2019) reported that nearly 95% of organisations in OECD countries are SMEs. Nevertheless, most SMEs do not have formalised strategies and have a limited assessment of their competitive environment (Howard et al., 2022; Anzules-Falcones et al., 2021).

Moreover, according to Miller (2002), organisations usually fail to implement more than 70% of their strategic initiatives, the key reason being the lack of practical yet theoretical sound models to guide their actions during implementation (Okumus, 2003). For these reasons, SMEs need practical and usable approaches to studying the future (Järvenpää et al., 2020). The significance of knowing how to study the future comes from SMEs' ineffectiveness to cope with discontinuous change, a capacity SMEs must develop to ensure long-term survival (Järvenpää et al., 2020).

Despite SMEs' relevance, the epistemology of studying the future has been overlooked in organisational performance (Liu et al., 2021; Ahuja et al., 2005). However, for SMEs operating in the CE, their need for futures approaches linked to strategy and business development has been acknowledged as crucial (Järvenpää et al., 2020; Rohrbeck and Kum, 2018).

"To prepare for the challenges as to take advantage of them, SMEs operating in this rapidly changing business area—the CE—need to continuously explore future challenges and opportunities in their business environment. For this reason, developing and utilising effective foresight practices is essential for circular economy SMEs" (Järvenpää et al., 2020, p. 42)

Although CE embeds multiple disciplines and some methodologies, approaches, and tools to support the transition toward a more sustainable and resilient society, the available support to the private sector falls short in providing a structured methodology to guide SMEs in the transition towards an alternative course of action to the linear model (Prieto Sandoval et al., 2021). Instead, most studies have been mainly focused on large corporations, even though SMEs seem much more suitable for adopting circular strategies than large organisations (Howard et al., 2022; Ghisellini et al., 2021).

Considering their prevalence in the European and international landscapes, SMEs could permeate CE corporate practices and peer pressure large organisations to adopt circularity quickly. As Ghisellini et al. (2021) argue, these CE practices deliver positive environmental, technological and social innovation, infuse new values of civil responsibility, and cooperate for the common good and public happiness. Furthermore, there is evidence that this size of organisations is aware of and engaged in tackling global challenges, aligned with a sustainable vision of doing business (Parente et al., 2018). However, barriers such as limited resources in various axes –not just economic– hamper their potential to contribute to these CE practices and further engagement with world problems, and at the same time to reach a solid economic and environmental performance at the root of fully nature-inspired and regenerative solutions (Mura et al., 2020).

According to Ahola and Tolonen (2021), SMEs should begin their journey to circularity to ensure the long-term viability of their business, either financially, from a resource dependency point of view or a licence-to-operate point of view. Furthermore, SMEs are showing high awareness of global challenges, hence adopting circular business models as a response, in an agile manner or since their conception as entities (Ghisellini et al., 2021).

Ormazabal et al. (2016) surveyed SMEs in northern Spain, identifying several barriers, including lack of capital and government support, scarce financial resources and customers' uninterest in environmental issues.

Another analysis by Rizos et al. (2016) was conducted on a selected sample of SMEs, from solutions providers to distributors, to end-users, pointing at similar barriers when implementing circular business models. The study revealed that 54% of the sampled SMEs suffered from a lack of support from both the supply and demand networks, followed by a lack of public (funding) support.

Alongside limited resources, other SMEs experienced hindering company environmental cultures that would prevent investments in methods and tools to explore possible futures for the company or specific innovations, mainly because the corporate

horizon planning is short-sighted (Rinkinen and Mäkimattila, 2015). Despite studies proving that CE adoption into business model innovations can help organisations achieve competitive advantages in challenging contexts (Mendoza et al., 2017), practical implementation of CE practices is scarce in the literature (Urbinati et al., 2017).

Although management scholars have been encouraged to study the future more extensively (Fergnani, 2020), inquiries into the future are a small minority of management research; therefore, this field, similar to the CE research (Weigend Rodríguez et al., 2021), is ill-equipped to create theories about the future of SMEs and their implications in the present (Fergnani and Song, 2020).

The limited management and organisation research that attempted to consider the future has, as Fergnani (2020) discusses, significant limitations, mainly that these studies try to explain and predict phenomena in the present —projections of the future rather than exploring the future.

Moreover, a recent study (BetterUp, 2020) found that the degree of flexibility to adapt to changing circumstances and the unexpected correlates with company size. The bigger the organisation's size in terms of employees, the more economic flexibility. SMEs often face years of unknowns on their path to profitability and growth. Thus, successfully navigating those years requires methodological guidance.

FS contributes with tools to challenge the conventional thinking within organisations (Wright et al., 2013) and question the hegemonic and partial view of the future (Inayatullah, 2013). By creating a shared vision, aligning the strategy to reach this favourable future, having the courage to change actively and looking at all processes, communication channels, organisational structures, employee recruitment and promotion, product and portfolio management and finally, the components of the organisation as a whole, the challenge to remain future-relevant can succeed.

Organisations are not likely to survive by only passively observing competitors or the industrial environment. Therefore, they must start thinking about the future and align their strategy with long-term goals. As a result, these organisations will have a greater chance of surviving the emerging economic depression and other future challenges by showing the courage to change and tread new paths (Rohrbeck and Kum, 2018). As Uotila et al. (2012) also argue, explicit FS outcomes can result in knowledge, which is more difficult to absorb, but if this knowledge succeeds, it supports new learning and novel insights into the futures. It could also contribute to radical positive innovations in organisations.

Organisations need to learn how to think about alternatives to expand their potential space for manoeuvre and apply their strategies in an agile manner. When the realisation

is reached that it is not essential (or possible) to predict the future but to deal with a certain degree of uncertainty and increased complexity, organisations remain actionable at any time and in any situation. This can be achieved through the appropriate application of FS methods. However, this way of thinking must be applied throughout the entire organisation and requires managers better to assess the consequences and implications of their actions and make decisions based on the explored alternative futures and an agreed vision.

Agile methods and strategies can compensate for the uncertainties of the changing future. As a result, entrepreneurship and opportunity optimisation are created instead of falling into shock. Moreover, combining human-centricity, long-term vision, agility, and resilience aligns organisations with the future and enables them to survive even in high uncertainty, such as in global pandemics like COVID-19.

Since the available support for a CE transition is mainly focused on large corporations, the benefits that a guided and structured approach entails for SMEs are numerous, starting from a better understanding of the key elements to implement and the specific CE principles that apply to the organisation and which different aspects of the business can be the focus on the intervention (Järvenpää et al., 2020).

The literature in recent years discovered and empirically supported the positive effect that futures literacy has on performance and innovation capacity in organisations (Rhisiart and Jones-Evans, 2016; Jafari-Saddegi et al., 2020). Ahuja et al. (2005) argued that FS could only fulfil its role if the participants understood at least the basic concepts of FS and could act as responsible and future-conscious partners. In addition, according to BetterUp (2020), future-minded organisations have higher-performing teams. The study reported significant percentage increases in team agility (25%), engagement (19%), innovation (18%), performance (18%), resilience (15%) and risk-taking (13) compared to those organisations that have not invested on applying a Futures mindset.

Furthermore, working on a team opens a broader range of possibilities and awareness than working individually or imagining on our own. This is another reason why diversity on the team involved in creating this change is vital for organisations as they look at how to tackle the challenges they face. Such an approach should also develop the necessary dynamic capabilities in the employees involved in this transition, especially to generate the organisation's preferred future collaboratively, where the team involved make sense of the world together and thrive in this journey.

2.3 Concluding remarks

This summary of CE and Management research limitations, and the outline of FS attributes, make FS epistemology an ideal candidate for my research to borrow from to reconfigure the way the CE and SMEs can explore the possible futures and engage more to offer actions in the present that will most possibly improve a circular future for organisations.

The value added of the literature review presented here was the identification of the most relevant research gaps and later on bridging these gaps during the design of my approach, namely by doing a thorough methodological inclusion of FS methods into my research and by including a detailed explanation of how I arrived at the results and conclusions reached from the CFA implementation—ultimately aiming to catalyse the integration and facilitate collaboration between both research disciplines.

Given the potential contribution of FS epistemology to CE, it is crucial to design an empirical approach tailored for SMEs transitioning to circularity. This is particularly urgent in a (hopefully) post-COVID-19 pandemic.

Chapter 3: Conceptual Approach

3.1 Introduction

After my literature review, I argue that the CE system principle is to consider the future as unknowable rather than unknown. I consider this characteristic a reactive approach toward the future because CE principles are implemented to respond to events occurring in the present or the past. By contrast, FS is anticipatory because its systemic principle considers the possible futures to be known. When FS methods are used, the aim is to pull the future into the present. CE, instead, is currently mainly pushing the present into the future. For this reason, a solid and evident collaboration potential exists.

Considering that CE tries to make the old model obsolete, it should not make the same mistake of not developing a foresight capacity in the same way as the linear model did. Otherwise, the CE could have the same negative environmental and social impact as the linear economy, just that it will take longer to occur, as Millar et al. (2019) discuss. So how could CE avoid making this mistake? This opens the possibility of looking for other disciplines with both the theoretical framework and suitable methodologies for CE to elaborate and integrate the study of the future.

Considering the knowledge gaps reviewed in Chapter 2, this research builds on Pomponi and Moncaster's (2017) call for a future-oriented and multidisciplinary CE approach. Thus, my research aims to effectively develop a pathway to transition from the present to the future. The rationale of my research topic is that while CE operates in the present, it is orientated to the future. However, since the future is not easily perceptible, CE lacks a methodological tool that systematically evaluates whether its approach to the future is rigorous or not. This is highly relevant because, as Lazarevic & Valve (2017) argue, CE is not just suggesting significant economic changes; it also articulates a radical win-win shift for people and the planet (e.g. Barreiro-Gen and Lozano, 2020; Frishammar & Parida, 2019; Aboulamer, 2018).

The CE community and its thought leaders should take responsibility to cover the open space currently neglected about the future and fix a systemic failure in its underlying principles: to consider the future as unknowable. Current practitioners and researchers on CE must understand and address the implications that the paradigm change —from linear to circular economy— involves as completely as possible.

3.2 Reviewed frameworks

As a starting point and inspiration for creating the CFA, I first searched for and reviewed existing CE and FS approaches and frameworks to build on a structure already used and approved by the CE and the FS fields. Therefore, from the CE literature, I mainly analysed and took ideas from the Butterfly Diagram (EMF, 2013a) and the ReSOLVE framework (EMF, 2013b).

Concerning FS, I narrowed down my selection of approaches by choosing those which I considered most applicable and that their structure met scientific research standards, defined by Ollenburg (2019) as those where "process, distinct methodology, as well as the objective of each phase, support the evaluation of the results and help to define the researcher's role" (p. 52).

Therefore, I analysed the following frameworks and took inspiration from them to build my approach:

1) 'Generic Foresight Framework' by Voros (2007)

2) 'Six Pillar Approach' by Inayatullah (2008)

3) 'Natural Foresight Framework' by Salvatico and Spencer (2019)

4) 'Association of Professional Futurists (APF) Competency Model' by Hines et al., (2017)

5) 'The Future Today Institute's (FTI) Forecasting Model' by Webb (2020).

From these five frameworks, I decided to use the Six Pillars Approach (Inayatullah, 2008) as my main guiding methodological structure because it offered the most extensive example for designing the CFA as a systematic process and the most flexibility to be adopted within a transformation process. Nonetheless, the inspection of the other four FS frameworks incited some of their features to merge into the CFA.

In the following seven sub-sections, I review the CE and FS frameworks' key and essential elements.

3.2.1 Butterfly Diagram

One of the fundamental tools outlining the three basic principles of CE and how they could be applied into practice, in this particular case by SMEs, is the Butterfly Diagram (EMF, 2013). According to Howard et al. (2022), in the UK, Europe and the US, the Butterfly diagram is the model of choice and catalyst for change for organisations.

The diagram brings forth cradle-to-cradle concepts and illustrates the many possibilities to avoid resource leakage by narrowing and closing biological and technical loops. The former refers to the management of biological resources, renewables and stocks, whilst

the latter focuses on solutions to retain components, materials and products in technical loops. These circular strategies are achieved by recirculating loops that reincorporate materials into new value streams (Gibbs, 2021). Furthermore, the technical and biological conversion of residues into a resource is crucial for SMEs as these outcomes create new business opportunities (Järvenpää et al., 2020). This diagram was adapted from the CE model developed by the EMF (2013). When visually dividing it into three horizontal sections for analytical purposes, the upper section illustrates the first principle: preserving, regenerating and restoring natural capital by managing finite resources and renewables. The central part of the diagram has two sides: the left side illustrates the loops and cascades of the biological cycle, in which biological resources, renewables and stocks are managed. The right side displays the technical cycle and the circularity loops to keep materials in use. The centre illustrates the second CE principle: enhancing the usefulness of products, components and materials throughout biological and technical loops.

Finally, the lower part of the diagram focuses on the third principle: developing effective systems that design waste and negative externalities.

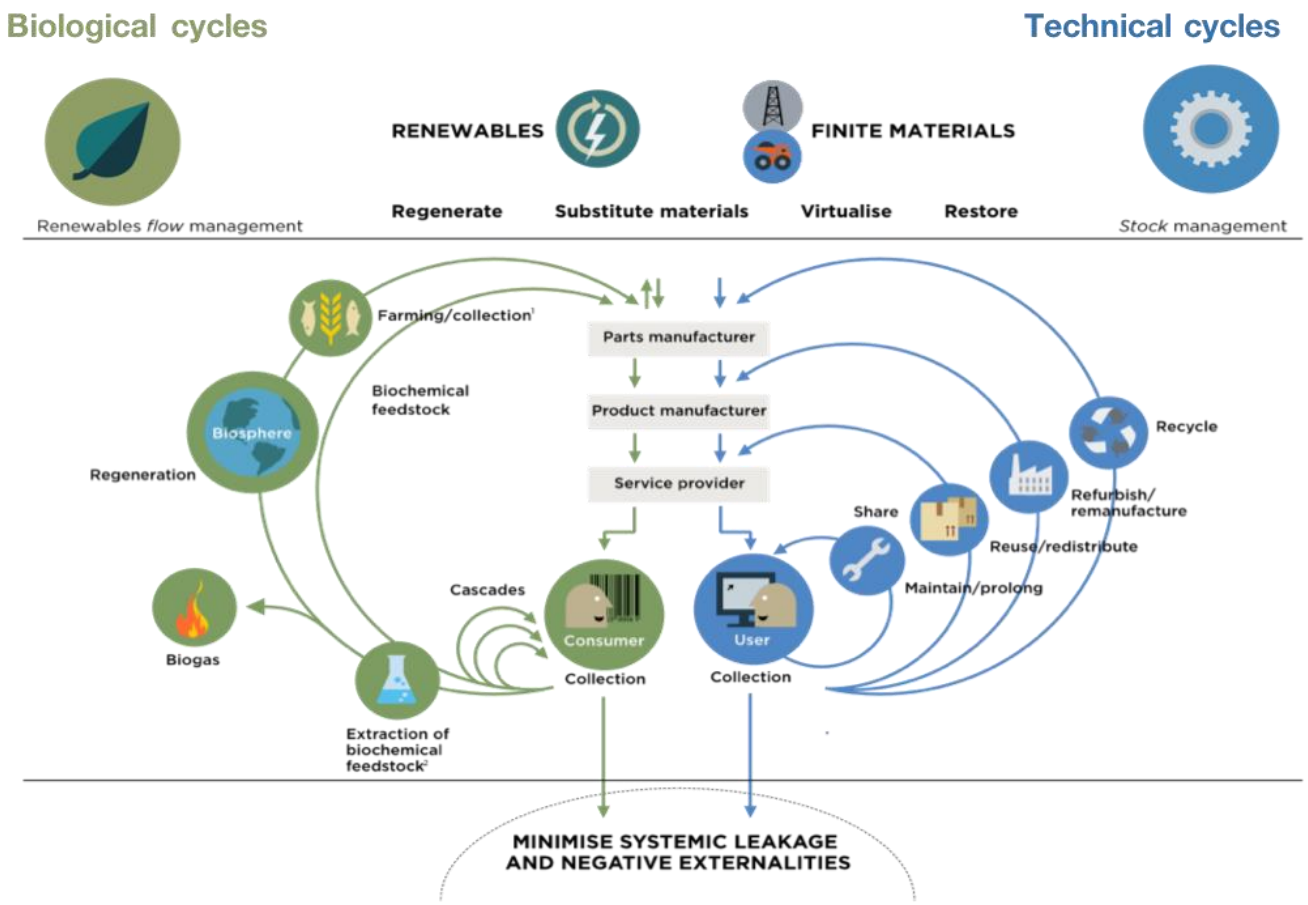

Figure 3. Butterfly Diagram.

(Ellen MacArthur Foundation, 2013).

3.2.2 ReSOLVE framework

Notably, the Butterfly Diagram is intertwined with the ReSOLVE Framework (EMF, 2015), which the EMF has also designed to support businesses in identifying core action areas that can be taken to apply the CE principles. The ReSOLVE framework (Regenerate, Share, Optimise, Loop, Virtualise and Exchange) identifies these six pillars organisations should implement for a successful transition to CE. While this approach was not designed particularly for CE implementation in SMEs but for the broader group of organisations to provide businesses and governments with a tool to develop CE strategies and growth initiatives (Gibbs, 2021), I believe some of its principles can contribute to a successful transition in SMEs if they are applied systematically.

The 'Regenerate' pillar (Re) seeks to restore natural capital and increase the ecosystems' resilience by safely returning valuable biological nutrients to the biosphere through anaerobic digestion or composting. This is enabled by the cradle-to-cradle philosophy, which states that technical and biological nutrients should be kept separate through a product's life cycle from the initial design stage. In addition, this pillar promotes renewable energy to power buildings in the built environment.

The 'Share' pillar (S) pursues the maximum utilisation or reuse of components, products or assets throughout sharing schemes, exchange platforms or other sharing practices (e.g. office sharing or peer-to-peer renting).

The 'Optimise' pillar (O) is about increasing the performance and efficiency of a product and leveraging big data, automation, remote sensing and steering, and removing waste in the production and the supply chain. This pillar is aligned closely with the Total Productive Management philosophy.

The 'Loop' pillar (L) has four main objectives: to recycle material, extract biochemicals from organic waste, digest waste anaerobically, and procure the manufacture of products and components.

The 'Virtualise' pillar (V) focuses on two types of dematerialisations: direct (e.g. dematerialise conventional books and transform them into e-books and use the same process with music, movies, etc.) and indirect dematerialisation, where the product in itself is not virtualised but the way of obtaining it is (e.g. online shopping).

The last pillar, 'Exchange' (E), has three categories: innovation by choosing new products or services (e.g. multimodal transport), new technologies (e.g. 3D printing) or the replacement of old materials with new materials.

3.2.3 Generic Foresight Framework

In Figure 4 below, I have included the Generic Foresight Process Framework (GFPF) from Voros (2005) to show the six key elements (inputs, analysis, interpretation, prospection, outputs and strategy) to follow to integrate the study of the potential alternative futures. This generic framework includes some FS methods in its corresponding recommended stage (Delphi and Strategic Intelligence Unit for Inputs, Emerging Issues and Cross Impact for the Analysis). Moreover, the most valuable contribution of this framework is the recognition of the several distinct phases when introducing foresight into the formal strategic planning of an organisation. These phases go from gathering information to producing outputs intended as inputs for strategic development and planning activities (Voros, 2005). This framework was my starting point and inspiration for creating the CFA, as explained in (Weigend Rodríguez et al., 2019), especially for understanding and evaluating how different FS may be combined within my developed approach.

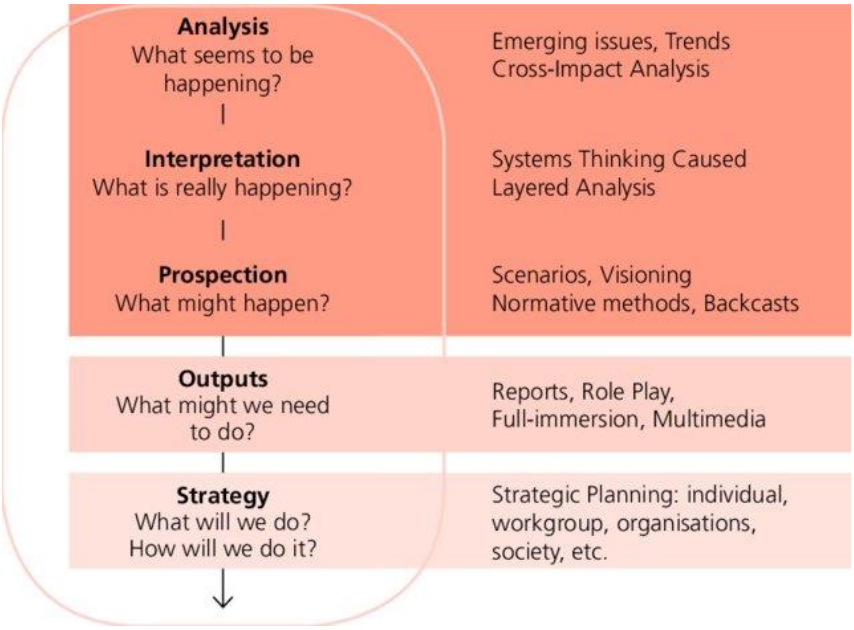

Figure 4. Generic Foresight Framework.

(Weigend et al., 2019, adapted from Voros, 2005).

3.2.4 Six Pillars approach

Inayatullah (2008) developed the Six Pillars approach, introducing six basic and foundational concepts of futures thinking: the used future; the disowned future; the alternative future; alignment; models of social change; and the use of the future. Inayatullah's approach provides a theory of futures thinking linked to FS methods and

tools, which he developed through practice. In a nutshell, this approach enables us to map the past by being sensitive to the gran patterns of change. To map the present by deepening our analysis to include worldviews, myths, and metaphors. Moreover, to map the future by anticipating future issues and consequences, creating alternative futures and choosing a preferred and backcasting way to realise the preferred future so we can create the world we wish to live in (Inayatullah, 2008).

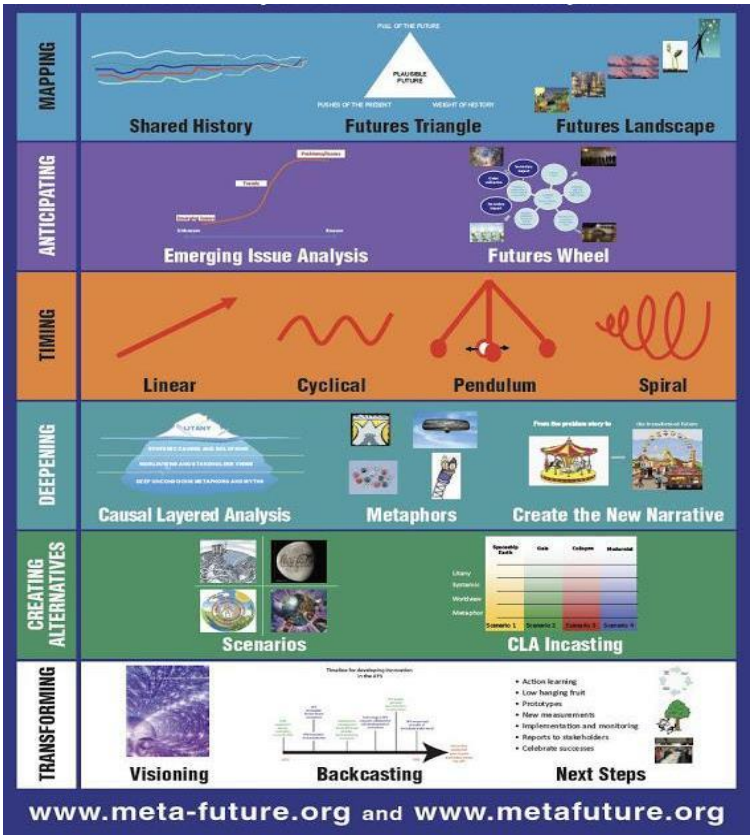

Figure 5. Six pillars approach phases and methods.
(Inayatullah, 2008).

3.2.5 Natural Foresight Framework

This framework assumes that more than a one-size-fits-all approach is needed to effectively solve the strategic problems that exist in the current business environment. This environment is defined by Bourne (2021) as a Volatile, Uncertain, Complex and Ambiguous (VUCA), where there are constant changes at a rate faster than before, in which uncertainty becomes even more uncertain on the central issues that drive change and where the variables that create these changes are unknown. As a solution, Salvatico and Spencer (2019) proposed embracing this environment by leveraging from an organic approach that mimics the powerful growth cycles found in nature, and where rather than

combating this VUCA world, the proposed solution is to take advantage of it in four sequential phases: discover, explore, map and create, by:

1. Thinking and acting systemically to avoid simplistic outcomes.
2. Examining interconnected layers of influence.
3. Operating within feedback loops.
4. Embracing complexity as a sign of maturity.
5. Allowing users to enter or exit the framework at any point, depending on their present needs.
6. Animating internal foresight capacity to cultivate transformation and futures literacy (The Futures School, 2022).

3.2.6 APF Competency Model

APF Competency Model provides a shared view of what professional futurists should conceive central when carrying out foresight work. The model considers today's landscape and proposes developing the following competencies:

- Framing: in this phase, the primary purpose is to scope the project and define the current conditions.
- Scanning: This phase involves identifying the future indicators of change, prospecting how life could be different, for example, by 2025 or 2030.
- Visioning, designing and adapting: these three phases focus on exploring what the scanning phase suggested could be different in the future, the need to effectively face these and how we might respond to those challenges (Career One Stop, 2022).

3.2.7 FTI Forecasting Model

This model uses quantitative and qualitative data to spot weak signals and considers between three broad and four narrow scopes to guide the design of strategic planning processes.

In the three broad steps, the main actions are: to make observations and employ the most critical detected information; evaluate how the identified trends interconnect with the industry and the business involved; to write scenarios that describe the impacts and outcomes of these signals and trends in the future.

Lastly, on the four narrow steps, the main activities are: to define the research question (s), time horizon and stakeholders; to look for contradictions, extremes and oddities; assess the internal and external trends and terms of their speed and position; and identify the strategic actions connecting the future with the present (Future Today Institute, 2022).

3.3 CE & FS: an interdisciplinary approach

One of the CE's system primary characteristics of considering the future as unknowable was discussed in Section 3.1. This is a manifestation of CE's adaptive nature (an essential contribution it received from biomimicry); CE adjusts itself according to the conditions it is challenged with. By contrast, the FS system considers the possible futures to be known. This is a manifestation of FS being anticipatory; using the information explored and gathered by its methods, FS can adjust present behaviour based on future threats or opportunities. These two contrasting, and I will demonstrate, complementary principles (adaptation and anticipation) suggest a strong potential for collaboration between both fields of study. How do I believe this collaboration could be made possible in practice? I proposed a preliminary approach (Weigend Rodríguez et al., 2019), as Figure 6 illustrates below. On the left-hand side of Figure 6, I have included the generic foresight process framework (GFPF) from Voros (2005). I believe this FS framework could contribute to developing CE's long-term strategic foresight capacity and benefit from studying the potential alternative futures. This is illustrated by the GFPF's six key elements: inputs, analysis, interpretation, prospection, outputs and strategy. In addition, this generic framework also includes some of the FS methods in its corresponding recommended stage (Delphi and Strategic Intelligence Unit for Inputs, Emerging Issues and Cross Impact for the Analysis, CLA for interpretation, Scenarios for Prospection) to follow to integrate the study of the potential alternative futures.

I have included the "Butterfly" diagram from the Ellen MacArthur Foundation (2013) to represent CE on the right-hand side. I have kept all the attributes from this diagram to indicate CE contributions with its prevailing three general principles, which are, 1. Preserve and enhance natural capital. 2. Optimise resource yields, and 3. Foster system effectiveness. I have placed the GFPF and the Butterfly diagram next to each other to symbolise interdependence. In sum, I conceptualise the GFPF as a continuous activity that informs strategic thinking and is the basis for actions to be taken anticipatorily in the present by CE. With this combined methodology, I believe that FS will enable CE to have a more mature approach toward possible futures and to integrate that knowledge into existing work, research and action towards sustainable futures. This proposed framework offered an initial common ground for an interdisciplinary discussion between CE and FS research communities. This framework was my starting point as an inspiration to be used by SMEs at different stages. Even though this framework was only presented in preliminary terms in Weigend Rodríguez et al. (2019), some thought-provoking points and subsequent improvements through the CFA were taken from it.

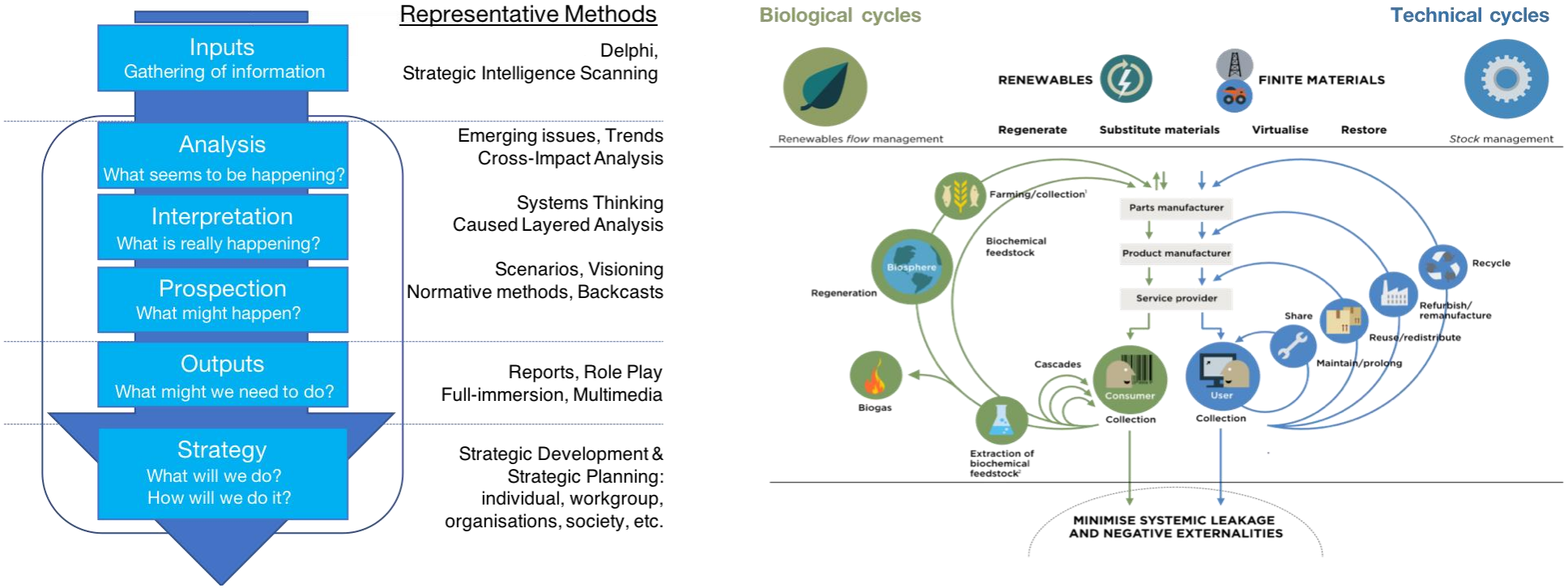

Figure 6. Generic Foresight Framework (Voros, 2005) and Butterfly Diagram (EMF, 2013) (In Weigend Rodríguez et al., 2019).

3.4 Discussion of the potential interface between CE and FS

CE and FS still exist in different academic and social contexts. Thus, the differences within both fields make collaboration challenging. However, the aim of both fields aligns in various ways. While both areas seem disassociated in practice, their complementarity is hard to ignore. There are major shared characteristics between CE and FS. They share the most critical elements of the long-term, big picture and radical change orientation. This thesis has identified how the CE has evolved. However, CE needs to be more receptive to other research fields (Geissdoerfer et al., 2017) to make conceptual improvements (D'Amato et al., 2017). I believe an interdisciplinary approach that integrates FS methods in the CE as a system is key to a more effective transition to CE in businesses.

As a field of study, CE is built on a vision of the future as it might benefit from ecological modernism (economic growth decoupled from resource constraints) (Hajer, 1995). This is a technical rather than a political fix based on production decisions. In turn, these decisions are based on increasing efficiency using technology (primarily digital these days) to increase productivity; except that as well as labour productivity, it adds resource productivity as a source of added value by adjusting business models and consumers' behaviour with it. CE expects a future shaped by supply forces, minimal governance and global and technological imperatives. However, this is just a partial vision and is only one story of how the transformation should and will take place (Lazarevic and Valve, 2017).

Therefore, a feasible interface between CE and FS might be under the following assumptions. First, FS has the most to offer CE as an exploration of differing macro models into which the ecological modernism (in which the CE is grounded) can fit or not.

As an economic and development paradigm, CE is a trial for notions of stock maintenance, effective flows in dynamic systems, the interplay of resilience with efficiency, and how that might unfold into the design of suitable macro-models. Here, the underlying metaphors around metabolism are being explored through CE lenses. So, how would it all look if the rest of the economy was viewed differently?

CE and FS, guided by shared systems thinking approach and inspired by living systems, could provide a new narrative for positive social change. This is why these two communities must start interacting as soon as possible and open and maintain productive collaboration to accelerate the transition towards a sustainable economic system.

Concerning the CE and FS research communities, I found that these academic communities tend not to publish in the same peer-reviewed journals (Weigend Rodríguez et al., 2019). Consequently, both fields of study likely have different reading communities, meaning that even if the information is available in these publications, some people may not access it as they are not the intended audience. I believe that the CE and Sustainability journals would be good platforms to disseminate collaborative research and act as a stimulus for the crossover and cross-fertilisation of research ideas from both communities. This could serve as a springboard for further interdisciplinary studies between CE and FS.

3.5 Circular Futures Approach design

As the available frameworks from CE and FS lack guidance for their implementation, I developed an integrated and systematic process to make both concepts more practical and applicable, especially for those SMEs in which the Futures' concepts are new. This approach, which synthesises my research with complementary ideas from other frameworks and methodologies (as explained in the previous subsection), represents the first methodological effort integrating both disciplines' (CE & FS) contributions into a unifying approach. The centrepiece of the approach is a well-prepared and structured participatory process.

I named the proposed framework 'Circular Futures Approach' (CFA) as it combines CE and FS principles and methods. I define this approach as:

"A systematic process that enables SMEs, collaboratively to explore alternative futures while acting in the present to create a preferred sustainable future that gravitates around essential CE and FS principles" (Weigend Rodríguez et al., 2021, p. 701).

As defined by Webster (2017, p.22), the fundamental CE principles are: 1) "to become an economy built on the endless flow of energy from the sun, which transforms materials into valuable goods and services endlessly"; 2) "to build capital and maintain it, where money is seen as information that stimulates and coordinates the exchange of all things and where prices act as messages and reflect the total cost of things just as materials need to flow cleanly and without contamination for new cycles"; 3) "like all living systems, CE is dynamic but adaptive and, if it endures, it will be effective"; 4) "to thrive by celebrating diversity as a fount of creative adaptation, a means of resilience, a source of

redundancy or back-up, and lastly"; 5) "CE is led by business for a profit within the rules of the game, decided by active citizenship in a flourishing democracy".

There are five main principles regarding FS: 1) the future exists in multiples, as it is not written yet. Instead, it exists in parallel futures; 2) the future is a space and not a time destination; 3) the pathway into the future is spiral, not linear; 4) how we think about the future influences our current decisions in the present; 5) most changes start with a disruption coming from outside the usual business or industry. However, they have the power to transform the field entirely.

With regards to the 5th CE fundamental principle, Bell (2009) argues that one of the primary aims of FS is the democratisation of the future, giving people, typically outside of the organisational decision-making process, a say and encouraging people to participate in dialogue to what they have been traditionally alienated from. Similarly, Bas (2022) argues that FS has materialised as an effective practice for participatory democracy and has helped the development of future visions inside communities

Gustavsen (in Elden and Leven, 1991, p. 136) further formulated nine-point criteria that would lead to a democratic practice when FS methods are implemented in a workshop setting. The CFA approach was designed and implemented to be aligned with these nine points:

1) Dialogue is a process of exchange: points and arguments move to and from participants.

2) All concerned must have the possibility to participate.

3) However, possibilities for participation are not enough: everybody should also be active in the discourse.

4) As a point of departure, all participants are equal.

5) Work experience is the foundation for participation.

6) At least some of the participant's experiences when entering the dialogue must be considered legitimate.

7) It must be possible for everyone to understand the issue at stake.

8) All arguments which pertain to issues under discussion are legitimate.

9) The dialogue must continuously produce agreements which can provide a platform for investigation and practical action.

Habermas's (1963) philosophical thinking on democratic practices has been synthesised by Kemmis (2001) and applied to the fundamentals of action research, particularly to the ways that an action research approach helps in knowing:

1) Instrumental: what is the particular problem we have as an organisation, and how can we solve it?

2) Practical: how can we evaluate our work as action researchers and see and understand ourselves in this context so that our practice creates change for the better?

3) Emancipatory: how can we critique our work setting so we may connect in collaborative research and action to transform situations of dissatisfaction, alienation, distortion, or injustices?

I have combined these principles from both fields and integrated them into the CFA. The CFA also includes serious games in the context of FS, often referred to as ‘futures games’. These games are used because they are highly participatory and easy to replicate in workshop settings, either in person or online (Fergnani, 2022b).

Going back to the CFA design, it is built around the theme of exploring outer space. Metaphorically speaking, exploring space denotes exploring the possible futures for the organisations, and the orbit around which the organisation must gravitate is the CE and FS principles. Overall, the CFA's various activities can be grouped into seven phases. These are: 1) Surveying, 2) Mapping, 3) Exploring, 4) Cruising, 5) Encountering, 6) Landing and probing, and 7) Transforming, as shown in Figure 7:

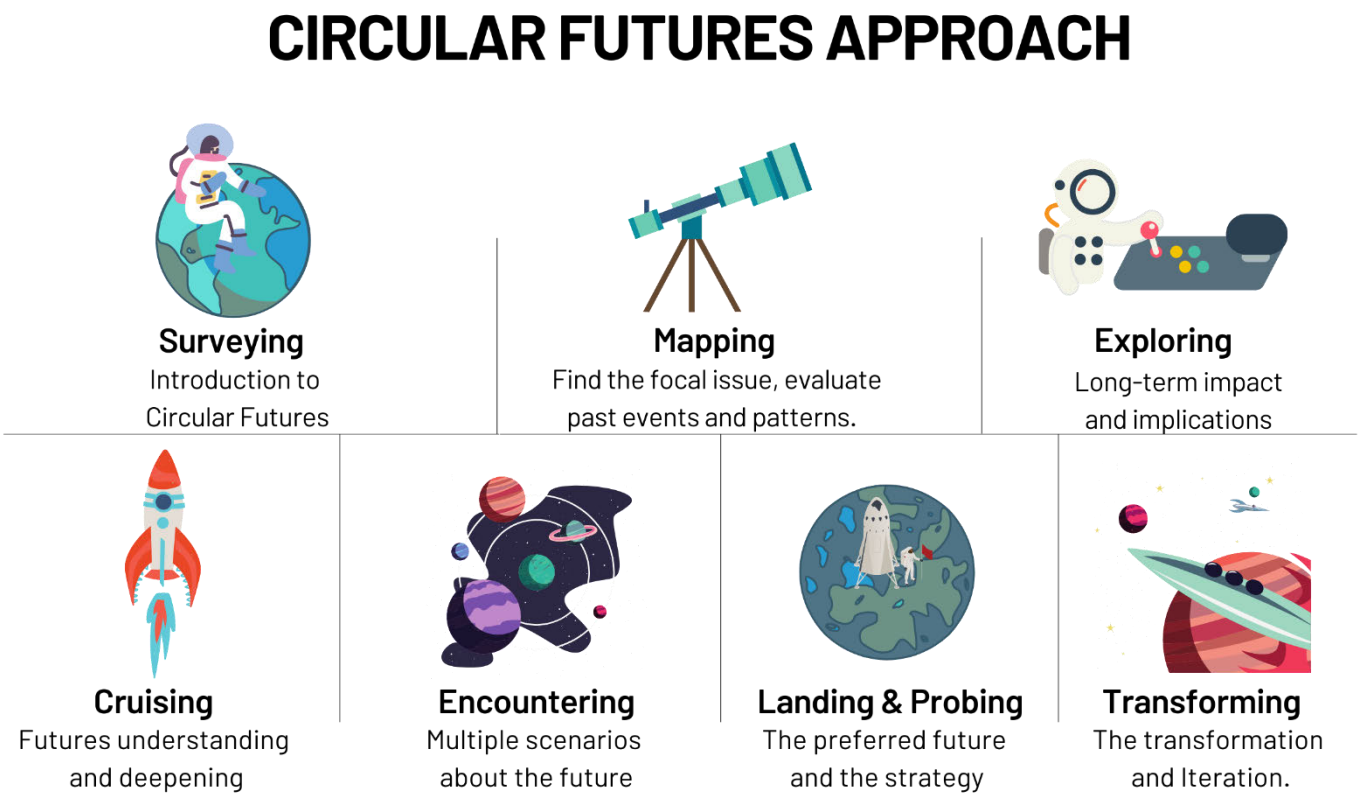

Figure 7. Circular Futures Approach.

(Weigend Rodríguez et al., 2021).

In this sense, the CFA approach is: a multistep process of (1) mapping and understanding the subject of the future; (2) thinking about and generating possible futures; (3) selecting the preferred future; and then (4) returning to the present and move to action to reach that future.

Lastly, the intrinsic contributions of the CFA to the participant are manifold. I align myself to the objectives that any participatory FS implementation should include (objectives 1 to 4) according to Gáspár et al. (2021) and include the particular objectives of my research related to the approach design (objective 5)

(1) To develop futures literacy and the ability to discover and formulate possible and alternative ideas for a preferred future.

(2) To allow participants to use some FS methods competently

(3) To empower participants to have a role in the approach implementation (participatory futures)

(4) To acquire skills through practice in recognising, articulating and expressing different stakeholder perspectives, understanding and negotiating each other's perspectives, developing acceptable and desirable future alternatives, and applying these activities after their implementation.

(5) To apply, test and refine the developed methodology (as the participants also were asked to contribute to the approach improvement).

In a nutshell, The CFA pursues to become a catalyst for action by helping SMEs identify and assess future scenarios that revolve around CE & FS principles and orientate the decision-making process to reach the organisation's preferred—and circular—future.

Finally, based on the Generic Foresight Framework (Voros, 2005). The CFA design follows a two-staged method for implementation: education first, methodology second. As explained by Voros (2005), the logic behind this is that the educational first stage 'prepares the ground' for participants and assists in creating a shared CE & FS vocabulary throughout the CFA implementation. The second stage establishes the methodology within the organisation.

In broad outline, the CFA has a seven-phase structure. These phases and the activities within each are explained in the following subsections:

3.5.1 Surveying

This approach phase introduces the definitions of both disciplines (FS and CE), key concepts, characteristics, and shared goals. The activities that take place in this stage are:

1) First series of meetings with the Dutch SME Management team to align on objectives and define who will participate in the CFA implementation and the go-live day to start with the first session. This series of meetings could take place physically or virtually, and the number of meetings could vary depending on how rapidly the agreements are reached.

2) The Masterclass. A visual presentation with the most relevant concepts and examples of organisations implementing FS and CE.

3) The Polak game. It is a popular exercise within the Futures community, named after Frederik Polak, considered one of the fathers of the FS discipline. In this game, the objective is for participants to map themselves in a 2 x 2 matrix. Specifically, the game was inspired by Polak's distinction between essence optimism or essence pessimism and between influence optimism or influence pessimism.

Firstly, participants allocate themselves to the matrix by how they perceive the change in the world: either towards an optimistic or pessimistic future. Secondly, the participants are asked whether they consider having influence or not in the future state. This activity helps organisations consider each individual's different viewpoints about the future. It also opens up a rich discussion where the participants share the nature of their answers, moral basis, and culture (Hayward and Candy, 2017).

4) The State of play. The participants are asked to answer a set of questions called the 'State of Play' (Rao, 2020). These are 20 questions that help organisations uncover the state of play (current situation) in their business. Specifically to turn an unconscious sense of the business into a conscious one.

5) The circular thing from the future. 'The Thing from the Future' is an awarded foresight tool and imagination exercise developed by Stuart Candy and Jeff Watson (Situation Lab, 2015) in the form of a game. This tool is originally an existing downloadable open-source card game.

My approach adapted this tool and exercise by adding CE principles and making it playable as a virtual online game. The game's object has initially been to use a set of cards, divided into four groups, to generate new artefacts or "things" from the future. The four sets of cards are: a) arc, which outlines the type of future world that the "thing" comes from and how far away it is from today; b) terrain, which is the thematic location where the object is to be found in the future; c) object, a specific cultural element that reveals something about how the state of the future is different from the present; and d) mood, which expresses how it might feel to experience this object from the future (Hayward and Candy, 2017).

The players create the artefacts from the future by producing their brief descriptions and sketching or collaging images of the object they have developed by combining the cards. I modified this game for the approach by aligning it with the CE principles. Therefore, I included two additional groups of cards, circular business models and circular design strategies. These two elements were considered crucial as modifications of the original game as these concepts explain how an organisation creates, captures and delivers value and rearranges the organisational process towards circularity (Hofmann and zu Knyphausen-Aufseß, 2022).

A second game modification is to have two rounds with different objectives. The first round's objective is to develop a (circular) artefact of the future (as in the original game), whereas the second round aims to develop a circular product for the organisation involved.

3.5.2 Mapping

This phase focuses on finding the focal issue or most crucial challenge the organisation faces to survive and evaluating past events and patterns to establish narratives about the future. The tools that enable to achieve these outputs are four:

1) Past Janus Cone. The Janus Cone looks backwards and forwards in time to see the chronological sequence of historical events and how the passage of time may affect possible future events (Carleton et al., 2013). It is an adaptation of the Futures Cone from Voros (2005) that looks mainly forward in time. We only look into past events at this state and only run through the first part of this method. Looking backwards, we can identify patterns that may implicate future developments and are used for the following scanning activities in phase 3.

2) Butterfly Diagram [present]. This diagram has been explained already in section 3.2.1. In this exercise, the group is asked to fill in text boxes and indicate the company's status in each loop and cross-section of the Butterfly Diagram by considering all principles mentioned above in their rationale. This exercise entails a single yet comprehensive snapshot of the organisation's current status in the CE biological and technical loops.

3) Futures Triangle. In this method, the future is mapped three-dimensionally. The image of the future (a preferred vision of the organisation for the future), the existing and observable pushes of the present (such as trends that lead towards the preferred futures) and the weight of the past (such as systems, structures and barriers that hold the organization back to reach their preferred future).

First, the group is asked, what is your preferred future? Then, the second dimension, the present, answers the question, what are the trends and drivers pushing towards the image of the future previously identified? Finally, the last step in the third dimension is asking, what are the weights from the past that keep us from reaching that image of the future? By answering those three questions in each triangle angle, the organisation gained insights into their relationship to the future and how to reach it. Moreover, this method fuels creative and forward-looking strategic discussions by using the tension of past data, present perception and future anticipation (Ehls et al., 2022).

4) The Futures Landscape. This concept from Tibbs (2000) introduces futures thinking in the organisational by imagining it as a landscape. Using the metaphor of a star, the mountains, a chessboard, and the self, explain the interconnections between an organisation's vision, goals, strategy, and personal biases. The star on the horizon describes an organisation's vision, providing guidance even in uncertain times when we cannot see what is coming next. To fulfil this vision, an organisation needs to climb certain mountains representing the strategic goals. On the other landscape' end are the organisation and its employees, representing their values on how to perceive the world.

The chessboard also represents the organisation's environment to navigate to reach its goals. To make this concept practical, the organisation gets together to map the landscape. They begin with a shared vision, the star; the vision must be shared amongst all stakeholders. The same goes for the mountains and the goals. Next, they map their individual and organisational values at the bottom of the landscape; these are the lenses through which they see the world. Finally, for the chessboard, they write down their current strategy for reaching their goals and map their current environment (stakeholders, customers, competitors, regulations). The chessboard is also directly connected to the scanning activities, explained later in subsection 3.4.3.

3.5.3 Exploration

This phase aims to anticipate future issues and explore countless possibilities for new products and innovation within the complex, connected global arena. During such interaction, participants are confronted with the reason (the 'why') they should actively participate in implementing the CFA by realising the long-term impacts and implications of moving towards a circular and futures-oriented organisation.

1) Scanning. By scanning, organisations explore their ever-changing surroundings to identify changes in the future, present, and past. Several frameworks are utilised to conduct scanning activities; the most popular one is around the STEEP categories (Social,

Technological, Environmental, Economic, and Political). In this phase, the focal issue or the main research question explored in the Mapping phase is taken forward, followed by the actual collection of weak signals. Looking out for signals in non-mainstream places, wearing different hats and lenses, besides challenging one's own biases, is critical for this stage. Finally, these collected signals need to be stored, organised and analysed; this stage is called Sensemaking and is further explained below in paragraph 3).

2) Emerging Issues Analysis. This type of analysis plays a crucial role in building preparedness for the future. All trends arise from emerging issues, whereas emerging issues can evolve from weak signals (Conway, 2015). Weak signals give a glimpse into the future but are hard to find. They are signals that mostly only appear in a geographically limited region and are noticed by a few people but may become a driving force in the future (Miles et al., 2016). The case with megatrends is that these do not happen linearly; megatrends develop over a long period, have global effects, and stay long-term. Therefore, the collected signals should be clustered using this framework after scanning.

3) Sensemaking. This activity is where the collected signals start making sense for the participants. As a natural process, patterns emerge once a series of signals of change are collected; some patterns emerge organically when signals are grouped into commonalities. Other patterns need to be further analysed by the team to find potential implications of these changes in the organisation's surroundings. Signals in isolation may seem relatively unimportant, but these, when identified early and linked to a particular issue, can significantly benefit the design of strategic pathways. A series of frameworks are used; causal loop diagramming, Impact/Uncertainty matrix, etc.

4) Butterfly Diagram [future]. As previously explained in the mapping phase, the group is asked to fill in the text boxes for each loop and cross-section displayed on the Butterfly Diagram [future]. Differently from the first Butterfly Diagram [present], the group indicates the vision for the company in each section. They then express the rationale behind their choices. The direct results from the scanning activities can be used as input to enhance the diagram and identify new opportunities.

5) Futures Janus Cone. After looking backwards in time with the past Janus Cone exercise, we continue looking forward and mapping the collected trends into the future. This identifies patterns and makes sense of future uncertainties by comparing past patterns with patterns emerging in the future. The participants are asked to map the identified patterns alongside their relevance for their business, level of impact and approximate appearance in time.

3.5.4 Cruising

This phase aims to obtain deeper insights into the why; look at ingrained behaviours, society's drives and systems. Here we navigate the future and the present by better scrutinising the organisation.

1) Futures Wheel. This method looks like a three-ringed wheel, hence its name. As with emerging issues analysis in the previous phase, this method facilitates anticipating the future by deliberating on how today's emerging issues can develop and, most importantly, which consequences could create in the longer term. The chosen trend or event is written in the centre of the wheel. From there, trim rings are drawn from the centre to a second area, and these rings are filled in with the primary consequences; a ripple effect continues to a second and third set of consequences or until the event's implications are clear. This method does not stop at first-order consequences; it helps explore and deduce the unthinkable consequences (Inayatullah, 2008). For example, using the futures wheel can map logical implications of the creation of a new product or a new business model. How the parts interact with the whole becomes clearer

2) Causal Layered Analysis (CLA) - part 1. The CLA is a method that helps organisations articulate core metaphors and develop new strategies and success measures. The contribution of CLA is to be alert to litanies, worldviews, systems and metaphors within the organisation. CLA has these four layers deep and two parts wide: the present (part 1) and the future (part 2). According to Inayatullah (2008), CLA is promoting critical futures discourses where it decisively moved from ontological concerns about the nature of the predictability of the universe to epistemological concerns about the knowledge interests in varied truth claims about the future (Kuusi. et al., 2016). The CLA (part 1) helps unveil the company's current status and supports mapping present needs. This method helps organisations by enhancing their ability to be alert to new possibilities before deciding how to address a problem or challenge. The result of this method is also a deep revealing experience of the power of worldview and metaphors that dominate the organisation's decision-making.

3) Sarkar Game. This role-playing game was invented by academics and futurists Voros and Hayward (Inayatullah et al., 2006) to obtain a more personal and deeper understanding of alternative futures (Inayatullah, 2008). The game has four types of roles, representing four powers: the worker, the warrior, the intellectual, and the capitalist, and each of these archetypes has a positive and a negative aspect. I also adapted this game by adding another role, the activist, to represent the current development of political movements. By playing this game, the individuals can learn about their social

constructions and how each role limits or not the effectiveness of their professional activities within an organisation (Inayatullah, 2008). The game aims to identify that to provoke change; we need to step outside our roles and empower collaboration amongst those systems. New roles created by the participants may be introduced as a consequence.

3.5.5 Encountering

The Encountering phase is dedicated to imagining and visualising alternatives to uncover multiple scenarios, showing options and possible futures. It also touches on the different layers of a preferred future.

Visioning is a highly relevant component of the CFA approach since it involves creating compelling images of the future and creating an extraordinary collective sense of possibilities. Dator (2002) argued that for an organisation to create a future, it must first be imagined. Furthermore, visioning produces a map of what the future may hold, but more importantly, what the SME wants the future to be (Ancona et al., 2007).

1) Scenarios. A special place within FS is reserved for the scenarios method because scenarios are also the end product of futures research to summarise the results of every method used by a futurist (Bell, 2009). Four examples of scenarios are inductive, deductive, incremental and normative (Wilkinson et al., 2003), and each could be implemented according to the challenge and the desired purpose. As Fergnani explains

"Future scenarios are created not as a set of alternate predictions, but as plausible states to be worked with. The value of scenarios lays in achieving preparedness in navigating the future that will occur by having simulated futures that may have occurred" (2022b, p. 4):

Furthermore, scenarios serve three purposes, according to Bezold (2009). The first is to circumscribe the range of uncertainty and display the broad range of possibilities ahead. The second is to stimulate the exploration of both dangers to be avoided and positive possibilities to construct a vision of the preferred future. The third is to test how potential strategies and actions might work in future circumstances to assess how robust strategies are across multiple scenarios.

2) Causal Layered Analysis (CLA) - part 2. As explained by the CLA in section 4.4, this method is tailored to foster people's imagination and think metaphorically to facilitate the transformation process by better understanding the deeper levels of the change processes. The CLA (future) helps create alternative futures by bringing different worldviews and stakeholders into the futures process. By being inclusive, the resultant

strategy is often more resilient and robust. After a shift in the metaphor of the organisation, this method lines out the necessary changes in the organization's culture and processes to enable its preferred vision.

3.5.6 Landing & Probing

A preferred future has been visualised and described in the previous activities, but even the most compelling vision for the future will lose its power if it stays disconnected from the day-to-day actions of the organisation. This is the reason for including landing as the next step since the business will move from an abstract world of ideas into concrete actions to implement. As Inayatullah (2002) advices:

"The future is constructed through deep participation. Content learning gives way to process learning. The Future thus becomes owned by those having interests in that future" (p. 8).

Consequently, this phase is concerned with the how, the strategies, the steps and the milestones one needs to make to achieve that future.

1) Strategy Diamond (Hambrick and Fredrickson 2005) provides a framework to create a solid strategy based on the assumption that by answering the following questions of the following domains, a profound strategy could be defined: Arena - where will the organisation be active?; Vehicles - how does the organisation get there?; Differentiators - how does the organisation win in the marketplace?; Economic logic - how will returns be obtained; and Staging - what will be the speed and sequence of moves. Thereby, all five fields are interrelated and only when the organisation can align them to create a mutual reinforcement will it outperform the competition.

2) Windtunneling. This exercise assesses strategies that are discussed in the previous section. It is how strategic options are evaluated regarding cultural fit, financial performance, and risk. This is done by drawing the strategies and scenarios created in section 4.5 into a matrix. The purpose here is to define strategies to go forward in any scenario. This multi-coverage strategy is a good fit for any possible outcome. Other strategies are avoiding strategies; these are meant to prevent a future that is not desired. Finally, shape strategies are designed to push for and create a preferred future, and there are also strategies to adapt to the possible futures.

3) Experiential Futures - Artefacts. This Experiential Futures' immersive experience aims to create impact by bringing one or more of the five scenarios from the Encountering

phase to life as an artefact and getting participants to live it. These artefacts make the possible futures more tangible and bridge the gap from the future to the present. This activity seeks to create empathy and understanding towards an environment, an industry, and ourselves as humanity. Creating an artefact that lives in that future vision helps one grasp what is possible and how one would feel and act if that happened.

3.5.7 Transforming

After all the previous work from the six phases, all of the insights gathered are applied to set concrete and actionable steps in the present to reach organisational transformation towards the preferred future.

1) Reflection Exercise. Considered a bridging activity between phase 6 and phase 7, the main goal of the reflection exercise is to draw closing remarks on the activities, emotions, considerations, and changes experienced by the participants in the previous exercises. This is to prepare them to reach and hold onto the final stage of transformation and plan for continuous iterative improvement. There are several ways to engage participants in such a discussion, and they revolve around asking questions to oneself, each other, and the team, which are strongly linked to the State of play questions in section 4.1. These reflective questions should be asked and answered amongst all participants in an open discussion format.

2) Backcasting. This FS method enables participants to formulate a normative vision, work their way back from such an ideal future, and plan steps on what actions and milestones can lead towards that preferred future. It provides a clear pathway from the present into the future as the method enables participants to identify measures that need to be implemented in the present to move towards a more sustainable future (Dreborg, 1996; Gáspár et al., 2021). What seemed impossible to reach from the present now has a clear pathway. Moreover, the method teaches participants that their future vision can seriously influence their current actions (Gáspár et al., 2021).

Quist and Vergragt (2006) identified learning as the critical element of Backcasting since it facilitates dialogue between the desired conditions of the future and the present, enabling mutual learning and, most importantly, learning by doing (Gáspár et al., 2021).

3) Transformed Futures Landscape. This method is based on the concept explained earlier by Tibbs (2000). This time we use it to map the emerging future of the organisation and its updated vision, goals, strategy and personal exploration within the organisation. The insights from the scanning activities are mapped on the chessboard. The complete map helps visualise and reflect on the preferred future without neglecting the different

pathways explored during the scenario exercise. It is a visual that shows where the organisation comes from, its wants to go, the obstacles and future challenges and a possible pathway to reach its goals and vision.

3.6 Concluding remarks

The CFA presents itself as a set of methods which guides SMEs to achieve their preferred future and involve all employees in the system. The approach is designed to be parameterised according to the specific needs and context of each SME.

Each of these seven stages fulfils a specific objective of the designed approach, making their integration a decisive factor in implementing the developed methodology. Basing the development of the CFA on the recent systematic review presented in Chapter 2 and this chapter allowed me to ensure a scientific basis and comply with comprehensiveness requirements.

To this end, the design of the CFA is intended: (1) to help SMEs reach their preferred future while (2) achieving their goals, (3) their mission is delivered, (4) to enable alignment within and between the organisation, (5) optimises resource allocation, and (6) supports decision making, thereby improving organisational performance (Alencar de Andrade et al., 2021). Furthermore, the CFA approach contributes to the decision-making process in the present by (1) detecting and collecting intelligence, (2) interpreting the information, and (3) making and implementing decisions.

Chapter 4: Research design

4.1 Introduction

This chapter describes the theoretical paradigm, research strategy and standards followed during my research. It further introduces the SME in which the CFA was implemented and then describes which type of data has been chosen and how it was collected and analysed. Finally, it explains the overall research design to achieve my research objectives.

4.2 Theoretical paradigm

The theoretical paradigm I adopted that underpins my research is interpretivism (Guba & Lincoln, 1994). This paradigm aims to understand the subjective experience of individuals or groups by uncovering, describing and interpreting the meanings that people use in particular real settings (Burrel & Morgan, 1979, Gephart, 2004, Levakos, 2021). I used qualitative research and followed constructivist grounded guidelines (Charmaz, 2014). According to Fergnani (2020), a grounded theory is suitable for my type of research since I conducted 'nascent theory research', a kind of research with little existing theory to explain a novel phenomenon in a new field of inquiry. This theory also considers the researchers' values, omissions, emphasis and interpretations while not departing from solid intuitive, logical reasoning.

4.3 Research strategy

The theoretical construct of the approach aims to: (1) identify an organisation's preferred future, what barriers exist and what solutions can be implemented, (2) understand an organisation's strategic process and determine what they do and do not know, (3) ensure the effective decision-making; and (4) indicate whether the expected outcomes have been realised (Franco-Santos, Lucianetti, and Bourne, 2012).

Directly related to FS work, Slaugther (2000) divides the creation of knowledge using four steps: (1) A futures method is selected and applied, (2) the results of the work are assembled, (3) the assembled results are interpreted, and (4) the results are confirmed, or rejected. Slaugther (2000) in Ramos (2002) also emphasises that a sound research strategy related to FS should not pretend to know the future or predict it but rather aim to create meaningful forward views that lead people to meaningful and constructive activity.

There is little empirical work that seeks to develop a specific paradigm for examining the preferred future of an SME (Wilcox and Bourne, 2003; Bititci et al., 2012; Harkness and Bourne, 2015; Bourne et al., 2014, Weigend Rodríguez et al., 2020).

Regarding the implementation stage of my research, the type of fieldwork I carried out is in line with 'action research'. According to Greenwood and Levin (1998), this line of scholarship emerged from sociology, industrial relations, community, and rural development. The main characteristic of action research is that it is carried out by a researcher or a team but in collaboration with members of an organisation or community, seeking to improve their situation. Therefore, action research promotes broad participation in the research process and supports action leading to more satisfying situations for the stakeholders. However, action without foresight can be dangerous, and foresight without action is meaningless (Ramos, 2002). Furthermore, Rohrbeck and Kum (2018) have argued that a foresight process can only become part of the organisation's culture if it is based on the broad participation of its employees.

I argue that I followed an action research approach because together, the DSME team and I defined the problem to be examined, cogenerated relevant knowledge around it, learnt and executed research techniques, took actions, shared reflections, and interpreted the results of the actions based on what we learnt together. This is opposite to traditional management processes where change is conducted from top to bottom. In Ramos's (2002, p. 2) own words:

"As organisations and even nations must sometimes make radical changes based on perceived threats and opportunities, action research aims to deal with the alienating effects of such expert/non-expert division through a reflective participatory approach. In action research the research process is open to many and facilitated to promote fairness. Outcomes support participants' interest so that the knowledge created helps participants to control their own destiny. Actions are generated by the participants themselves, ensuring a maximum amount of self-determination"

Inayatullah (2002) supports the involvement of the researcher in an action research approach, as he argues that to be effective in an FS-based work, the researcher must be willing to play the role of 'sage to stage' and the role of facilitator, at some points leading by just listening and at others by teaching the methods. Similarly, Ramos (2002) argues that the researcher becomes a co-researcher as there is no subject of study but research partners.

In line with action research, I argue that my research strategy and the CFA have been developed with a focus on action research since one of the main objectives of the approach is that organisations learn by themselves how to conduct the approach without the need for an external facilitator. This means the organisation would further empower and live its democratisation process during the research and action phase. As Inayatullah (2020) stated, the FS practitioner's role is to determine the most appropriate iteration of interventions. These characteristics are part of my research, notably how the CFA created a proactive attitude post-implementation.

I used an abductive, grounded theory and empirical approach. Regarding research standards, the process followed comprised four steps to guarantee viability (that the approach can be implemented), usability (or how easy the approach could be followed), and utility (that the model contributes to the organisation's performance and in the formulation of the SME strategy):

Step 1: Study of theory: in this stage, scientific papers related to CE and FS; and, more specifically, developed approaches were analysed. The most used approaches were identified and presented in section 3.2. Therefore the underlying CFA derives from the scientific literature in the CE and FS fields.

Step 2: Identify experts and validate methods used: this section was characterised by identifying specialists, i.e. people with high knowledge and experience in CE and FS, and therefore have enough background to make suggestions that supported me to improve the developed approach. In this context, I mention a handful of specialists from both fields (CE & FS) in the acknowledgement section. The interaction with experts with diverse backgrounds allowed the approach to consider different perspectives and supported the development of an integrated foresight view. This step also contributed to the CFA's consistency, clarity, and soundness.

Step 3: Design and implementation: the different stages of the approach were constructed. For this, the theoretical knowledge acquired in the first stage, the literature review and the interview with the CEO was of absolute relevance. The purpose of the interview was to provide more extensive knowledge of the organisation from one of its leaders to construct the approach.

Step 4: Improve the approach based on learning and feedback to ensure usability.

4.4 Case study justification and selection

As the research topic of FS methods applied systematically within the CE research field is still in its infancy, specifically applied to SMEs, I focused on drawing more

profound descriptions and providing in-depth empirical evidence. Therefore, my research adopted a case study research strategy.

As the great distance to the object of study and lack of feedback quickly leads to an invalid learning process, my objective was to engage closely with the subject by observing and interacting with a Dutch SME. The case study can be an effective solution to accomplish this. A case study is a detailed examination of a single example (Flyvbjerg, 2006). Therefore, the choice of the method should depend on the problem under study and its circumstance. Moreover, using a case study increases whenever an empirical inquest must scrutinise a contemporary phenomenon in its real-life setting (Yin, 1981). There are several advocates of this method (Eckstein, 1975; Yin, 1981; Kuper & Kuper, 1985; Walton, 1992; Flyvbjerg, 2006).

Like other methods, Eckstein (1975) argued that the case study could be used to test and compare existing theories of knowledge. Kuper & Kuper (1985) went further by stating that "more discoveries have arisen from intense observations than from statistics applied to large groups" (p. 95). A similar argument supports action research, and since my research combines both approaches, a case study and action research, it is worth integrating the argument in this discussion.

Greenwood and Levin (1998) write that action research is closer to a 'true' scientific method compared to traditional social science in its knowledge creation process since the former engages with the phenomenon of study, and systematically researchers outdistance themselves from their object of study connecting thought and action that permit the testing of results. The latter, traditional social science, does just the opposite.

Flyvbjerg (2006) demystified the misconceptions about the case study as a research method. He catalogued the five most common misunderstandings about case-study research and explained and corrected these misunderstandings one by one in his publication.

In Table 1 below, I include these most common misunderstandings (left column) and Flyvbjerg's arguments against them (right column):

Misunderstanding about case-study	Flyvbjerg revised argument against each misunderstanding
1. Theoretical knowledge is more valuable than practical knowledge.	Concrete, context-dependent knowledge is more valuable than the vain search for theories and universals. Proof is hard to come by in social science because of the absence of 'hard' theory, whereas learning is undoubtedly possible.
2. One cannot generalise from a single case; therefore, the single-case study cannot contribute to scientific development.	One can often generalise based on a single case, and the case study may be central to scientific development via generalisation as supplement or alternative to other methods. Nevertheless, formal generalisation is overvalued as a source of scientific development, whereas 'the force of example' is underestimated.
3. The case study is most helpful in generating hypotheses, whereas other methods are more suitable for testing hypotheses and theory.	The case study is helpful for both generating and testing hypotheses but is not limited to these research activities alone.
4. The case study contains a bias toward verification, a tendency to confirm the researcher's preconceived notions.	The case study contains no more significant bias toward verifying the researcher's preconceived notions than other methods of inquiry. On the contrary, experience indicates that the case study has a more significant bias toward falsification of preconceived notions than toward verification.
5. Case studies are often difficult to summarise and develop general propositions and theories based on specific case studies.	It is correct that summarising case studies is often difficult, especially as a concern case process. It is less correct as regards case outcomes. However, the problems in summarising case studies are more due to the properties of the actual studies than the case study as a research method. Often it

	is not desirable to summarise and generalise case studies. Good studies should be read as narratives in their entirety.

Table 1. Five misunderstandings about case-study research.
(Flyvbjerg, 2006).

According to Yin (1981), two basic types of designs are possible when using case studies for explanatory purposes. The first is a single-case design, which is most beneficial for testing a theory. The second type of design is a multiple-case design, in which conclusions are drawn from a group of cases.

It is considered good practice to use a single-case study design to specify how the case study research was designed as thoroughly as possible. For example, topics to be covered, the type of organisation, and participants from which information will be obtained. Lastly, the case study should specify the researcher's protocol before the data collection, including various sources of evidence used (Yin, 1981).

4.5 Dutch SME case study

What does the Circular Futures Approach look like in practice? It has been acknowledged that a case study can be applied to the different stages, including testing and knowledge generation (Flyvbjerg, 2016). According to Gáspár et al. (2021), the implementation of FS methods is most effective in those organisations that operate in a market with numerous interactive companies, which aim to achieve long-term goals, in which culture is open, innovative, and where its employees are capable of expressing themselves (without fearing negative retributions) when they express criticism, cooperation, and pursue dialogue. For fulfilling all these characteristics, the Dutch SME seemed a good fit for implementing the CFA.

The CFA design was finalised at the beginning of 2021 and implemented from May to November 2021. The approach implementation was planned to take place in face-to-face workshops, but they were halted due to the COVID-19 pandemic. For this reason, I adapted the series of workshops to an online setting. In addition, I rehearsed the CFA activities with a group of experts in CE and FS and some amendments to the approach were made based on their suggestions before the CFA implementation.

Aligned to Hofmann and zu Knyphausen-Aufseß (2021) recommendations for a case study selection, the requirements to select an SME, beyond the apparent reason of size and CE orientation, was that the organisation must have been operating for several years and must be organisationally secure and stable, i.e. it is not at risk of insolvency or abandonment, regardless of profitability. An extensive description of the selected Dutch SME is included below as a case study was adopted for testing my developed approach.

4.5.1 Dutch SME (what they communicate externally)

The DSME technology started being developed in 2007 in the United States. Since being patented, it has advanced steadily. Nowadays, the DSME has emergent sales and commercialisation activities worldwide.

The DSME as a material is a lightweight, high-performance, clean, VOC-free panel that is 100% recycled and recyclable. This Dutch SME upcycles fibre-based residues from agricultural, industrial, or urban production & consumption cycles into advanced green material. Examples of market applications and solutions for the DSME panels are temporary exhibition stands and signage, merchandise displays, seating and chairs, shelving systems and decorative surfaces.

The DSME has emergent sales and commercialisation activities in the United States, Mexico, European Union, United Kingdom, Singapore, Japan, and India. Its current vision is to be one of the circular economy's leaders by deploying innovative solutions in collaboration, co-creation and co-responsibility with partners such as manufacturers and designers, industries, cities and government agencies. DSME clients and partners include, for instance, companies such as Avery Dennison, Concourse, Mars, Nederlandse Spoorwegen (NS), Heineken, Royal Schiphol Group, Tarkett, etc.

The DSME also collaborates with governments and governmental institutions (local, regional, and global) such as the State Government of Andhra Pradesh, MVO Nederland, The Dutch Entrepreneurial Development Bank (FMO), the Netherlands Embassy in New Delhi and the Government of Saga Prefecture in Japan. Additionally, DSME co-creates solutions in partnership with NGOs like Grameena Vikas Society for Rural Development (GVK) in India, fabricators partners like TRIBOO, Occony design studio, and well-known entrepreneurs and designers like Malou ter Horst.

The current mission is to enable more types of waste to be recycled and upcycled, offer advanced conversion solutions that increase the value of recycled materials, provide solutions for products designed to be 100% recyclable and compostable, and unlock new

opportunities for cost savings and revenue generation through all stages of the value chain and user life cycle.

The DSME is made in DSME's Living Factories (ELFs). The ELF is the industrial facility where DSME panels are manufactured to serve the clients' needs based on one or more DSME Fibre Alloys (recipe for the fibre mix created by the DSME R&D team). DSME's current focus is on supporting its customer's journey toward circular business models and initiatives to gain a competitive advantage.

The DSME believes potential competitors are far behind on commercialization and Technical Readiness Level (TRL) and are focused on solving the challenge of one single waste stream. In contrast, the installation of the manufacturing panels will come from several kinds of cellulose waste materials to make DSME panels.

The factory does not need to change its machinery for this. Therefore, it is resilient to the volatility of raw material pricing or access to a regular supply. Notably, a factory's manufacturing process can convert residual cellulose fibres as feedstock for the panels, only using water, pressure, and heat (without any additives).

The DSME's ambition is to build factories in any place where there is one or more residual cellulose fibre stream(s) that can be processed using their technology. These fibres could be recycled paper, paddy straw from rice cultivation, spent brewery grains, jeans fibres, grass, and other by-products of industrial processes and agricultural activities at the local level.

Since the sourcing availability of these residual streams is more abundant and available than the virgin fibre from the forestry and wood industry, the DSME products provide greater flexibility and adaptability than their biggest market competitor right now, the Medium-Density-Fibreboard (MDF). Although this competitor produces a slightly similar product, it does not use a wide variety of rest streams or offer various applications. Therefore, its offer to its customers is much more limited, and they have historically chosen a different strategy (Red Ocean) and route-to-market approach. Moreover, they are not using an integrated approach as they do and position themselves as 'middleman' without focusing on the end product.

Notwithstanding, MDF is produced with formaldehyde and other chemicals that can off-gas through production and usage. Formaldehyde is known for its carcinogens and Volatile Off-gassing Components (VOCs), which also contribute to indoor pollution.

According to third parties' assessment, DSME panels are non-toxic, healthy, VOCs-free; and Cradle to Cradle certifiable. Furthermore, DSME panels can be reused, recycled and composted 100% based on external validation and endorsement of recyclability. In

addition, DSME panels are free of toxic binders and residual fibres locally sourced and produced. Currently, to the best of DSME's technical team's knowledge, there is no facility in the world producing panels based on a similar circular technology as theirs.

4.5.2 DSME (description based on the State of play questionnaire answers)

The DSME originated in the United States but has evolved to have a European division, which is the area of the organisation that focuses the most on and leads the CE efforts. Because the size of the organisation and the financial capabilities are still limited, it is common for just one or two individuals to represent some internal areas (e.g. two employees represent finance, and just one employee represents marketing). However, they also work in different employment schemes: part-time, full-time, or self-employed entrepreneurs. The generational differences that everyone brings to the organisation are also of significant importance since the expectations (work-life balance or not), experiences (past work experiences) and preferences of work (home office or working from the office), among other differences, vary between DSME employees. In addition, the DSME is in constant dynamism, either by focusing on new markets, new applications or strengthening the organisation's internal processes. These elements sometimes bring an operational bottleneck since most challenges have never been faced before and, therefore, are new.

Externally speaking, the most significant source of uncertainty for the DSME comes from the COVID-19 pandemic. This pandemic has affected the organisation structurally since there have already been several lockdowns in the different regions where the DSME is located, constraining the employees to work at full speed and negatively affecting some projects. Additionally, as most DSME customers are businesses, the commercial opportunities have shrunk, and therefore the options that generate cash are considerably limited.

Internally speaking, the DSME faced, in parallel with COVID-19, also organisational disruptions. Since the financial capabilities of the DSME are minimal, constant changes are proposed to create an increase in economic resources. These changes subsequently created structural changes, and this was the cause that in 2021 the DSME faced an internal attempt for a hostile takeover. Since this threat has ended, the DSME is now more open to building a more robust strategy to cope with and prepare for future challenges.

Lastly, the DSME is immersed in a highly uncertain market; this is the market for CE-like-minded organisations. This new economic paradigm invites organisations to propose new lines of services, products, materials and components throughout new business

models. For the DSME, they need to orient its efforts toward replacing linear materials. One of the challenges is that traditional players in the same industries that the DSME participates expect the DSME to perform and outperform linear materials, aiming for a cost-competitive advantage with comparable material behaviour to the current materials.

The end-user of the organisation depends on the clients' distribution channel. Generally speaking, any client with access to cellulose-based waste streams (e.g. a by-product of the company itself) can benefit from the DSME's technology. When referring to raw DSME panels, the designers and fabricators are the end customers.

The prototypical customers for the DSME are businesses from the following industries and sectors; fast moving consumer goods (FMCG), flooring, furniture, and fashion. In addition, the DSME also partners with and sells to manufacturers, fabricators, designers, and makers, giving service to end customers from the abovementioned industries. These are part of their community of partners, craftsmen and makers.

DSME's prototypical customers believe that DSME materials are too expensive compared to traditional materials. The DSME would like its customers to embrace DSME materials as the first choice as it challenges the current linear economic take-make-dispose model. DSME's ideal customer would like to purchase and use the DSME panels as the most sustainable, non-toxic, and versatile material. For this ideal customer, the cost comparison of DSME's panels versus traditional materials is not a deal-breaker; however, the price is seen as cost-competitive if they also consider the attributes of DSME's materials, such as being more versatile and robust, light, flexible, recyclable and compostable than traditional materials.

Both resilience and adaptability can be used to describe the work and efforts that DSME has taken when working with partners around the globe to enable their circularity ambitions and promote health and clean materials alongside a Blue Economy strategy. In 2020, previous 'ploughing and seedling' activities surprisingly aligned like pieces of a puzzle when the company and the team faced countless challenges. This allowed the survivability rate of projects to increase. One example is the impact-led project in India, where financial support has fallen short due to the project's high-risk profile. Nevertheless, commercialisation opportunities have arisen with potential off-takers, new collaborations are flourishing, and a pilot study to live up to the project expectations is starting. The DSME-partners ecosystem was shaken by internal and external turmoil but did not fall and is now in the self-healing phase with the end goal of setting up the first DSME-licensed factory in India by the end of 2022.

There is internal consensus and an external acceptance that DSME's business model is economically sound. Nevertheless, the current business model is still evolving in the other two dimensions, social and environmental. Therefore it cannot be stated yet whether it is successful or not in having a remarkable positive impact on society and the environment. However, it is assumed that its impact in these two dimensions is positive since it creates employment and improves social equity, and in environmental terms, it mitigates CO_2 emissions, is 100% recyclable, bio-based, and is VOC free. On the other hand, it is perceived that the DSME's results will depend on the region where a project is based, the funding, the resources availability, and the market readiness in terms of circularity.

In the next three years, the organisation expects to consolidate its business. As a result, the estimation of executing a business model pivot is highly low. In the next three years, however, there will be a high need for standardised procedures intended to improve the business flow as it is expected that the opening of new factories and consolidation of projects will open up new markets and, therefore, the need to be agile.

4.6 Methods of data collection

Following the grounded theory approach (Glaser and Strauss, 1967; Strauss and Corbin, 1990), the primary method I used to collect data was a series of workshops. These workshops were the most critical part of the approach, as they are the basis for establishing a dialogue between participants and facilitator. In total, 28 workshops were implemented, producing 2,520 minutes of CFA fieldwork material that was iteratively collected over seven months (May to November 2021).

In addition to conducting the series of workshops, the DSME shared many documents, such as PowerPoint presentations, reports, and videos. I also examined these documents which served as supplementary sources of information to better understand this SME. This multi-methodological approach helped me to explore complex issues within the DSME thoroughly.

Before the COVID-19 pandemic began, I also had two face-to-face meetings with the top management at the DSME headquarters in the Netherlands, allowing me to do on-site observations. The access and triangulation of these primary and secondary data from various sources resulted in sufficient information for a detailed case description (Ridder, 2017).

4.6.1 Interview design

A preliminary activity for the CFA kick-off was to interview the DSME's CEO. Throughout this interview, the questions asked were inspired by the Futures Journal publication *Six Pillars: Futures Thinking for Transforming* (Inayatullah, 2008).

The interview occurred on February 13th, 2020 (a couple of weeks before the COVID/19 pandemic spread globally). The DSME CEO is a global expert and pioneer in CE. He joined the DSME in 2015 and has been the CEO of the DSME's European division and the Global Corporate CE Director. The six basic futures questions are:

1. What do you think the future will be like? What is your prediction? More and more progress and wealth? A dramatic technological revolution? Environmental catastrophe? Why?

2. Which future are you afraid of? Do you think you can transform this future into the desired future? Why or why not?

3. What are the hidden assumptions of your predicted future? Are there some taken-for-granted assumptions (about gender, nature, technology, culture, or others)?

4. What are some alternatives to your predicted or feared future? If you change some of your assumptions, what alternatives emerge?

5. What is your preferred future? Which future do you wish to become a reality for yourself or your organization?

6. And finally, how might you get there? What steps can you take to move in toward your preferred future?

These questions are to be answered by the CEO or the SME's managing director(s). The reason to involve this role in the activity and to place the interview as a CFA preliminary step was to engage with the prominent leader(s) of the organisation, to understand better the process of change and the importance of working towards a preferred future so that the leader can be the first catalyst of change within the organisation. In addition, it contributed to understanding what was occurring, setting their efforts to study the future and organising their insights to reach a preferred future.

Asking these questions to the DSME CEO in Europe before the workshop implementation started was highly instrumental for my research, as these questions would allow me to connect with the CEO and understand where he was at in terms of a future vision.

Content-wise, the interview material contributes to understanding how the DSME is being led, under what assumptions, and the CEO's leadership style. Furthermore, it helped

my research as I compared the insights from the interview with the insights of the workshop implementation.

The interview was recorded in full and subsequently, I transcribed it using Otter (Otter, 2022). Afterwards, I arranged a series of meetings with the DSME CEO, presented the significant statements, and asked whether the statements represented what he had said. The DSME CEO could accept or reject these statements or modify them. After confirming, rejecting, or modifying these statements, I edited the interview and created the final copy.

After reading the final copy of the interview, I had the impression that the content of the interview could be worth publishing. Previously asking for authorisation from the DSME CEO, I shared the interview with a couple of futurist colleagues. They confirmed the interview was worth publishing and suggested sending the interview to journals specialising in Futures Studies, such as the Journal of Futures Studies or The World Futures Review. Knowing that Sohail Inayatullah[1][2][3] is the chief editor of the Journal of Futures Studies, I sent the interview to him because he was who developed the six futures questions that the interview is based on. The interview was published after a peer-review process.

4.6.2 Interview discussion

The data gathered throughout the interview proved insightful because it questions the dominant discourse about what is and what is not innovation and the differences and similitudes between the 2nd renaissance and the 4th Industrial revolution. The CEO believes that Artificial Intelligence (AI) and the CE are the main drivers and paths toward the future. He forecasts a paradigm shift of priorities in humans, from focusing on a material property (things) to focusing on an immaterial property (happiness). The way the CEO thinks the future could be like is a decline of the US and its western culture as a dominant force and as a reference to individual and organisational behaviour (after 80 years of being dominant compared to the 200 years of Rome dominance) to give way to a new eastern oriental era.

He is sure that the DSME in Europe should look to Asia, to countries such as Japan, but not to the U.S. or China to do business or adopt certain cultural practices. However,

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[3] Futurist-in-residence, Government of Abu Dhabi, Culture and Tourism, UAE

he also argued about creating a new narrative to break up the past narratives from the old generations.

In parallel to these interesting ideas, he criticised the current exploitative human behaviour paradigm that sees nature as separate from humankind, where nature serves human beings. Opposite to this, he sees humankind as part of nature and that nature dominates us, not the other way around.

The interview, in sum, provided a thought-provoking viewpoint on the DSME future and the CEO's perception of the future of humankind. Before the interview took place a couple of weeks before the COVID-19 pandemic started, in his answer to the question "what future are you afraid of" he showed a futures literacy, when answering that:

"The only species which still can't survive is mankind; it cannot adapt. That's an interesting fact. For mankind, I only fear the little things that will ultimately kill us: bacteria and viruses. Normally, that's a very natural way of cleaning up. It is the only thing I can come up that I fear, but I'm a basic optimist" (Logtens and Weigend, 2020, p. 102).

With the concept of wildcards (or black swans), the CEO argued that they do not exist as such, just that they are perceived as this because individuals and organisations lack information to identify these events, or we have information, its occurrence is rare, and therefore we do not consider it or isolate them as errors in our models.

His approach and vision on how to manage his team are ground-breaking but also contradictory as it hinders his team from a participatory process in creating a preferred future:

"I really enjoy observing when people are switching gears, going left or right in the absolute conviction that it was their own rational. It's fantastic working towards a future which doesn't need your competencies and skills anymore once the job is done. Everyone sees themselves as co-creators at the starting point. Imagine yourself planting a young small tree. You need to water and nourish it, keep it safe in the first years. But it will be there, way longer than you will live. It will outgrow and outlast you for sure. Already when planting the first small seed, defined by your perception, you think that you are growing your tree in your own garden. You are not, for it is another tree in the world. What you think you own and pride yourself with is irrelevant in time and to the bigger scheme of life" (Logtens and Weigend, 2020, p. 105).

The DSME's management in Europe has been trying to work under a Holacracy model. This is a type of governance framework. SMEs started to pick up this practice in 2013. Holacracy is "a real-world-tested social technology for agile and purposeful organisations that radically changes how an organisation is structured, how decisions are made, and how power is distributed" (Holacracy, 2008, p.1). The promises that it holds are, among others, (1) a lean and adaptable organisation, (2) clearly distributed authority and (3) purpose-driven.

In holacracy, the organisation is structured in self-organising teams or units of a group of people, called 'circles', and these circles emerge and evolve.

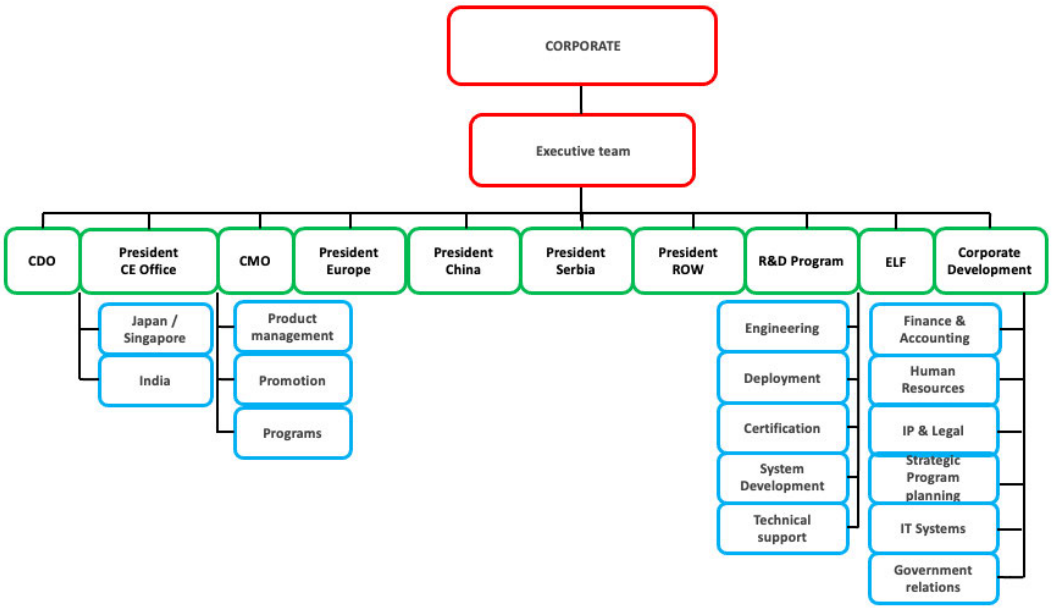

Figure 8. Example of a traditional hierarchical organigram.

(Own source).

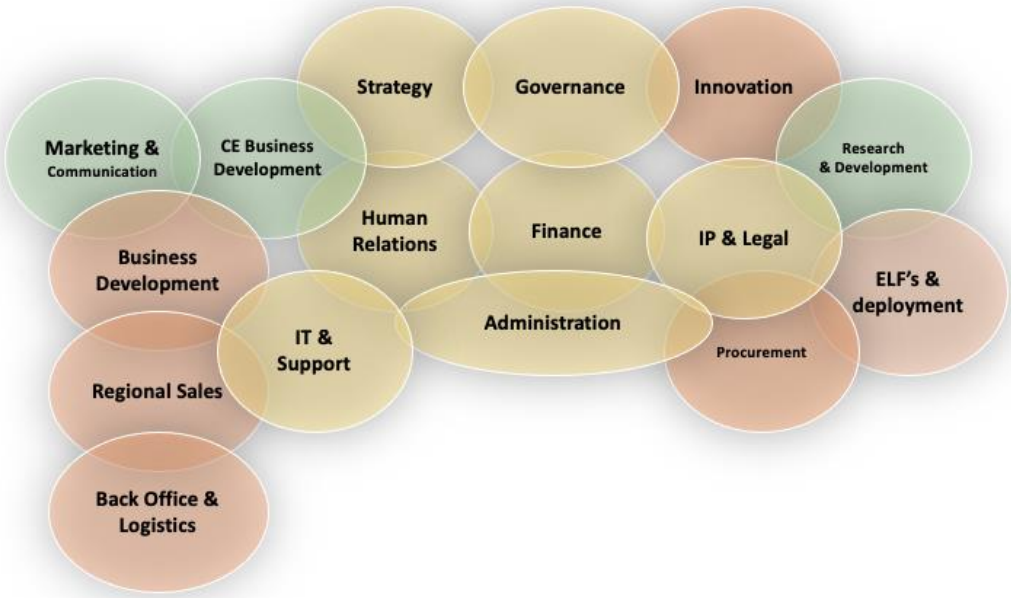

Figure 9. Example of a Holacracy organisational model.

(Own source).

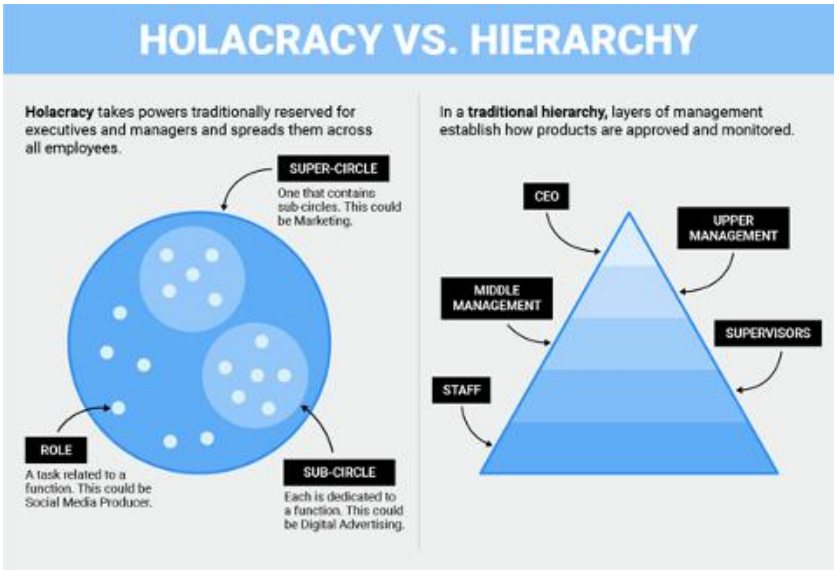

Figure 10. Comparison of Holacracy and Hierarchy

(Insider, 2022).

Another significant change of holacracy compared to the traditional hierarchy model is that decisions are made based on consent (decision-making occurs when nobody has a reasoned objection against the proposed decision) instead of consensus (where everybody has to be in favour of the decision). Consent, according to holacracy, should lead to taking action in an agile manner rather than through analysis. According to Robertson (2006), consent-based decision-making must embrace the Holacracy concept because agile decisions enable rapid feedback. This is illustrated in Figure 11 below:

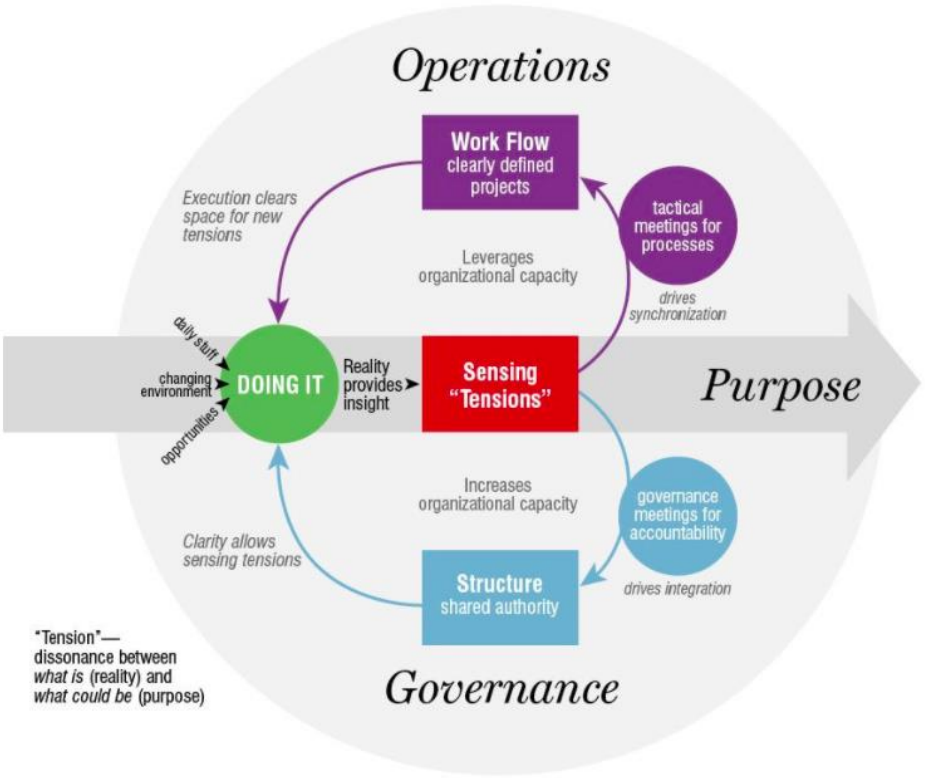

Figure 11. Organisational dynamic Steering in Holacracy.
(Top Management Degrees, 2022).

Considering the concept of consent is crucial for an organisation following a holacracy model, it is applicable to mention that according to some members of the DSME, the organisation has not been consistent on this. For example, one of the participants shared with me one of the correspondences he sent to the CEO, the Managing Director and the Human Resources Director. The subject to discuss was whether to continue doing business with another organisation that tried to intimidate the DSME by email. The threat came after the DSME pressured them on delayed payment. As a reaction to this email threat, a participant responded internally by email with the following (verbatim, including typos and errors but edited for anonymity):

Regardless of our response to this threat on the email below I want to communicate that effectively from today I am not longer answering any phone calls, emails or being involved in any commercial relationship with them. You have my full support on the background if you decide to continue doing business with this organisation that from my point of view, we were highly unlucky to start working with and cursed to have continued besides the evidence of their lack of values, work ethics and professionalism. We all have been patient with them for a year and a half since we were introduced to them. We decided to not give the deserved importance to the multiple signals of how negative they are to our business: stealing samples from our office, being disrespectful and rude to colleague X and colleague Y and myself, not paying or paying partially, representing us badly and I even think unlawfully (with two of our most important customers). For a year and a half they have just brought harm to the organisation commercially, and personally also to my wellbeing, mentally and physically. I trust you will understand and respect my position forward. (Correspondence by email, 2021).

The participant's request for not working with this client was honoured in response to this email. However, the DSME, as such, kept working with this client for another six months until more negative and irreversible actions from this client to the DSME made it inadmissible to continue the collaboration. Furthermore, once this commercial relationship ended, it started a legal lawsuit from the DSME against this client as they did not honour a non-disclosure agreement.

In holacracy, individuals can perform multiple roles as they serve different purposes and responsibilities. Thus, employees alternate leadership according to their roles and priorities and become collaborators with other employees at different times. This way, the decision-making process is distributed throughout the organisation (Robertson, 2006).

When leadership is distributed in this way, individuals sense opportunities (called tensions), and according to the literature on the topic, this helps improve the organisation's alignment with its ultimate purpose.

Cardoso and Ferrer (2013) reported that this dispersion of tension helps decrease the pressure exerted on one leader and distributes it throughout the organisation, enhancing constant learning and innovation. This contributes in parallel to adjusting to rapid and accelerating change.

Although there is much more on holacracy than what I have summarised here, the above description gives an overview of how holacracy works.

Based on this, holacracy is seen as a critical aspect of the DSME CEO leadership, as he points out during the interview:

"The best and most creative ideas, out of the box solutions, arise from frustration. So, I am cultivating frustration to enable ourselves to grab the different learning curves. Where I have to tamper it, is when frustration grows into despair. So when a colleague is on the verge of freaking out because he or she doesn't know anymore, that's when I have to tamper it. Pull the break" (p. 105).

He believes that the organisation's structure will emerge naturally by energising tensions throughout the organisation, and subsequently, this will satisfy the organisation's overarching purpose.

Another strong idea from DSME´s CEO, in line with holacracy, was to experiment with his team. When I asked him to explain further how important the concept of alignment was for him, he made clear that alignment is not what he is putting effort into but that at this stage of the organisation, he is experimenting with his team:

"to have total alignment right now in this phase of our trajectory would be the stupidest thing to do. It would kill the intrinsic energy and force of the team. You cannot say this to the team, because once they know, they would see me coming and then they would take action based on what they anticipate. Therefore my experiment with building a team would fail" (Logtens and Weigend, 2020, p. 106).

CE practitioners mentioned embracing this characteristic of experimentation. With an experiment, you wait to see the results and hope your expectations were correct from the beginning. Based on the CEO's answers for the interview, it became apparent he shares

this approach which my research tries to address. I seek that rather than learning by doing or experimenting (as the CEO called it), there is a strategy to systematically plan, evaluate and modify SMEs' approaches toward the future.

Another vital element in the interview is the concept of awareness. For the CEO:

"In this present era, humankind will again take a giant leap on all kinds of fields: religion, migration, information, technology and **awareness**" (p. 99)

"**Awareness** as such is a very big challenge for everyone" (p. 104)

"Only when you can't find a lynx anymore, anywhere in Europe, then you become aware of the fact. Hey! Where are all those millions of lynxes! And only when a wolf comes back to the Netherlands, you suddenly say, Hey! We've got a wolf in the Netherlands! So your **awareness** and the perception through the lens you use to look at our world is of the essence, before we move into action" (Logtens and Weigend, 2020, p. 104).

"For a very short period of time in our existence we have forgotten how the world really works; we are now going back to where we came from, but at a tremendously higher state of **awareness** from the perspective of wealth, science, social organisation, communication, health, etc. than in the millennia before" (p. 108).

I would argue, following up on these comments, that if awareness is as relevant as the CEO argues, why he is not fostering those elements in his team? Based on subsequent comments in the interview, he stated that;

"I really enjoy observing when people are switching gears, going left or right in the absolute conviction that it was their own rational ideas which led them to their own conclusions" (p. 105)

"I like to see when everyone in the team is completely committed and dedicated to making themselves obsolete at the end of a project which leads to something so strong that it grows on its own. It's fantastic working towards a future which doesn't need your competencies and skills anymore once the job is done" (p.105).

It was interesting to hear from the workshop participants once this assumption was challenged by inviting the DSME's whole team to participate in co-creating that future for the DSME. One of my research questions is to challenge this assumption. What would the outcome of a team and an organisation be when everyone participates to co-create a preferred future, where no one is obsolete as such but constantly striving to look for preferred futures once a previous one has been reached?

Lastly, since the interview took place in February 2020, and the CFA approach implementation started more than a year later, it allowed time to contrast some of the CEO's assumptions on the organisation's performance during 2020 and the following years. He elaborated on grabbing the learning curve from the regions where DSME was doing business then and shared his vision of how the DSME will perform based on this. The CEO argued that:

"What we are doing right now is grabbing the learning curve from different regions in the world and analysing it from an innovative, catalysing, capitalising perspective, and what might seem as random to the outside world is actually truly, completely strategically orchestrated" (p. 104).

"Japan is about proving speed. After only 7 months, when the paradigm was "it takes seven years to do business in the Japanese culture", we signed a memorandum of understanding (MoU). In Singapore, we are about proving the concept of leapfrogging out of one early adaptive agile region. India is where we're going to grab the learning curve through social impact and environmental impact. In Northwest Europe we grabbed the learning curve of being capable of manufacturing in a high-cost labour environment, successfully providing a competitive product against the long-rooted and institutionalised industries who have dominated for more than 40 years. With the company X we're going to prove that true growth is to be captured on the eight continent: airports. In Mexico, we're going to prove and grab the learning curve of "Absolute Massive", meaning low prices, one application, one waste stream and tremendous masses of celluloses to be converted" (p.105).

To my knowledge, a systemic review of these goals was not performed by the CEO or any DSME employee. From a business standpoint, reviewing the results against their expectations shows individuals where they need to improve, showing their biases (Drucker, 2017). Throughout the approach implementation and information shared with

me by the DSME, it was evidenced at the beginning of this year (2022) that the MoU signed with Japan did not produce any business. Furthermore, the DSME stopped having a presence in Japan and Singapore last year, both by not having a physical office or DSME representative and not having a project running in these countries. All the efforts were paused because of the governmental visa restrictions on entering the country.

India is another country that the CEO mentioned. India does not have any DSME physical representation, and while there is still a project with a socially positive impact purpose, the project is losing traction compared to 2020 due to the high impact of the COVID-19 pandemic. Its funding has been constrained, and the headquarters have refocused the DSME efforts from India to western and Eastern Europe.

The Mexican market is another example the CEO gave of how the DSME would invest in mass production due to its qualified but relatively low labour cost. Nevertheless, as happened with Japan and Singapore, the DSME representative they had in México left the organisation for personal reasons at the end of 2021 and no one to this day has replaced his role in this market.

Lastly, on being active with the DSME material in airports, the CEO mentioned Concourse, a signage and display manufacturer the DSME partnered with from 2018 to 2020. Nevertheless, Concourse is no longer an organisation that the DSME is doing business with, nor the DSME has any project running or planned to be executed in airports, so no growth is being captured.

With the update on how the DSME is doing in these markets compared to DSME's CEO projections, there is clear room for improvement in how leaders of organisations back up their strategies more robustly. My argument is that his strategy approach has shortcomings because there were no methods or a solid approach used by the CEO or the DSME to come to the conclusions he detailed during the interview.

Another insightful characteristic of the DSME's CEO is how he has built DSME's business strategy. He is a prominent supporter of the blue ocean strategy (Kim and Mauborgne, 2005), opposite to a competitive strategy. The CEO supports the creation of a new market space (Blue Ocean) rather than competing in an existing industry (Red Ocean).

An example of a company that has created a new market space is Cirque du Soleil, as it combined opera and ballet within a circus format while eliminating a star performer and animals, among other traditional elements.

A blue ocean strategy has been criticised as idealistic, in which successful examples have been selected with biases to tell a winning story (Pollard, 2005). As an alternative,

what has been proposed instead is a blend of the two approaches (blue ocean and competitive strategy), for example, by having an effective competitive strategy for the existing market and with the increased reserves available to fund blue ocean investments augmenting the chances of finding an untapped market (Burke et al., 2010).

The current DSME team is built inspired by the idea to function as an ecosystem in the way it forms partners and projects, but since COVID-19 harmed this interaction, it also affected its impact. It is not uncommon for the top management in organisations to come to inaccurate projections on how their business will perform and grow or transition to better outcomes. I argue that it is a standard feature in organisations.

For example, it was revealed by a survey run by Deloitte in early June 2021 that 53% of 117 leading CEOs representing more than 15 industries forecasted that the effects of the COVID-19 pandemic would be over by the end of 2021 (Deloitte, 2021). Just three months further, at the end of September 2021, Deloitte ran the same survey with the same question. Only 11% of CEOs surveyed believed that was true, with 35% saying that business effects of the pandemic will finish by the end of 2022 and 31% saying not for the foreseeable future. As COVID-19 effects demonstrated opposite results, I agree with Wooll (2021) that it is not about hitting hard on CEOs, but facts prove the inadequacy of a predictive approach to the future.

This sense of uncertainty is disturbing and unsettling, and it can also harm competitive elements such as quality, agility and speed to produce and deliver products. Furthermore, for businesses and organizations, the leaders' inaccuracy in their planning in the face of uncertainty affects their employees, customers and broad stakeholders. This proves that leaders need to reconsider how to approach the future and lead their teams for what is ahead where certainty is off the table (Wooll, 2021). This is why it is highly relevant for organisations to access alternative approaches to reach their preferred future.

Solely implementing key performance indicators has traditionally helped to reach organisational goals, but this was the case in times when the world was considered to have stable environments. Therefore exercising this managerial control produced a positive effect.

Spitz (2020a) argues that if organisations do not improve their ability to evolve in a non-linear world, human-decision making could become blindsided by increasing complexity. In the same vein, Alencar de Andrade et al. (2021) asserts that managing an organisation requires facing up and overcoming many challenges because of the business environment we currently live in.

At the turn of the new millennium, Stephen Hawking qualified the 21st century as the century of complexity (Spitz, 2000b). This business environment has been defined as Volatile, Uncertain, Complex and Ambiguous (VUCA) (Bourne, 2021). Furthermore, current decisions are made in the context of global markets and radically changing financial, social, political, technological, and environmental forces. Moreover, stakeholders such as activists, regulators, investors, and employees have claims on organisations (Ancona et al., 2007).

According to Patnaik (2020), these characteristics of the business environment are the following: (1) volatility: extreme and rapid oscillations, (2) uncertainty: there is no knowledge about situations or events, especially about their cause and their effects on relationships, (3) complexity: rose naturally with rapid industrialisation, due to the need to interconnect sectors, procedures and networks in the organisation, and (4) ambiguity: there is a confusion about a situation or event, and there is a diversity of potential results that makes the final result not easily or clearly described.

Furthermore, contemporary society has been described as 'liquid modernity" by Bauman (2002), which refers to the current world lacking stable institutions and structural referents, where insecurity and uncertainty are the main characteristics of the present day, leading to increasing social and economic polarisation. Bas (2022) argues that this liquid modernity debilitates any sign of solidness, continuity and stability—a common characteristic of the industrial society.

Therefore, a systematic approach to reaching the preferred future is essential for organisations to thrive and survive (Bourne, 2021). I argue that academia has neglected its development and is overlooked mainly by organisations. As Acton (2022) argues, when we become aware of our shortcomings, we can use what we discovered to inform our leadership style and correct our course. The key is to slow down and investigate our beliefs and assumptions. For example, what core beliefs do I hold? How might these beliefs limit or enable my colleagues and me to work? Am I creating an inclusive environment for them to open up or share their thoughts? Notwithstanding, we have come to expect a lot from our leaders.

"top executives, the thinking goes, should have the intellectual capacity to make sense of unfathomably complex issues, the imaginative powers to paint a vision of the future that generates everyone's enthusiasm, the operational know/how to translate strategy into concrete plans, and the interpersonal skills to foster commitment to undertakings that

could cost people's jobs should they fail. Unfortunately, no single person can possibly live up to those standards" (Ancona, et al., 2007, p. 1).

4.6.3 Workshop design

In this subsection, I laid out some recommendations based on what I learned during the design phase of my workshops and from experts in workshop implementation.

It is crucial to start by agreeing with your team on the questions, issues or topics you want to learn more about. This will help you create the best workshop structure and activities. For example, small group workshops are best for three to eight participants. Larger groups are more challenging to manage and give less time for detailed, individual contributions. If you need to run more extensive workshops, you will also need more facilitators.

A practical workshop can run from one to three hours. For longer workshops, factor in regular breaks. Book additional time before and after for set up and clear up. A good default structure is to divide the workshop into three main parts. Start by letting the participants explore the subject and open up their thinking. Then, continue with activities that help the participants focus in more detail on particular topics, decisions, tasks or experiences. Finish with participants comparing, consolidating and reflecting on the emerging ideas and issues.

With many of these activities, you can choose whether to split the group or have the whole group work together. For example, if the group are colleagues from the same team, you might have them work together to create a joint experience map. Whereas if the group are individual members of the public, you might ask them to create an empathy map and then bring the group together to compare the results.

Make sure that the workshop will produce the research data you need. Ideally, this will simply be the outputs of the various activities. Nevertheless, you may also want to have a colleague take notes or record the session in other ways. Create a workshop plan once you are happy with the structure and the activities. This should include:

-Your introduction script: this tells the participants who you are, explains the workshop and reminds them about things like recording

- Descriptions of each workshop activity, along with instructions and expected timings

- A planning checklist ensures you have everything you need: source material, sticky notes, pens, templates, cards, printouts and worksheets.

-Lastly, you can use your workshop plan to try out the activities and instructions with some colleagues and stay on track during the workshop. Ensure participants are given the activities consistently and maintain a record of what you do in this round of research.

4.6.4 Preparation for the workshop (setting the stage)

4.6.4.1 Before the sessions

Several points are crucial to cover before the workshop takes place. First, the fact that all my workshop sessions took place online via Zoom meant that I did not need to choose an appropriate room with the right amount of floor and wall space to put worksheets and sticky notes on the walls, tables and chairs, and other equipment you need for the workshop activities when they take face to face. A researcher who will physically embark on these matters must arrange this before the workshops. Also, to make sure the room is accessible for the participants and anyone who will be supporting them.

Regardless of the virtual, face-to-face or hybrid format, the researcher needs to set participants' expectations to be ready for the workshop when they arrive. There should be a preparatory talk with the participants where the facilitator makes sure they understand the overarching goal, what is required from them, and the session's structure. It is also crucial to think about potential problems and how you might deal with them.

4.6.4.2 During the sessions

The facilitator should show clear instructions for each of the activities. I recommend using Mural boards (Mural, 2022), as was my case for all sessions. Mural is a virtual space to collaborate visually with an easy-to-use digital canvas. I dedicated 30 minutes in the first session to explaining how to use Mural. There is a free version for the researcher when you log in with your student e-mail account.

Additionally, it is recommended during the sessions to check how the participants are doing and provide guidance and support when needed. It is also necessary to remain flexible. For example, during the CFA implementation, some employees had urgent calls or meetings, some participants had holidays, or their computers broke down. At the beginning of the workshop, I was very optimistic that I would not encounter any unplanned issues during each of the sessions, but as I got used to the role of facilitator, I realised I needed to pre-engage with each of the participants before the sessions to make sure, or at least to minimise, the chances of unexpected things to happen. Since I had a small group of participants, missing one person was already significant.

A vital function relevant to the outcome is to constantly emphasise to the participants the purpose of each session and the primary purpose of the next stage when there is a

transition between stages (Apel, 2004). Lastly, keep the participants informed about the total progress versus the complete programme of sessions.

4.6.4.3 At the end of the sessions

At the end of the sessions, I usually dedicated the last five to ten minutes to answering questions from the participants. I also acknowledge their insights and thank everyone for their time. Finally, I would mention critical aspects of how those sessions would help my research when I found it relevant (usually when we moved from phases).

4.6.5 Workshop implementation

During the implementation period, the DSME facilitated their employees to work under a hybrid model, fully embracing remote work while maintaining available office spaces.

Implementing FS methods using a workshop setting was initially developed by Robert Jungk in 1970 for citizens groups with limited resources who wanted a say in the decision-making process, shed light on a common problem, generate visions about the future and discuss how these visions can be implemented (Apel, 2004). Jungk and Müllert (1987) offer steps and guidelines for running a workshop. The phases and the most critical elements are:

1) The preparation phase introduces the workshops' methods, rules, and schedules. Paper, Post-Its notes, pencils, etc., should be available at hand, and the participants should be cited in an open circle to interact and go for the available material to write down their thought at any time.
2) Critique phase: the problem is investigated critically and thoroughly.
3) The methods are explained, and the discussions take place.
4) The implementation phase: the ideas found are checked and evaluated regarding their practicability. If the solution has been found, it is written down.

The seven stages, methods, and activities shared in section 5.2 illustrate how I guided the approach implementation.

The CFA pilot was implemented with the participation of 9 DSME employees with the following characteristics (reaching gender parity as can be observed):

Name	Nationality	Gender	Age	Area	Years in DSME
Participant 1	Italian	Female	28	Sales	3
Participant 2	Dutch	Female	42	Admin	2
Participant 3	Dutch	Male	21	Marketing	2
Participant 4	French	Male	28	Sales	1
Participant 5	Dutch	Female	25	R&D	4
CEO	Dutch	Male	52	CEO	8
Managing Partner	Dutch	Male	45	Finance	4
Participant 6	Mexican	Male	38	Sales	5
Participant 7	Dutch	Female	38	Sales	4

Table 2. DSME participants' demographics.

The DSME participants worked in the following functions: sales, administration, marketing, research and development, and finance.

Doing research in small group workshops is the most beneficial way to learn how people work together to decide or get something done. Working in small groups, rather than through interviews, contextual observations or experiencing mapping, can help participants, as they can feel more comfortable as part of a group and learn about and build on others' contributions. However, working with groups requires getting everyone in the same room simultaneously. The disadvantages could be that strong characters can dominate the discussion, or participants may not feel comfortable speaking openly in front of others, especially in groups with different levels of seniority.

All participants agreed that an empirical and futures-oriented implementation at the intersection of the CE and FS was a promising analytical and practical endeavour for the organisation. This was previously discussed in an open conversation with the DSME CEO. The time horizon to visualise the organisation preferred future was determined for the year 2030, which explicitly forced a long-term perspective into the existing planning mindset (Voros, 2005). The participants confirmed that this timeline was suitable for envisioning a preferred future for the DSME.

From May to November 2021, 28 sessions took place. This study period within the DSME enabled me to understand the organisation deeply. Each session was limited to 90 minutes. (in some cases, sessions could be run within one hour). The first session was an introductory presentation to the participants to understand the approach, the objectives, and the requirements for the subsequent sessions.

4.7 Method of data analysis

I primarily used a thematic method for data analysis, defined by Braun and Clarke (2006) as searching across a data set to find repeated patterns of meaning. The data sets comprised videos, transcripts, recordings, interviews, documents, and emails.

The software I used for the verbatim transcription of all workshop sessions was Otter (Otter, 2022). This software is an assistive transcription technology for research that allowed me to recognise who was speaking during the sessions and integrate search and keyword extraction.

The data analysis was followed by a multi-layered analytical process that categorised the gathered information to facilitate its analysis, known as coding. First, I followed grounded theory guidelines for data coding (Fergnani and Song, 2020; Charmaz, 2014; Strauss and Corbin, 1990). Next, I coded the interview, archival data, and workshops video using the qualitative data analysis software, NVivo (release 1.5.1) (NVivo, 2022). This is a well-known software programme used when mixed research methods are used, as was my case.

I considered each workshop session as a subject and coded workshop by workshop. The first layer of analysis consisted of identifying and highlighting data fragments that I considered essential and related to my research questions. Subsequently, I compared the total of the selected pieces of data to identify consistent patterns, similarities or differences (Fergnani, 2020). These data segments were then grouped, and I assigned a label to each segment. For example, ‘socio-cultural differences’, ‘strategic priority’, etc. Once I started analysing these categories further (focused coding), I considered different grouping codes in one. This was an iterative process of comparison between codes, going back and forth between data collection and analysis, consolidating codes to a fewer number of overarching codes. This constituted my data structure. This method of data was performed once all the workshop sessions took place and not immediately collected after each session ended. This was to analyse the implementation approach's results as a whole and not to influence the following sessions by being influenced by the results of the analysis of a previous session.

Furthermore, the participant’s qualitative comments were analysed using a coding procedure inspired by Corbin and Straus (2015). First, each member statement was categorised across ten dimensions. With these perspectives, the content and comments exhibited were covered. I then coded all comments individually. The resulting database

of qualitative comments was an essential input for interpreting the results, mostly used in Chapters 5 and 6.

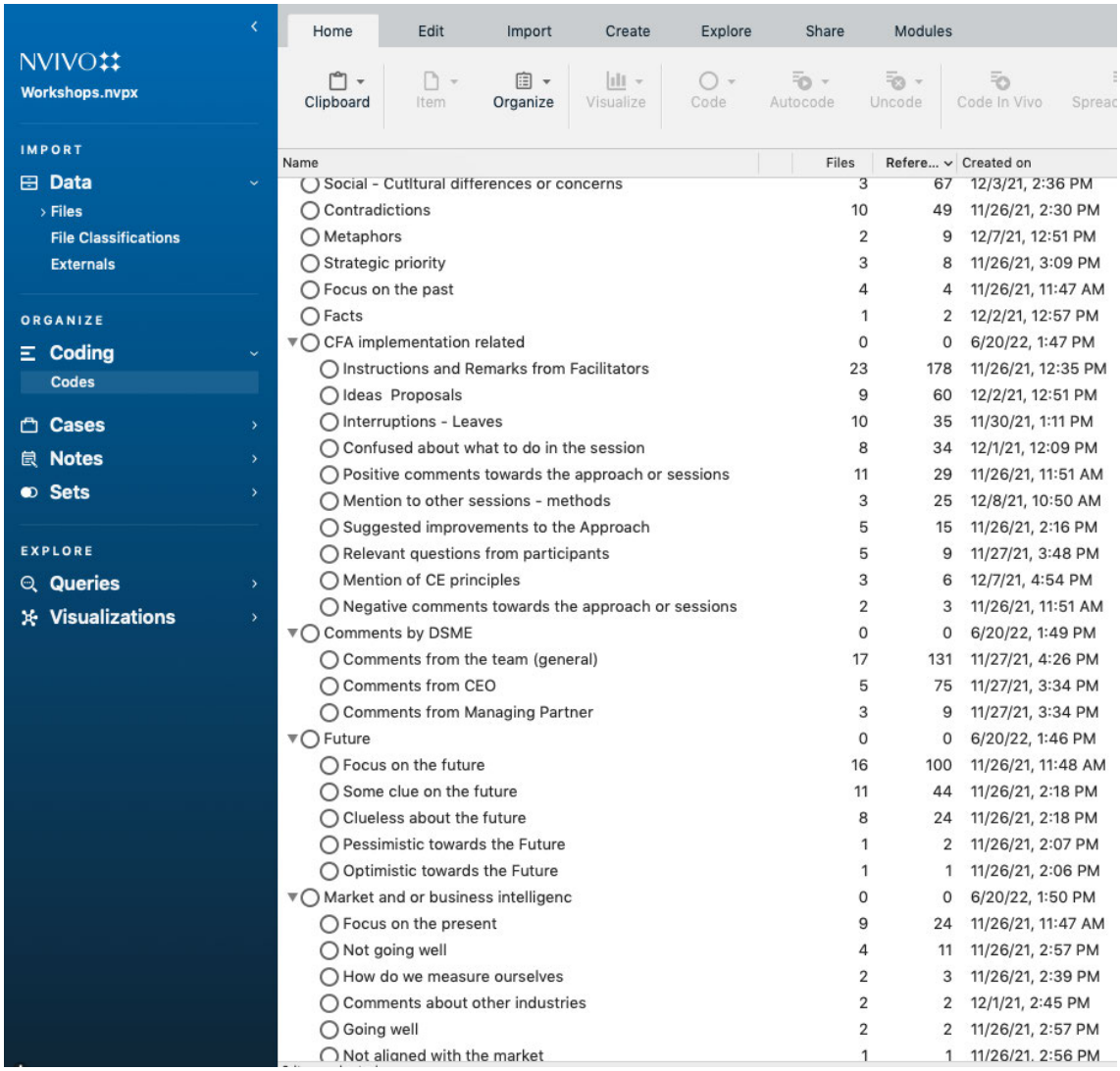

Figure 12. Nvivo coding DSME workshops.

It is relevant to note that this outlined data analysis step was not sequential but iterative. The findings from one of the workshops session observations could be compared further with other sessions, adding more details and sophistication to the data analysis (Fergani, 2020). I considered reaching theoretical saturation when no new insights emerged and variations between the analysed data ended.

4.8 Standards for the quality of conclusions

I followed a quality standard and several techniques to ensure my thesis findings could be trusted. The criteria and the steps that I followed to fulfil the trustworthiness criteria (Lincoln, 1995; Braun & Clarke, 2013; Miles et al., 2014; Levakos, 2021) are:

(1) Dependability: this refers to whether the process of data collection, the methods, and the analytics procedures used for my research are reasonable and in line with the accepted methods and standards of inquiry, and whether this process has been transparently documented and traceable.

(2) Confirmability: refers to whether my research findings and conclusions are neutral and free from unacknowledged research biases.

(3) Credibility: refers to whether my findings authentically portray the participants' accounts and if there is a fit between them and my interpretation of them.

(4) Transferability: refers to the degree to which the results of my study can be transferred and applied to other contexts or subjects.

Lincoln and Guba (1985) outlined five strategies for increasing the credibility of qualitative research:

(1) Activities to increase the likelihood that credible results will be produced by prolonged engagement, persistent observation in the field, and the triangulation of different methods and data.

(2) Peer debriefing: regular meetings with other people not involved in the research to disclose one’s blind spots and discuss working hypotheses and results.

(3) The analysis of negative cases in the sense of analytic induction.

(4) Appropriateness of the terms of reference of interpretations and their assessment.

(5) Member checks in the sense of communicative validation of data and interpretations with members of the fields under study.

I adopted several strategies to meet the four quality research criteria and the five strategies mentioned above. Firstly, throughout my research, I adopted a reflexive viewpoint where I constantly examined my assumptions, values and beliefs. The second strategy was to adopt a prolonged engagement by spending sufficient time with the participants to build trust so the team would trust me and open up and share all the necessary data. The third strategy was peer debriefing, which refers to the action of asking trusted peers for their critical opinion, especially about how I built and implemented the CFA. Finally, the fourth strategy was to get regular audits from three high-quality and experienced researchers, experts either in FS or CE, who helped me audit the empirical process of the approach.

Lastly, as Yin (1981) recommended, a final part of the data collection procedure was to review substantial portions of the case study by the primary informants. The main purpose of this step is that the participants find no misconstructions of the data recollected. Moreover, the participants must find my presentation of facts accurate and my interpretations balanced, presenting the different perspectives of the participants.

After I gathered the participants' final opinions about my findings, they were satisfied with the interpretation of the collected data and the presented facts.

Chapter 5: Circular Futures approach Implementation

5.1 Introduction

The operationalisation of the CFA will be discussed in this chapter. This includes the case selection, the methods used to implement the approach and collect data, the pilot study and the rationale and procedures for a grounded theory approach to data analysis. This section mainly deals with the presentation of the most relevant data collected.

It was fundamental to put my hypothesis to the test through a pilot phase to explore how an SME would respond to the CFA implementation, look for constructive insights, and observe if it contributed positively to the organisation after its implementation.

Testing is a critical step in the research cycle and is needed to enable the generalisation of new knowledge. Bearing this in mind, the research process incorporated three stages to examine the CFA: (1) case justification and selection; (2) data and model selection; and (3) results. Each of these stages is examined in detail below. Based on this, this section aims to justify a case-study company and the uses of the CFA for model testing.

I pre-tested the CFA. Then, I conducted a dry run with five experts, all academics or practitioners with deep methodological or subject-specific knowledge. Finally, I modified the order of some of the activities within the approach. As a result, the theoretical construct of the CFA matured into an applicable interdisciplinary approach.

While my work with the DSME must be considered exploratory, I present my contributions as analytical observations, responding to my original research questions in terms of ‘what steps and activities should SMEs follow for a successful transition to CE?’ Furthermore, ‘how does the developed approach contributes to SMEs for a successful transition to CE?’ Finally, based on the approach implementation, what are the learnings, and how could the approach evolve based on these learnings?’

To conclude, following the same line of thought and contributions of Burke (2005); Stevenson (2002); Inayatullah (2006); and Gáspár et al. (2021) on how a robust foresight process should look like, the CFA implementation consisted of a collective understanding, co-creation of meaning, development and negotiation of shared future views, and community development of future-shaping actions throughout the whole process. Furthermore, following the advice from Buus et al. (2021), the workshops were organised in a manner that induced dialogue. All the implemented activities followed a participatory and iterative process to accomplish this.

5.2 Circular Futures Approach implementation

5.2.1 Surveying

1) First meeting with the Management team to align on objectives of the CFA implementation.

As explained in section 4.6, this session took place virtually via Zoom, like all the other sessions. The attendees were the CEO and two members of his team. It is essential to mention that before this meeting took place, I had a series of phone calls with the CEO in which we exchanged ideas about who should be invited to the CFA sessions. While I suggested including as many employees as possible, the CEO was worried that the operation team would lose focus on the top priority, making progress in opening up the new factory in the Netherlands. For this reason, the previous agreement with the CEO was to define a core team which was less operational and more functional (e.g. Business Development and Sales team, Human Resources and Finance).

Based on the workplaces and different time zones that the participants were going to be in, the Netherlands, Mexico City time, Singapore and the United Kingdom (UK), we agreed to set the time for each of the sessions at 13:00 Greenwich Mean Time (time in the UK). After these agreements were made over the phone, we set up a date to have our virtual meeting to align on the objectives.

During this first meeting, the CEO emphasised, as he did over the phone, that a tremendous milestone to reach was to open the first manufacturing facility in the Netherlands. The date set for this to happen was the 1st of July 2021 (by the time of writing the thesis, it was September 5th 2022, and the manufacturing facility had not opened yet).

He made an initial statement about how the CFA implementation appeared perhaps not at the best time for the organisation. He stated:

CEO: If before July 1st you would launch the thinking of what will happen from a future perspective, and where do we go from here perspective, on what do we see, where we should be heading to, then I think the timing for a lot of people you've got on this list as participants is not the right one, that is my concern

Based on this comment, it was clear that the CEO disagreed with me being as inclusive as possible for the approach implementation. This happened over the first five minutes of the session. Right after the CEO's feedback, one of the two other attendees for this meeting wanted to intervene in favour of the CEO. This attendee was the CEO's right hand and the most experienced in the team regarding strategy. She was involved in

helping the CEO define some strategic next steps for the SME. What she offered was an alternative to my approach implementation. She offered a different perspective, she said:

Participant 7: I think that the approach you are proposing can be super helpful to implement to the ecosystem that our organisation is trying to build, where our SME is just an example of a technology that you would need to get a circular economy off the ground. But there are many more entities in that same value chain, as separate organisations that are actually essential to us. So, what I could imagine that an alternative could be focusing on developing a tool that helps us to refine our thinking about what this ecosystem needs in order to get built.

My reaction was to evaluate this alternative against my approach design and thinking how to reach my objectives still. I was not opposing the alternative, but I was sceptic as my tool was not developed to intervene in an ecosystem but in individual entities. The proposed alternative also meant that the participants would need to be defined again and a new timeline for implementation.

After participant 7's intervention, I responded that, ultimately, the CFA approach was not designed to jump to the final stage (transforming) without first going through all of the CFA stages. In other words, the approach was designed to be tested based on the hypothesis that the organisation needed to move through the seven stages before it could create a preferred future.

In my response, participant 7 suggested the option to go through a shortened version of the CFA instead. However, while the CFA could be adjusted for that, this suggestion would not bring valuable insights to my research, as an incomplete or partial approach had to be implemented. Moreover, each of the seven stages was also designed to enhance the futures literacy of the organisation. In sum, to have shortened the approach I assumed at this point would have limited its impact.

The CEO intervened right after, calling for a further session, as the CEO also wanted to make sure that he honoured his agreement with me on implementing and testing the approach in the DSME and not delaying it, having in mind I had a deadline to meet in terms of collecting the data, writing and submitting my thesis.

I explained the CFA further as I sensed that perhaps the approach was not understood (or explained) well enough to the CEO or that he could not have briefed the additional two attendees before this alignment meeting. I then elaborated on the CFA and explained that early state activities within the CFA had to do with mapping the past of the SME. With this point, I wanted to make a point that the case study, in this case, the current

SME, had to have some history for studying it. Therefore, an ecosystem still to be developed was not a good fit to test my approach.

I also acknowledged to the CEO and his team that this discussion was already valuable feedback, which was unique at this research stage. I appreciated from the DSME that, in a sense, they 'shook the CFA up' and gave me hints on how I could apply the approach differently. When I finished appreciating their feedback, a surprising thing happened. The CEO gave remarkable closing as we were coming to the end of the session. He said:

CEO: *Thank you so much for the introduction, starting to get to know you. You know, I love this stuff, so we will get there, yeah, great. Thank you, so amazing.*

After this initial session, I had a couple of weeks to discuss the CFA implementation with the CEO over the phone. We discussed that there is never a perfect time to involve an organisation in a transformative intervention. I identified this as the main issue with the CEO regarding the approach implementation. However, over the phone, he was more open. He was happy that I would start with the first session with the broader group, as long as I would remain flexible on incorporating some of the elements we discussed during the meeting. (e.g., help the organisation get to the same level of understanding CE and FS and build a road map with milestones). The CEO recognised that the SME needed to go through all the CFA stages and that this would help the organisation understand the essential elements they needed to make for the further ecosystem with other organisations to work.

2) The Masterclass. A couple of weeks after the interest in my research had been established by the DSME, a visual presentation with the most relevant concepts and examples of organisations implementing FS and CE was introduced.

This activity started de CFA implementation as it was the first session with the DSME selected group. Therefore, the most relevant insights are shared below:

I started by explaining the era we live in, the Anthropocene. It is the first time humanity has had such a massive impact that it cannot be returned in the long term. This is relevant to the participants since this may be the first time they are exposed to this topic. They must understand that we are shaping the Earth and leading to a natural and inter-human crisis. I also explained the paradox in which we have never been so connected in the world, but at the same time, we also have increased the feeling of being lonely, and mental health issues have been rising in recent years. Finally, I mentioned the current polarization of society, 'it is either you are my friend or my enemy', the conversation in between has

stopped and how this has led to a policy crisis, where we see that in many countries, the principles of democracy are not working anymore. With this background, I emphasised the moral imperative to consider how we as a society should help tackle some of these aspects.

In the session, it was central to explain the 21st century as an unpredictable era, in which, more than ever, it is hard to know what the future is, but it is on us how to respond and how as an organisation, still prosper in uncertainty.

In the second part of the session, I also explained the concept of Circular Futures, each of the seven stages and the supporting methods and tools that the CFA incorporates. Finally, we dedicated the session's last minutes to confirming the day and time we will meet each week for the subsequent 28 sessions.

3) The Polak game. Following the introductory presentation, we moved on to play the first FS technique for around 25 minutes. Fergnani (2022b) recommends starting with this game at the beginning of a foresight intervention as an ‘icebreaker’ as it can prompt the group towards the necessity of having a shared worldview.

As explained early in section 3.4, the Polak game is about individuals placing themselves on a 2x2 matrix by how they perceive the change in the world: either towards an optimistic or pessimistic future and whether they consider having influence or not in the state of the future. The results of the game are below:

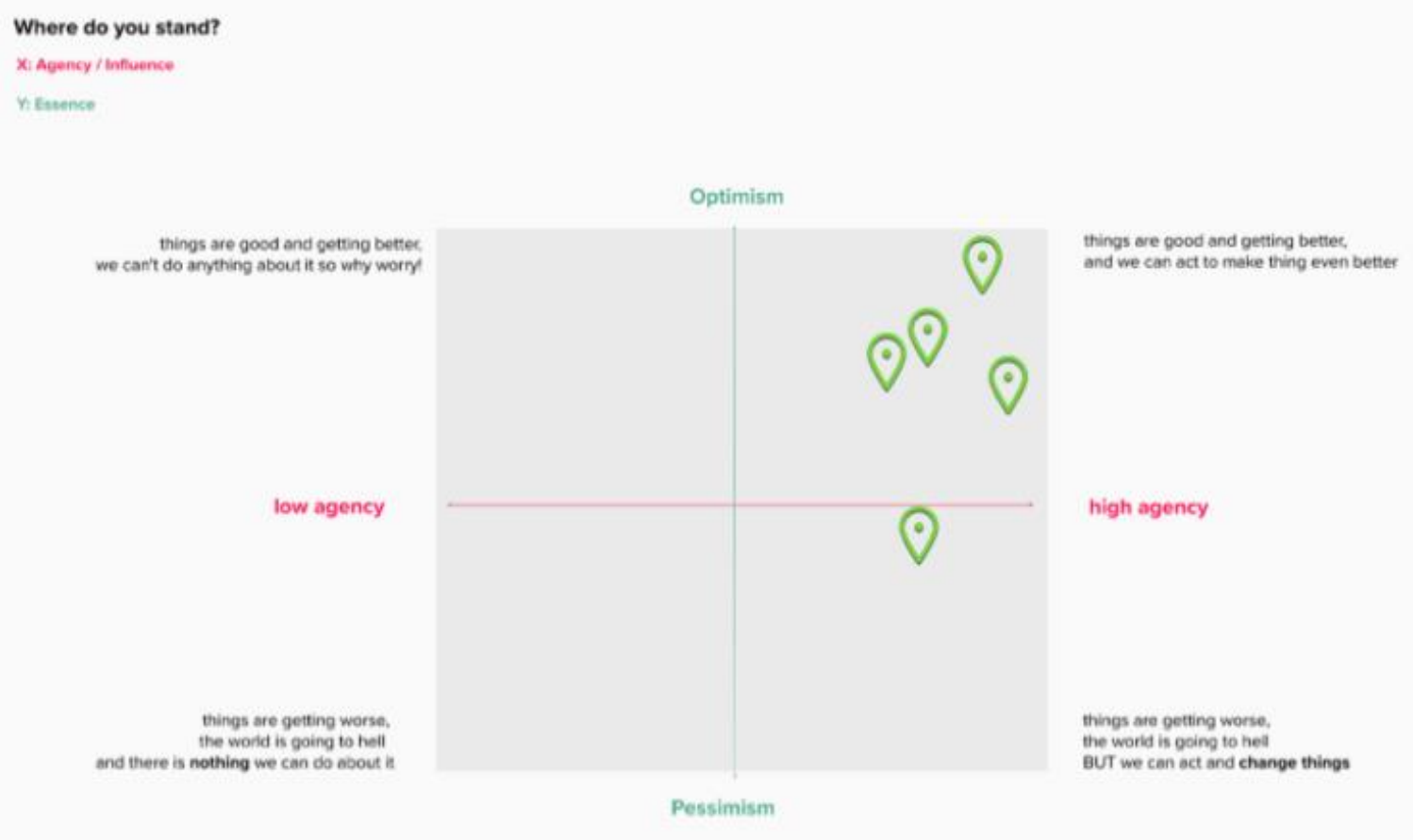

Figure 13. Polak game completed by DSME participants.

As seen in Figure 13, all participants considered having high agency in influencing the future state and can act to change or improve things. Regarding their expectations about the future, most participants (4/5) perceived that things were good and getting better, while the only other participant believed things were getting slightly worse.

Therefore I could infer that the group I was starting to work with was generally positively oriented. According to Fergnani (2022b), it is critical to ask questions to make participants reflect on their and others' position. Participant 5 shared with the group the following:

"so I voted just below line, because it's not like I'm very pessimistic, as you can see. But I do not think that right now the world is going into a great future if we go on as the current trend. But we do have the means to change that and get it into a good future. So that's more why I chose that spot" (participant 3).

The next participant to give his opinion was the CEO, in contrast to Participant 5, he elaborated and shared that:

"in essence, it's about where the world will go, and to my opinion, if the world will survive is not so much at stake here, it's about if the human race will have its license to operate and exist. So for the better part we got it in our own hands. And I see that we've been developing a tremendous amount of knowledge from all different kinds of facets and angles, which actually the solutions, the enablers are there, we're only struggling from a behavioural perspective on how to apply them and what prices we are willing to pay for that. So the whole discussion on fossil fuels. So that's about disrupting a system which we've been nourishing for more than 100 years, which is obsolete for about 30 to 40 years. And we're now slowly transitioning to what we all know what the solution is. So it's much more about the interesting thing is that when you're placing it as a crisis, then it's a call to action and that the word crisis only came in the last five years. So now this call to action comes, social awareness is there I think we can make a meaningful difference" (CEO).

The opinions between both participants, participant 3 having a pessimistic approach about where the world is heading, and the CEO's opinion, I think, were contrasting perhaps because the generations that both participants represented were 25 years apart. Participant 3, in his mid-20, possibly sees the world pessimistically since it could be that she thinks that the old generations' actions are what have placed the world in this current

state of crisis. However, while the CEO, in his early 50's, has experienced (as he shared with me on more than one occasion) the fall of the Berlin Wall and the creation of the European Union, it could be a motive for him to think that the world is not in such as bad shape as it seems to the new generations, at least geopolitically.

Therefore, this game contributed to getting to know each other regarding a critical element in the epistemology of FS, that the future is built through the sum of human actions and that being passive responders is not in the Dutch SME organisational culture.

4) The State of play. We answered 20 questions that, according to Rao (2020), help organisations uncover the organisation's current situation. More specifically, to turn an unconscious sense of the business into a conscious one.

During the Zoom session, we went through each of the questions. The first insightful contribution to the session came from the DSME Managing Director. Perhaps because of his role, he showed a clear picture of the organisation, especially for question 2 on the questionnaire: 'what is currently the biggest source of uncertainty/doubt/anxiety for the company?' He answered that the validation and performance of the DSME business model (including when the new manufacturing facility in the Netherlands would be open and running) was the most significant source of uncertainty for him. For question 3, 'what are the top 5-7 events coming up on the company road map in the next few years, the MD answered the opening of the Dutch manufacturing facility as the first top event coming up. Following his answer, participant 4, the newest employee in the organisation, answered as (2) the attraction and retention of talent. Following this, the CEO events choices were (3) changing legislation and regulation in CO_2 mitigation and Environmental, Social and Governance (ESG) quantification, (4) financing of companies immersed in sustainability and lastly, (5) growing from a 5 million company to a 500 million company and opening of the next manufacturing facilities.

As this is the first actual tool within the CFA where I could evaluate its outcome, based on the implementation of the questionnaire and the insights it gives to the researcher, I can confirm that the State of play questionnaire is a helpful tool for understanding as a quick scan, where the organisation is at. The questionnaire acts as an x-ray tool not just for the researcher but also for the organisation involved. It is also an opportunity for the participants to be critical of the organisation. Based on these answers, I could assess the participants' knowledge of the organisation's current state and if they were well informed about the financial status, current projects and challenges.

In contrast to what organisations want the wider public to think about them (which is usually available content on organisations' web pages), answering the State of play

questionnaire helps disclose the organisation as it is. I initially complemented section 4.5 with the information available in presentations from the DSME, which purpose is to attract investors and funding or also used for marketing purposes. However, I later complimented the section with information extracted from the questionnaire answers.

While the questionnaire is self-explanatory, and the researcher could circulate it online and ask for a deadline to receive it completed back from the team, I do not recommend doing this, as the researcher will miss valuable insights from the meeting discussions.

Finally, it is worth including the positive feedback from participant 3 at the session's end. She mentioned that:

"I want to say that this questionnaire apart from just the questions, it also helped me really that we could talk to each other about it and hear the answers from the other people. I think that helped me even more than just seeing the questions and having to answer that. At least for me, if that makes any sense in the way I said this" (Participant 3).

This is valuable information as it reinforced my assumption that the questionnaire was a valuable tool in the CFA. This is the only tool that does not come from the CE or FS field, and since it was one of the tools that received the most favourable feedback from the participants, I recommend that the CE & FS communities take this tool seriously into consideration. This recommendation is aligned with Voros's (2005) suggestion on using techniques and methodologies which are not necessarily futures-related but contribute, nonetheless, to 'get the message across. Lastly, going over the questionnaire in 90 minutes could be very demanding as the information asked in each question needs to be well thought out and come to a consensus. As a recommendation, I would suggest dividing the session into two, aiming to answer half the questions in each session.

5) The circular thing from the future. This is the first activity from the CFA where the DSME team is asked to combine the FS elements learnt during the first two sessions with CE design principles and business models. Another particularity of this activity is that it is game-based, as it incorporates the use of cards and that depending on the set of cards each player gets, is the circular thing from the future they are asked to create.

Playing this game required 90 minutes, in which ten minutes were spent explaining the rules of the game and each of the six sets of cards. As explained in section 3.4.1, we played two rounds: the first round to develop a circular artefact about the future (not focused on the DSME) and the second round to develop a circular product again, but this time focused on the DSME. In practice, the first round served as a warming-up exercise

to feel more comfortable during the second round. The link for full access to this Mural is available in the appendix.

During the activity, I also included an additional variation between rounds. During the first round, I asked the participants to freely choose the card they wanted (if they would choose a difficult card or one that they disliked, they could change it for another preferable), while in the second round, they ought to use the cards they got at the first attempt.

Based on the cards that each DSME player obtained, different timeframes were played during the game. For example, one of the players got a card that asked to create a circular artefact 100 years (2121) from the present, while other players just needed to go ten years ahead (2031) from the present. This was an excellent opportunity to experience the challenges faced in each timeframe as a group.

In the second round, one participant also got a card with the year 2121 and ideated a virtual device for a world where civilian order is deliberately imposed. The player's other cards were 'shopping' as the thematic context, 'corporation' as the object on which the artefact needed to focus, and 'satisfaction' as the mood the artefact should make the user experience. The circular cards obtained were 'virtualisation' for the circular business model and 'design to last' as the circular design practice. With these six cards, the participant created the following narrative:

"a world in which 13 billon people live in, and is growing, in 2121 where businesses do not have inventories not storage anymore. People can virtually try dresses, have a taste of chocolate, visualise their house interior with DSME material on the spot, and order it in real time. But the design is long lasting, instead of a call for fast consumption. In their lifetime, people respect the limited natural resources by draw from the inventory of the maximum number of items a person can buy in a lifetime. They gain more items if they return DSME material to the soil" (Participant 1).

Playing this game proved to be an entertaining activity to apply some of the main concepts from CE & FS in virtual practice. I let the participants give me their feedback during the last 15 minutes. As feedback on the activity, one of the players mentioned:

"I really like this game. We should do this stuff for real. We have to use our imagination so that's cool. I think it's really a fun game, it's nice to use your imagination for it. So I think that's nice to have input from different people with different ideas and ways of imagining the future based on what cards you get" (Participant 4).

Additionally, the same participant shared further the different experiences he had while playing in the first and the second round:

"It's just that in the first round I can really design it the way I want. So I have more, let's say room to imagine, while in the second one, I'm a bit forced to be framed in a certain way. So I think the first one is more than the way I did it, at least, the first one is more really designing something based on my own ideas or wishes. And the second one might be more okay, we have a certain frame or setup, then how do you use that to imagine the future? So that's why it's different. But I like both. It's fun. I liked to see also the difference between the two on how people then imagined the second" (Participant 4)

Similarly, on the same topic on the differences between the first and second round, another participant shared that:

"what it came as a surprise is a realisation after I finished playing the cards is that when I wanted to build a desired future, so round one, I will choose like a community approach. When the cards were given to me in round two, I chose the top down. Also because I had the discipline, but also because I thought how we can reach this type of transformation, we cannot do it by ourselves, we need sort of like centralised control. So there is a mismatch between what I would like to see community effort and what may be intrinsically I really seek to drive the transformation. That is regulation from some other authority" (Participant 1).

A third participant gave us stimulating feedback that I think should be applied as an improvement to the activity. The participant elaborated on how it was easier for her to write the cards she got on a piece of paper:

"I first thought, well, oh, gosh, now it's six cards to get in line but what really helped is that I wrote them on a piece of paper. I needed to imagine 2027 and then environment monument, and what I've kind of written them for myself, it's kind of connecting. So I think at the beginning, it's a bit overwhelming. But then it really works. And I think especially I love that the circular cards were added, because this really shows a pathway to what we always say on how to create the futures by using some of those circular concepts." (Participant 7).

Concerning implementing this activity, something that can be explored further is the order of the six cards and how to arrange them to make it a more accessible game. In the

original game, the order of the cards followed a logic of going from the broader environment (macro), which is the arc, to the terrain (meso) to the object (micro) and then to the mood (feelings), but then I added to this original order the circular cards. So it would be interesting to see if the circular business models should be placed between these first four cards or before or after. Moreover, it will be interesting to experience how changing the order of the cards could also change the results on the circular thing from each participant's future.

Having played the original thing from the future game before (without the circular economy cards) and having experienced this game with these additional cards, I think it helps the participants, mainly when the created artefacts are intended to be actioned in the present. The original thing from the future game can go, positively or negatively, out of this world, which for the first round can be very positive because that is how we feed our imagination creatively. Nevertheless, later, in a second round, the CE elements bring physical (or virtual) actionable features that can become a reality today instead of floating around. Adopting this game during a product design phase is particularly beneficial for the long-term circular orientation of an organisation.

Lastly, in this activity, I consider it very relevant to share one of the players' reflections on the DSME readiness or not to use (or be inspired by) this type of futures methods. The participant shared the following thoughts:

"when I was playing this game, I had always this question in my head, are we ready for it? Or do we have the right team, what do we need in addition to reach this point, and also in relation to the impacts that we can have, I was thinking, can the DSME deliver this impact? How can we do that in terms of we are sustainable material, but for example, something that I never thought of is in the second round of the game that the DSME might have a competitive advantage in terms of how much we can give back to the environment, and this is the first principle of the circular economy, regeneration of systems, that maybe other companies do not have. So, this thing that people the more they give to nature, and the more credits or items they can buy. That was the interesting bit. So I think we are in a very positive position towards the future by the use of our technology and also within the community that we are compared to a competitor that maybe is producing MDF, or other types of traditional materials" (Participant 1)

With this point of departure, I am pleased with the contributions that this activity brings to the CFA and the positive effects that playing this game brings to the team

involved concerning building up futures literacy and the practical knowledge that this game could bring to organisations. Thus, it is not just an enjoyable game but highly useful and the CE and FS concepts blend comprehensibly.

Figure 14. Example of a circular thing from the future created by a participant.

5.2.2 Mapping

1) Past Janus Cone. We dedicated half session going through this FS method, looking at where patterns and events in the past influenced the industry that the DSME is in and that we can learn from. Before the team started to fill in the blanks on the designated Mural board, I showed on the screen an example of the Janus Cone where the health care history was analysed. The DSME team started mapping, collecting, and writing down historical events and significant changes following this brief exercise. The collected events were different –from major historic events to societal trends and the development of technologies, but just events relevant to the DSME were included. I gave the participants a reference point on how far in history they could go to map events. I delimited the Janus Cone from 1998 to 2021 and divided this period into two categories; from 1998 to 2006 (the year the DSME was created) and from 2007 to 2021.

As in any other CFA Mural board, I included brief instructions that participants could read at any time. I also included some questions to help the group to remember events more easily. For example, the question, when was the first time you heard about CE or implemented a project around this concept? All of the mapped events during this session are included in Figure 15 below. The link for full access to this Mural is available in the appendix.

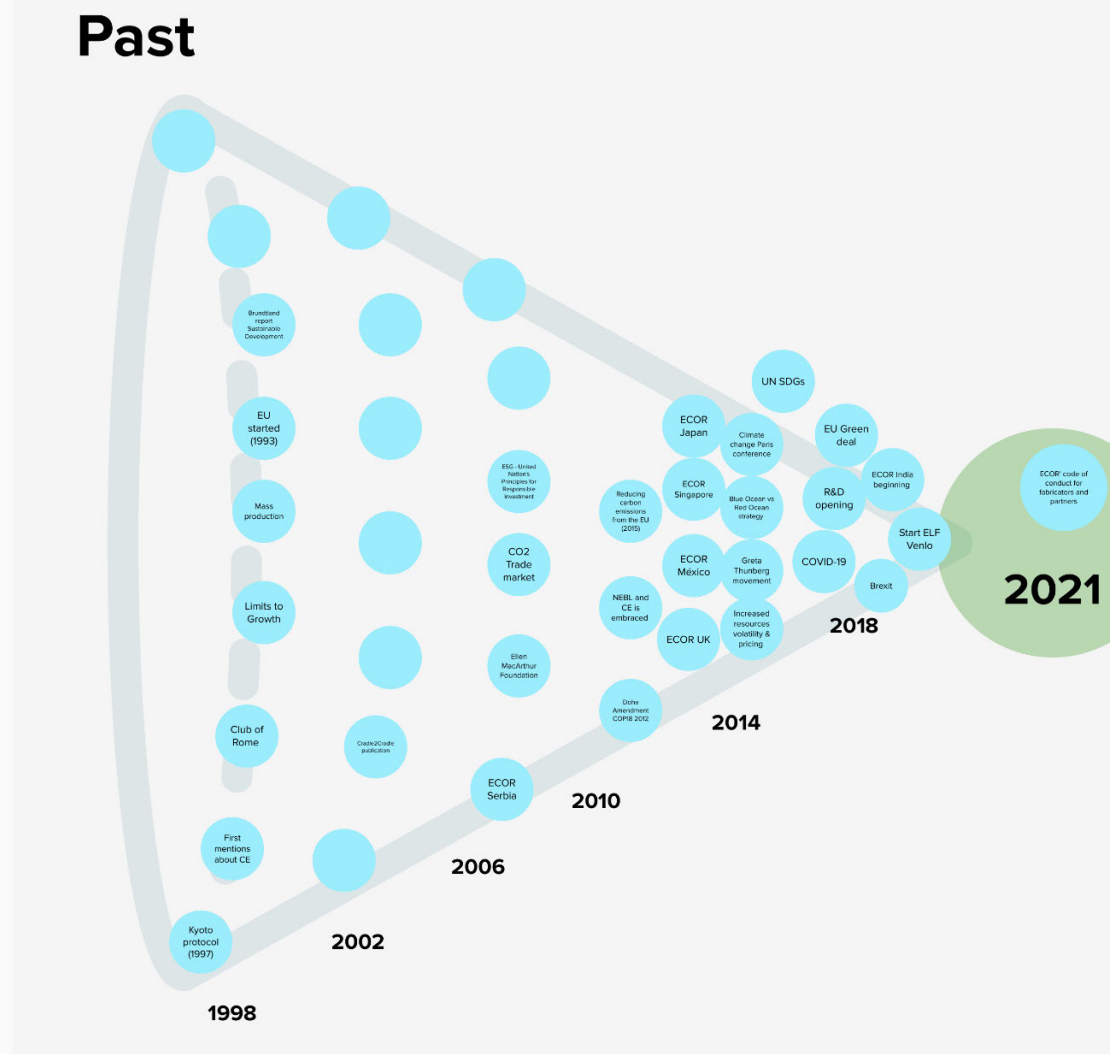

Figure 15. Past Janus cone board completed by the DSME participants.

The years from 1998 to 2006 were more challenging to map on the Mural board circles (as more empty dots can be observed). This is because most of the mapped events were historical events, while from 2007 to 2021, the mapped events were related to milestones within the DSME.

This activity was significantly helpful for the team to map, reflect and recap the relevant things that had happened and affected their organisation.

Another question I asked almost at the end of the session, once the most relevant events were mapped, was 'have the events and significant changes gone in the same direction or have there been opposing forces?' From this question, a participant answered that:

"An opposing force that occurs to me internally, actually is what happened in 2020. We had the hostile takeover or attempt to take over the DSME, which was an opposing force". (Participant 6).

The participant referred to a shocking event that happened internally for over three months just after the COVID-19 pandemic started to spread globally (from April to June 2020). As a result, the DSME management team, investors and stakeholders started to discuss a change of business model internally and also a change of management, which would have affected the primary role of the participants in the CFA implementation significantly, from a focus on creating circular ecosystems (aligned with a blue ocean strategy), to a traditional sales role (aligned with a red ocean strategy). However, we did not discuss this further during this session, mainly because it was not the focus of the activity, but it was discussed and analysed further in the CLA activity (sections 3.4.4 and 5.5).

At the end of the session, I asked participants for their opinions on the maturity of the events, trends, and technologies mapped, if these were still under development or nearing their peak, and if they saw any constants in the emerging patterns that might extrapolate into the possible futures. Although these are dense questions for the participants, the questions opened an insightful discussion. Finally, sharing my screen, I showed on google trends[4] (Google trends, 2022) using the keyword 'circular economy' the trend of how, since 2014, it shows an exciting increase in the number of times that this word has been on the news worldwide, compared to the previous years and also showed a contrasting pattern (a peak) if CE is compared to other related keywords such as 'sharing economy'.

As shown in Figure 16 below, Google trends also showed a steady increase compared to the keyword 'artificial intelligence' from 2014 onwards. Moreover, the CE keyword showed to be as popular as 'foresight' when these words were searched for. Of course, this was a new tool for the participants that they could use, but it evidenced the traction that the CE has been and is into.

[4] https://trends.google.com

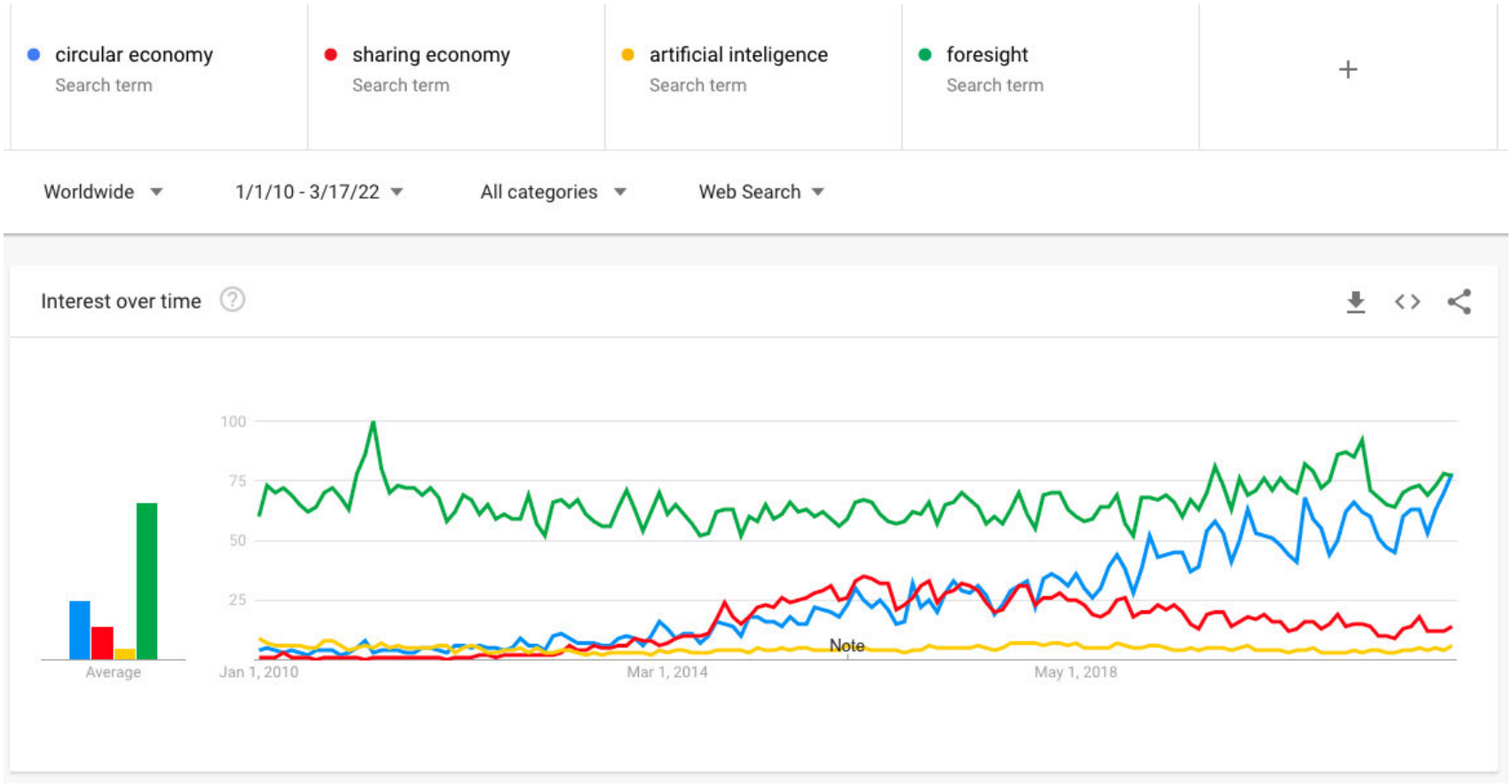

Figure 16. Google Trends screenshot (January 2010 to March 2022).

Lastly, a suggestion based on the learnings from this session is that it would be worth dedicating more time to do research and more scanning to find more historical events that have influenced their organisation, as it is often the case that it is hard to remember specifically in which year an event happened, especially when you need to go 15 years back in time.

2) Butterfly diagram [present]. As explained in section 3.2.1, the Butterfly Diagram is one of the existing CE frameworks developed by the EMF (2013). The reason for including this framework is to evaluate an organisation's present in terms of circularity and, later, in the exploration phase, to evaluate how circular the organisation wants to be in the preferred future.

We went through this framework to assess the circular practices of the DSME by asking the participants if the organisation was currently active in each of the loops that are part of the Butterfly diagram.

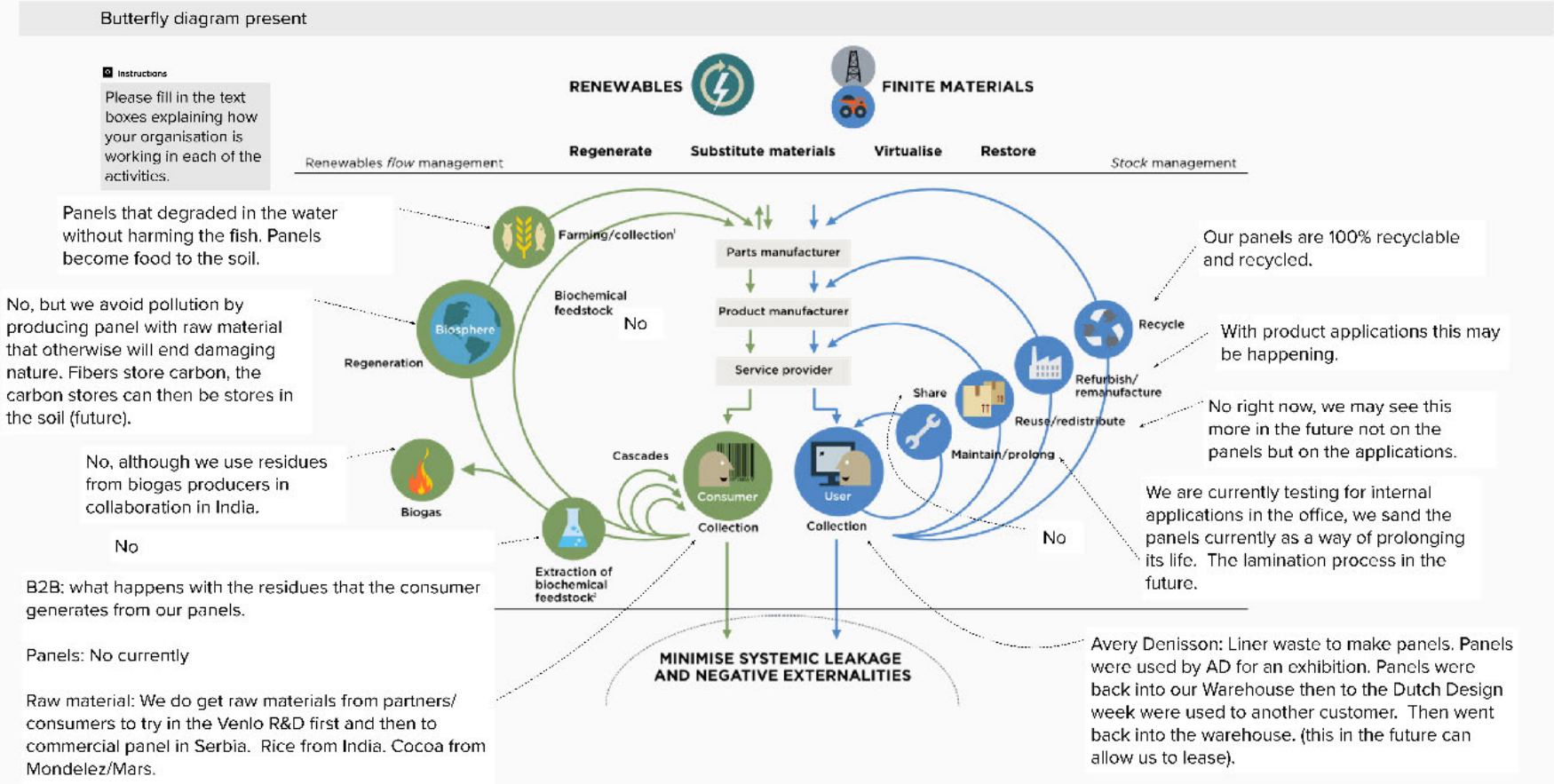

Figure 17. Butterfly diagram completed by the DSME participants.

As observed in Figure 17 (the link for full access to this Mural is available in the appendix), there are two sides (or wings) on the Butterfly, the biological cycle (in green) on the left side and the technological cycle (in blue) on the right side, and each wing has its corresponding loops or circular practices. So first, I started the session by briefly explaining the Butterfly diagram, although all the participants were already familiar with it. Then, during the session, we started filling in the biological cycle by going from the bottom up, trying to answer 'what is the DSME currently doing to collect its panels?' By asking this first question, it became clear that each question would steer a rich discussion.

The most contrasting issue was that some participants believed that the DSME was already active in all the CE practices, while others from the group were more sceptical and strict when considering if the DSME was active or not in certain CE practices. So, the way forward I suggested, as the measuring level, was by being as critical as possible. However, I also documented initiatives that did not make the organisation active in that particular loop because one of the Butterfly diagram's purposes was to map all of the CE projects that had or were taking place.

The following answer from Participant 1 illustrates how the participants struggled to capture what the DSME was doing now and not what the DSME would do in the future:

"thank you for specifying that we need to think about what we are doing right now because I was already jumping forward into what we will do in the future for many projects. Right now, it's very much dependent on where the facility is and for example, for the current projects, we are collecting specific waste streams, so we're very much dependent on the partners and logistics. Then I know that as soon as we scale up on multiple locations, then we will have a radius of less than 300 kilometres to work with to source raw materials but for now that's the way we do it" (Participant 1).

As we progressed on filling up the diagram, the team proactively started to evaluate if some of the current projects were or not significant and relevant enough to be included on the list of projects. I suggested leaving those for the Butterfly diagram futures activity for those minimal or still developing initiatives. For example, when I questioned if the DSME used some of its residues for farming or collection, to regenerate the soil or to feed cattle, the CEO answered:

"The answer is no. It is far-fetched. It is dependent on something earlier in the process. For example spent brewers' grains, when you can extract the proteins and give these as

food for cattle then there is a business case in which you can use the fibres in a stream that becomes raw material for our panels. So this is the collateral business case which become viable because you have multiple application of the raw material, which is the spent brewers' grains, but I think it is far-fetched for you to put in here" (CEO)

When we moved to the technological side, the CEO also became more active in giving his input, as the rest of the team was unaware of some of the DSME initiatives towards circularity and not completely aware of the whole value chain of the projects and the ultimate DSME vision as a business. For this reason, the inputs from the CEO during this session were valuable for the team and not just for filling up the diagram. For example, when I questioned if the DSME was reusing, remanufacturing or recycling panels, the CE commented answered:

"so for the group since I don't know if any of you know about this project. As such, what we did in a recent project was that we took the liner waste, which is the backing of labels, made panels out of them in Serbia, which was a month of manufacturing. Those panels then were used by a client that produced this liner waste. For them to have an exhibition stand, which they could travel the world with. Where they could say, listen, we know the customer, we are creating a pile of rubbish with you but now with the DSME technology, we mitigate that rubbish and we put it into value, then when that exhibition stand, was not used anymore by the client, that thing came back into our warehouse, and then the Dutch Design Week was in 2019 and we use those panels in order to make new stands for the Dutch Design Week exhibition in Eindhoven, but for a different customer, which was then paying for the panels. Then those panels came back into a warehouse, we shredded a couple of them to see if that was possible and now, we've got them in storage until another opportunity arises. So that is an example of what we've been doing. So this could be the now but, on the facility, we are building here, once you've got the capacity, we will take back panels, we will also change the transactional model, that you don't have to buy yourself a square meter or our material anymore, but you simply lease it yourself. So that's the difference between now and future is absolutely in the conversation of a couple of commercial projects" (CEO)

I believe that because the CEO had to explain this to his team is an indication that the current strategy is not that well shared within the organisation. Therefore, this activity has been helpful for this, and I think running this exercise at least twice a year could be highly beneficial to inform the organisation of the progress on circularity.

It is worth indicating the last intervention of the session, also coming from the CEO, with regards to the current state of the organisation on recycling, the last loop in the technological side of the diagram, when the team was asked 'what does the DSME do in terms of recycling', the CEO answered: "100% recycled content, 100% recyclable" (CEO). The CEO implied that the DSME material uses entirely recycled material to make the panels and that the panels, after their use, can be recycled entirely too. Because the answer seemed more like a statement, and because I thought this was one of the more substantial elements the DSME has for circularity, I asked the team if they wanted to develop further on this answer. To my surprise, the team was satisfied with this answer, even though there are no current certifications or official endorsements. I believe the organisation must be more thorough when informing or claiming these credentials on recycling.

For this reason, this diagram could contribute to assessing and helping organisations develop a plan, communicate externally those initiatives the organisation is currently doing, and evaluate internally if specific certifications are needed to make sustainability claims. Furthermore, this could help the organisation vastly when potential customers are interested in their materials, precisely because of the circular credential compared to traditional materials.

3) Futures triangle. After filling in the Butterfly diagram [present], we continued this activity as planned. We had another 45 minutes to fill in the Futures triangle FS method.

I started the session by briefly explaining the Futures Triangle, stating that this method can be very good at mapping the relationship between the past, present and future dimensions and helps us clarify why certain things within the organisation are the way they are. FS assumes that these three dimensions are always connected even though they could be not as evident on the surface. Subsequently, I explained the futures triangle axes, following the same order participants were asked to complete; the pull of the future, the pushes of the present, and the weights of the past.

The pull of the future is an image of the preferred future. In our specific endeavour, this axis aims to develop a preliminary state with a shared, preferred future for the DSME. To do this proactively and help the team with the information from the previous two activities, I added five questions to be answered within the first 10-15 minutes on the Mural board. The questions are 1. What are things you are not doing from the Butterfly diagram but ought to be doing in the future? 2. From the State of play questionnaire, what were the things the organisation wanted to accomplish in the future? 3. Using the insights from these two previous sessions, how would you frame your vision in one sentence? 4.

What are things you are already doing that contribute to your shared vision? And 5. What are the things that are holding you back from reaching this vision?

I then explained the second axis, the pushes of the present, or what is happening today informing or pushing the preferred future to occur. Pushes are usually emerging technologies, societal changes, the situation of the environment, political and economic happenings, and social or environmental changes.

Lastly, I explained the third axis, the weight of the past, where participants are asked to map what are they carrying from the past, internal or external motives, that is not letting the organisation reach their preferred future.

After this brief explanation, I mentioned to the participants that they could use the input from the Butterfly diagram [present] and the State of play) as insights to fill in this exercise (this was the first CFA activity in which we used the inputs from the previous to the current activity. To assist participants with these inputs, I previously analysed the completed State of play questionnaire and categorised each of the answers in three different colours depending on the relationship with one of the three axes. During this session, I showed the questionnaire on my screen and did a brief recap. I went quickly over each of the 20 answers from the questionnaire but specifically spent more time on those answers that the team or I thought were the fittest to be included in the Futures triangle. Based on this preamble, the team was able to start completing this method with good traction.

After giving participants seven minutes to fill in each axis, we reviewed each axis as I read the answers aloud. This was to discuss with the team if they fully agreed with the answers or if they would add anything more.

The axis we spent reviewing more time was the pull of the future. Therefore, it is worth sharing the following dialogue between two of the DSME participants just after I did a recap on the pull of the future answers:

"You want to help your partners to be more circular and make circularity profitable to prove it's feasible. Independently from your current stakeholders, you want to set the specs for circularity, be a global scalable model that is locally relevant. You could be one of the participants of a wide ecosystem in Europe. Okay, everyone on board on that vision?" (Facilitator)

"Well, I was wondering what you mean, with setting the specs for circularity, whoever wrote it?" (Participant 5)

"So as our CEO often says, the line to be first is very short and to be the second is super long. So since we are, I mean, maybe I'm biased, maybe I'm not, but I think the DSME is pretty amazing. Every time I try to explain it or embark new customers into our journey. We are building such an extensive ecosystem, we just mentioned it, of partners. And we're collaborating so much with the community with the community of makers, so designers, architects, so all those industry experts, that if they collaborate with a product like our materials, they have like the power and influence to set the technical specifications in the industry. So to set this circularity standards in the industry. That's what I meant with setting the specs. So having our material as something that people can look up to and say I want to perform just as well as they do on total cost of ownership, life cycle assessment, Sustainable Development goals, Carbon Footprint, Global Reporting Initiative, etc.," (Participant 1)

"Okay, that's very clear" (Participant 5)

"Maybe ambitious but…." (Participant 1)

"Well, it's called an image of the future, so it's meant to be like that, ambitious" (Facilitator)

In this activity, it is essential to ask the participants to be as clear as possible when setting the pull of the future. Using the dialogue example above, rather than writing down 'to set the specs of circularity', it is necessary to explain in a more detailed manner. The final results of the Futures Triangle are shown below in Figure 18 (the link for full access to this Mural is available in the appendix):

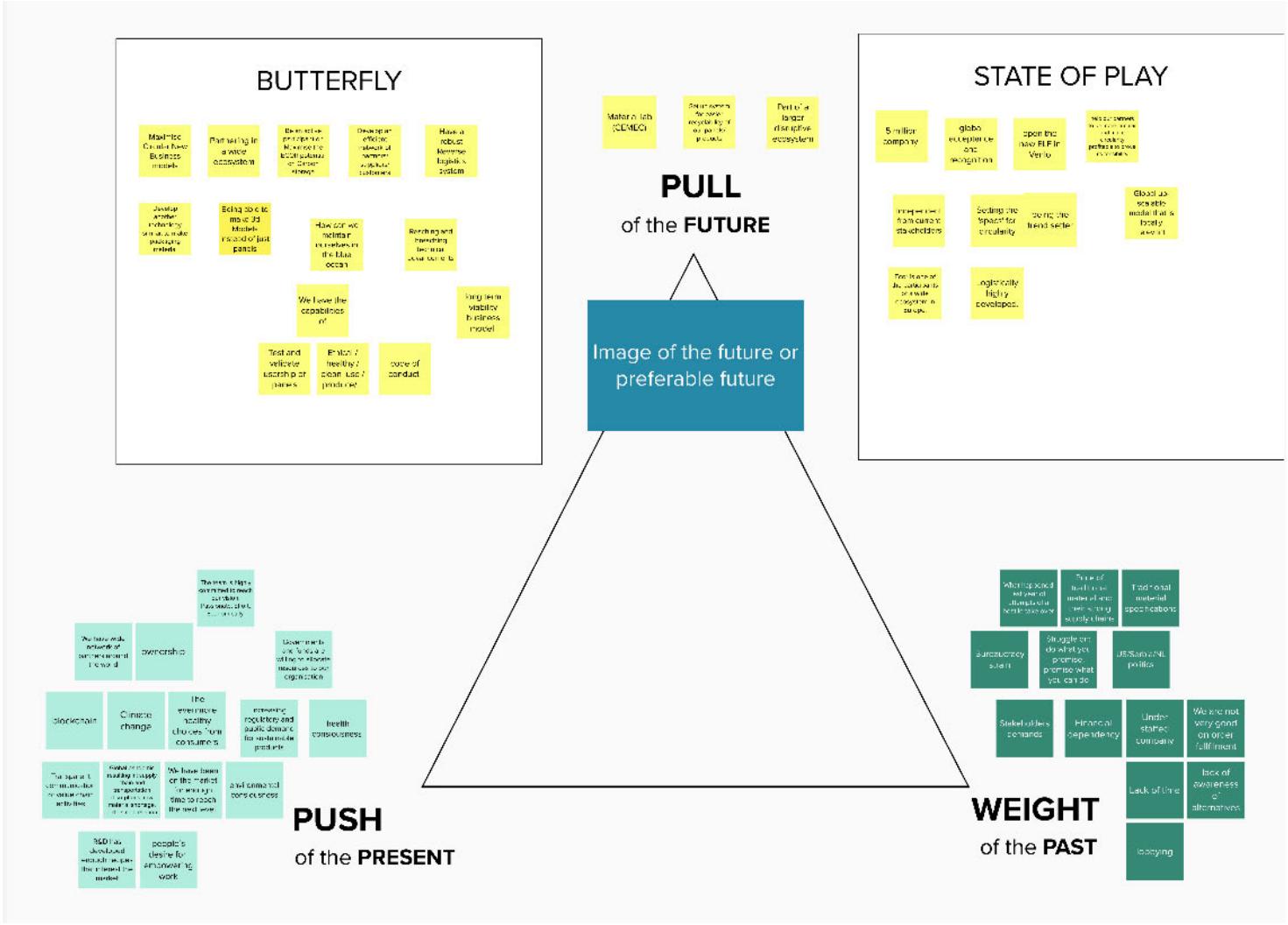

Figure 18. DSME Futures triangle.

As seen in the Futures triangle figure, the participants completed the method filing in each axis with what they considered the primary elements pushing or pulling the organisation to a preferred future. However, the image of the future built during the exercise still missed coherence, as many elements (Post-it notes) of the preferred future were dispersedly compiled. In other words, a unifying sentence or sentences as the DSME image of the future or preferred future was not reached yet. However, the essential element in this session is that the participants agreed with the different scattered elements of a shared vision. Therefore, a posterior work from the team was to synthesise all these Post-it notes into one or two sentences. This work can be done offline by the participants, without the facilitator being involved, or the facilitator could work analysing the inputs, building these unifying sentences, where later on could show to the DSME team the wording and agree on this image of the future or if necessary to make the changes that are needed. A unified future image is relevant since the DSME team will use this during other activities, especially during the last three phases.

4) Futures Landscape [current]. The traditional template from Tibbs (2000) for this activity includes a star, the mountains, a chessboard, and the self, symbolising an organisation's vision, goals, strategy, and personal biases. For this activity, I changed this template to different symbolic elements aligned with the CFA theme of going on a space mission. In this sense, the vision was symbolised by a planet, asking the DSME what the organisation's purpose is, explained as a future-focused role image that has not been completed yet. A rocket symbolised the goals, explained as what the organisation hopes to achieve. The strategy was symbolised by a map, explaining the issues and challenges the organisation will likely face. Lastly, the personal biases were symbolised by a telescope, explained as the values and strengths the organisation desires. These elements were circumscribed visually by a rocket ship taking off, as shown in Figure 19 below (the link for full access to this Mural is available in the appendix):

Figure 19. DSME Futures landscape.

The outputs from the Futures triangle session helped as an initial starting point for the planet section. In particular, the Post-it notes were written in the pull of the future axis. Five ideas were included in the vision; to be a part of a larger disruptive ecosystem, to have global acceptance and recognition, to be a global up-scalable model that is locally relevant, to set the specs for circularity, and to be a trendsetter. Subsequently, because these five ideas seemed too broad, I asked participants to review these and complement the vision with any other ideas. Then, focusing on the DSME commercialised product, I gave an example of how in another industry, there is a brand called GORE-TEX that is the primary reference for water repellency. I gave this example to the DSME team to steer a discussion on how the DSME products could become the primary reference for sustainable material in several applications, just like GORE-TEX.

Based on this, a participant added a vision of 'being the brand known for alternative material worldwide'. As this vision was directly connected to the material but not necessarily to the organisation, the team continued discussing other ideas and finally came up with an additional answer; 'the organisation, as well as our material, is honest, transparent, healthy, and clean'. With these inputs, we moved on to the second section of the futures landscape, the mission or goal.

Differently from the previous section, in this step, the team was asked to add specific and tangible goals such as building a material lab or being able to make 3D models. The team struggled less on adding specific goals and came up with: 'establishing a code of conduct to suppliers', 'fulfilling all the targeted market certifications such as cradle-to-cradle, water and fireproof', and 'define aligned measures to circularity'

We then moved to the values section at the bottom of the rocket ship. I previously included more than 100 possible options the DSME could pick values from. To name a few, some of these were: generosity, integrity, creativity, humanity, loyalty, patience, and courage. Next, the team was asked to drag the values the DSME should have to reach the vision. I also suggested that the team include images as visual support, as the Mural function easily allows this. The values picked were excellence, honesty, quality, teamwork, knowledge, enjoyment, intelligence, respect, gratitude, and diversity. Once these ten values were picked, I asked the participants to write down the strengths and weaknesses of the DSME. The chosen strengths were ambition, community, technology, diversity, passion, aspiration, market interest, and circular economy. The weaknesses were understaffed, lack of prioritisation, bad customer service, communication, uncertainty, lack of aspiration, that things are not all in one place, self-centred brilliancy,

and the lack of standard operational procedures. After these steps were completed, some participants wanted to share the reasons behind their answers. While all the participants completed the task successfully, the most elaborated answer came from participant 1, covering the aspects of values, strengths and weaknesses. She explained:

"so for me my answer on values was honesty, knowledge and intelligence. Honesty, it's related both to people, so being transparent in what we do, as also our CEO often says, do what you say and say what you can do, and this also relates to the whole certification parts with the material, not just simply stripping Sustainable Development Goals logos on the website and copy and paste it but more of a self-assessment and self-awareness process to quantify our impacts. Then knowledge because I think the team, our team, is characterised by knowledge, skills, competence, and experience, and all of these things they make up for our expertise. Our team is very small, but I think we are great experts in what we do. Then the intelligence part, being driven by also digital intelligence and data intelligence. So not only people because I don't like to say that someone's intelligent because I don't know how to measure it. And based on what; is it emotional intelligence, it is just simply like a high IQ? I don't know, but basically, intelligence is based on the material, because material is what we can use to really disrupt the world around us. And the strengths and weaknesses, so for me the strength is community because we would not be the material would not simply be will just be a panel, a panel with potential but just a panel. So the community of makers and designers and our partners are super important. Then Ambition because our team is very ambitious, and I think a good thing also is that we have also diverse backgrounds. So we have different perspectives. I have more economics and sustainability. So I guess I'm the least diverse, but a colleague has experience in ergonomics, another colleague was a mathematician. And then the weaknesses is self-centred brilliancy, which for me means that by having such an ambitious team, people that can think for themselves we are lacking doers, so people that just listen in a meeting and then after the meeting, they go out and do it, they get things done. So we're missing the practical part of the team. I think. We come up with brilliant ideas, new approaches, but everyone think what they're doing is the best way to do it. And also standard operating procedures, they are not yet internalised, they're still very well bypassed and I think this is also related to the fact that we lack prioritization".

Through this exercise, the participants could describe the organisation and what they would like to start seeing in their organisation. Worth noticing is that there was unanimity when each one of the participants explained their perspective on the DSME.

After completing this task, we moved to the strategy section, specifically mapping current key competitors, suppliers, products, and customers, to see what was on the radar of the DSME participants at that moment. Later in the approach, after the scanning and emerging issues activities in the exploration phase, the team would have a broader scope for including additional players to this list on the map.

This activity section went smoothly, as the participants could map the traditional materials the DSME contests against as their key competitors, such as cardboard, MDF, HDF, PVC, and foam PVC. The team, however, could not map the names of the organisations that are the producers of these materials and that target the same customers that the DSME does. This is because the DSME was not doing any competitor analysis exercise when implementing this activity. Furthermore, some participants could name some SMEs from around the world that, similarly to the DSME, produce alternative materials and therefore were categorised as their competitors.

We then moved to map the key products commercialised by the DSME. The participants mapped materials, such as standard or speciality panels, and non-material-based, such as business model evaluations for companies interested in buying or co-investing in setting up a DSME factory or R&D projects. As the DSME keeps the intellectual property (IP) of the developed materials, one participant also said that the IP could be mapped as a product. However, the team decided not to include it as the IP is not something they trade or commercialise. This concept indeed evidenced the notion that the IP value is a grey area for most participants, as understanding how the DSME uses the IP actively at that moment was unclear for them.

One of the participants commented:

"Indirectly, if the client has a specific IP and they have a unique alloy that ticks all the boxes like eco-friendly, healthy, and free of VOC's, that, indirectly, generates revenues and profits. Maybe this is too far-fetched" (Participant 1).

Another participant from the R&D team addressed the IP from another angle. The comment was:

"Well, our customers never have the IP, the IP is owned by us and solely by us. We own it. It's like a license. If there is a factory who we need to produce that factory will get that license for that period of time and then we get a revenue back, but it is not a goal to commercially sell IP. So I am not sure if we should write it down. It is a grey area for me" (Participant 5).

Based on this last comment, we decided not to include the IP in the mapping of products.

We moved on to map the key customers. The participants did not struggle to map the current customers they were working with, such as Mars, Mondelez, Heineken and Schiphol airport. They also included furniture manufacturers and interior designers. Lastly, they added regions such as Catalonia in Spain or Saga in Japan because the DSME had collaborated with them to do feasibility studies and potentially set up DSME factories in these regions.

Lastly, the participants mapped their key suppliers. This Mural board area was completed rapidly, while more time was needed to map all of the DSME raw materials. They mapped water, electricity, agricultural residues, industrial residues, paper-based fibre suppliers, and equipment suppliers.

As an overall evaluation of this method, it was easy to complete the information asked, giving the DSME participants a clear understanding of the value chain and actors in their business. Furthermore, this activity also contributed to an awareness of the knowledge gaps between the different areas of the organisations. By the end of the session, the participants were more informed on relevant details of the organisations that sometimes, without the help of this type of activity, remain ignored.

5.2.3 Exploration

1) Scanning. It is vital to be constantly and proactively aware of what is happening around us in the environment, as this affects our daily actions. Therefore, organisation members need to look for signals and patterns of change. Learning how to scan was challenging for the DSME participants and for me as a facilitator. It was especially exhausting for all. Therefore, after noting this in the first session, I divided this activity into three additional sessions and used different techniques to scan appropriately.

a) The first session was exclusively dedicated to immersing the DSME in explaining what is scanning and answering any questions the team may have. So I started by explaining the different concepts within an emerging issues analysis, such as the concepts of weak signals, emerging issues, trends and megatrends (as shown in Figure 20). I then

explained the relevance and interest as an organisation to start looking for weak signals, which organisations can find in social media, value shifts, futuristic or speculative design communities, special interest groups, forums, or even through conversations with customers.

In the case of emerging issues, these can be found in scientific publications by interviewing scientists. I explain why for organisations, it is essential to detect those weak signals and find emergent issues because they are glimpses of the future before they become trends, and by combining them into patterns, we can see things emerging.

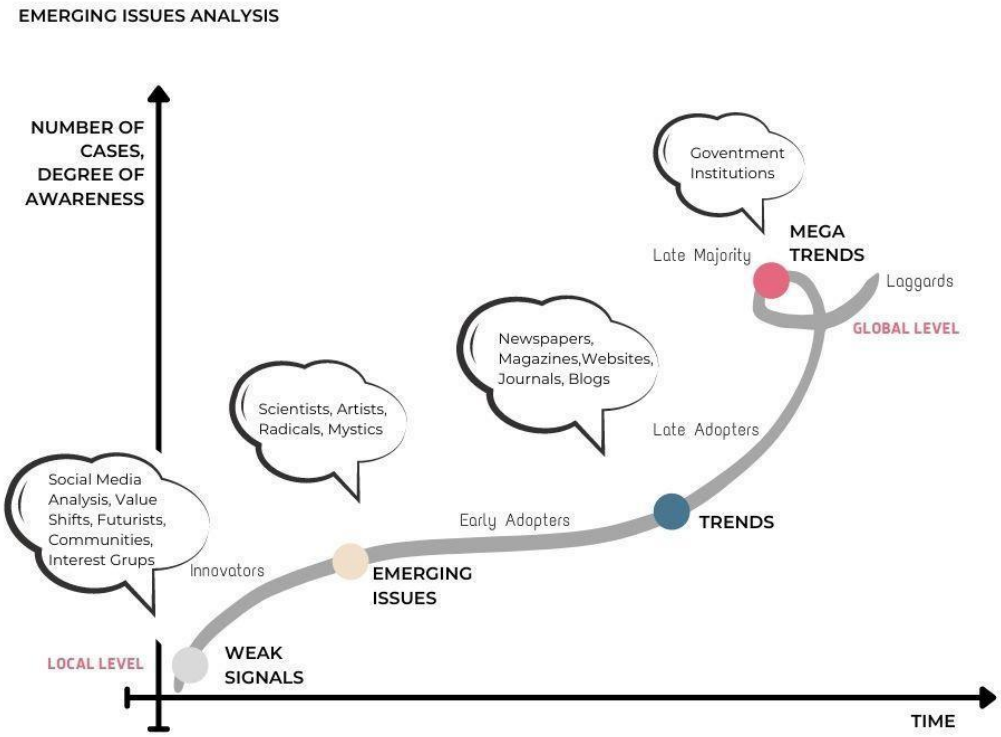

Figure 20**.** Emerging Issues analysis in comparison to other phenomena. Adapted from Molitor (1977), Rogers (1995) and Schultz (2006).

It is vital to remark that in general terms, these or any other existing FS process assumes that deliberate present-day actions can shape the future. For example, some unfavourable trends can be altered (redirected, slowed down, or stopped together) to some extent and new desirables one can be set in motion as a result of these actions (Havas and Weber, 2018). This session also introduced the five types of biases we could fall into as individuals or organisations; therefore, it is important to know, identify, and avoid them, mainly because these biases will appear when we start scanning for signals.

The participants were asked to be aware as we are inclined to look through particular glasses or lenses when we scan. For example, as part of an organisation, individuals could fall into a *confirmation bias* (only trust what I believe) when they already know what they are looking for in an article or news or a forum that convinces them and then scans for signals stops. Alternatively, they may fall into a *hindsight bias* (I knew it all along). For example, with the COVID-19 pandemic, it is common to hear people say, 'oh, I always knew that a pandemic was coming'. However, it is not useful to think retrospectively by focusing on past events as the organisation should think prospectively by focusing on possible future events. Then I explained the *anchoring bias*. This is 'first come, first serve'. So at the first hit or significant finding of something new, we stop looking because we think it is enough. The opposite is the bandwagon bias (I follow the mainstream) because the quantity of observations or scans does not necessarily translate into quality or the edge to look for. Lastly, I explained the *ambiguity effect bias* (I prefer to know the outcome). So you instead want to observe or collect sources or pieces of information that you already know where they are heading instead of exploring the uncertainty.

I then explained the differences between environmental scanning and horizon scanning. While environmental scanning is the practice of scanning the social, technological, economic, environmental and political environment (STEEP), horizon scanning is on those edges where one should think about what is popping up. This usually creates a strange feeling, something you read and think is strange or interesting. For this reason, horizon scanning should create an effect or a reaction based on the information that has been found. As one of the well-regarded futurists, Jim Dator argues,

"Any useful idea about the future should appear to be ridiculous because new technologies permit new behaviours and values, challenging old beliefs and values which are based on prior technologies, much that will be characteristics of the futures is initially novel and challenging. It typically seems at first obscene, impossible, stupid, 'science

fiction', ridiculous. And then it becomes familiar and eventually 'normal'." (Dator, 2019, p. 2).

I have included the image below as an example of this below:

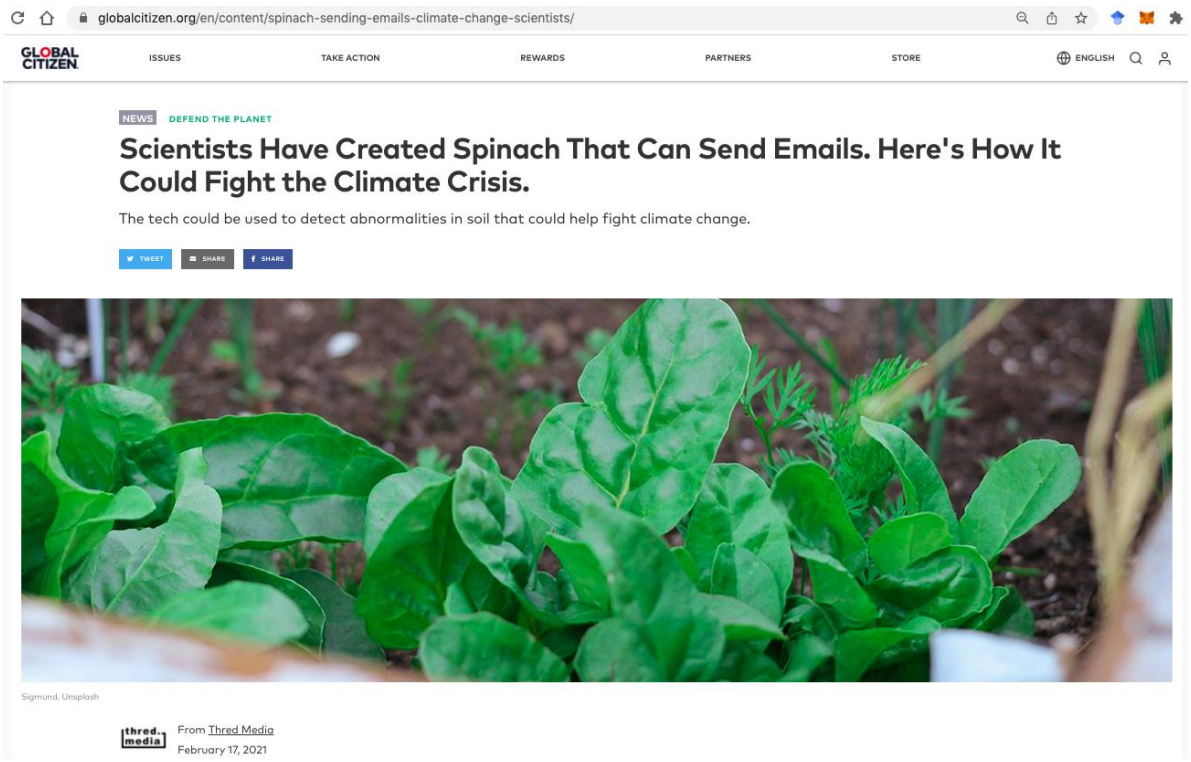

Figure 21. An article that seems impossible and ridiculous, but it is true.

(Global Citizen, 2022).

Following this, I recommended some tools to start scanning. Firstly I encouraged the participants to look at the strategic intelligence platform from the Word Economic Forum available at https://intelligence.weforum.org/. This is an excellent exploration tool. For example, if you look for what CE is, you will find all the different areas and aspects, and you can click deeper and deeper from one way or the other so you find comprehensive topics and themes and industries that you may otherwise not have looked for, as illustrated in Figure 22 below.

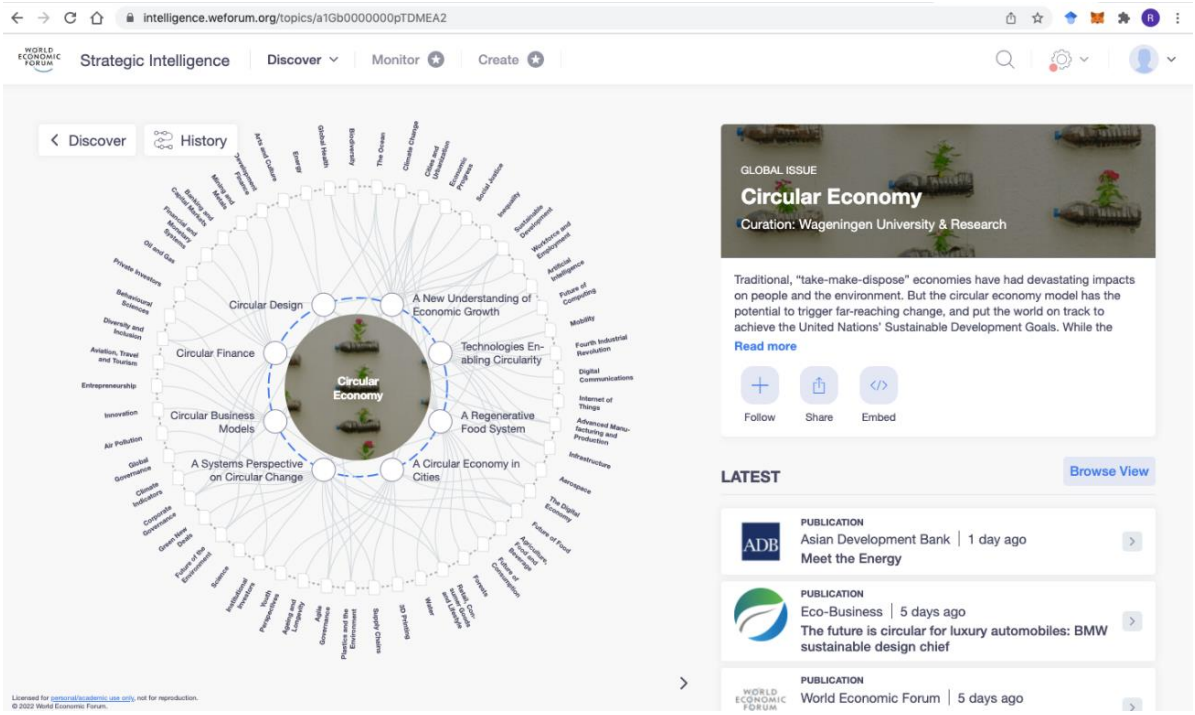

Figure 22. Strategic Intelligence tool.

(World Economic Forum, 2022)

Another suggestion for horizon scanning is exploring TweetDeck on Twitter. This tool allows you to look more thoughtfully at your Twitter feed as you can look at trending hashtags and follow specific trends like CE and new materials. In addition, you can observe what people are currently posting.

The last tool I introduced the DSME participants to is Factr, available at: https://factr.com/. This is a collective knowledge-based tool where instead of just sharing articles in the DSME WhatsApp group or emails (as the DSME participants were doing), this could be a place to go because you would have it all in one space, and you could share a comment and go back to it to make sense of it. Because this is the crucial lesson of this activity, it is not just about collecting articles or data. It is about making sense of the meaning and if there are any strategic positions that the organisation can take from there.

After this extensive but needed introduction to scanning, I started asking the group what we needed to ask ourselves about, which is what the DSME participants will be scanning for. This is called 'the focal issue'. To do this, I used the other half of the session to discuss the focal issue amongst the team and the things we will be scanning. To start the discussion going, I showed on my screen three questions and asked the group; what keeps you or your organisation awake at night (1), which time horizon do you want to explore (2), and what external issue do you want to know more about (3). Rather than answering these questions based on the DSME present, I asked the participants to discuss the question thinking as if the DSME and the participants were already in 2030. Based on this suggestion, the idea was to steer an open discussion around what the DSME needs to look out for in the future.

The first participant to respond mentioned that:

"what keeps the organization awake is the pressure of delivering what has been promised and the trade-off of promising what we can deliver. It's a small organisation, but we have different functions, different units, and different ways to proceed with this. So I guess another element that is keeping the organisation up at night is the alignment within all these aspects of the organisation from Management to R&D, to Logistics, Finance, Administration, and, of course, Human Resources as well" (Participant 1).

Since this answer seems based still on the present, one other participant responded that:

"I have something to add, because I just realized when you sat with people, if we would be in the year 2030, what I would wonder now is, how would we work as a big operation? Because as you say, we're now very small. But would we still all be passionate about this subject when we are in 2030? How would that work? Or will it be like every other big company out there?" (Participant 5)

A third participant answered right away that:

"I think in our organisation, we are consumed by the day-to-day activities and that keeps us not really thinking forward in time. So, for example, that exercise that we just did about thinking as if we were already in 2030, and being probably a multinational already, or a global organisation, and losing passion, that's something that I have never thought about. So I mean, for me, the focal issue is how can we change that pattern of not focusing on the present too much, but to start thinking also, through this type of exercise about the future?" (Participant 6)

According to Havas and Weber (2018), these participant comments are headed in the right direction as day-to-day decisions, guided by long-term, strategic thinking, tend to lead to more targeted and favourable outcomes.

Based on these three inputs from the team, it became more evident that a focal issue could be how the organisations of the future will do to grow. This also answered the third question on what the DSME wants to know more about, specifically, how organisations that started small and succeeded grew. Also, how do these organisations structure themselves?

As for the DSME, the creation of ecosystems is highly relevant. Some benefits of scanning are understanding how other organisations did it, how they developed good practices in these organisations, what failed, and analysing why it failed; if it was because of the culture or the technology that did not exist. Equally important could be what was the right or practical thing to do for those that succeeded. Was it because of slow growth or more rapid growth? So these could be some focal issues the DSME could start looking into.

A scanning exercise such as this could be revealing because the group was capable of finding examples of organisations from a different industry, and then the DSME could use these learnings in their context.

I proceeded to ask them if the DSME would go beyond their organisation. What is it that you would like to know more about? Is it around technology or the environment? Is

it around innovations on how to create new products? I also asked them what they were curious about in their roles. I suggested, to the R&D members, that perhaps a focal issue could be 'what could be the impact of the CE on materials by 2030?' Based on this, one of the participants commented that an interesting focal issue for the DSME would be:

"what would be the DSME role? What role the DSME would have in continuously being active with materials innovation. In a world where we have, an ever-widening range of what we think materials are. How materials can be sustainable and circular, and so many guidelines and standards, etc. So in this thunderstorm of different inputs that we have, how we can then in 2030 or in more years, how then we will be positioned? And indeed, this is linked to how can we leverage on the momentum that we're gaining right now" (Participant 1).

I found this comment meaningful to the approach because if they are thinking about the focal issue, they want to start addressing and scanning for signals and bring back all these insights. This can be mutually beneficial for the different phases of the approach. As the participants learn to ask themselves, 'what do we need to start scanning right now about the horizon that can help me get there by 2030', they make the connection between today and the future and reflect if this is how they want the DSME to be like by 2030. It becomes more precise for them what is necessary to do right now. It clarifies what is what they need to start scanning and exploring today. It could be social trends, signals, the environment, technology or politics.

Finalising this brief discussion around the three futures-focused questions, we moved to a final task, to frame the DSME scanning interest in a research question or focal issue on which they could start concentrating in the next session.

As the participants started to exchange ideas and try to find a unifying focal issue, one of them asked if it could be possible to develop more than one focal issue. My feedback to the team was that they could have two or three focal issues maximum because there must be a sweet spot between making it unnecessarily broad or unnecessarily specific. The trick lies in not reaching an exaggerated action on scanning by having too many focal issues because the team could get overwhelmed by all these signals they will be receiving. Nevertheless, if it is also concrete or exaggeratedly narrowed, they could miss out on important things potentially affecting the DSME. So this is why it is essential to discuss focalisation with the participants. To steer this, I gave four examples of focal issues:

- What is going on that could have an impact on the environment?

- What are the long-term impacts of COVID-19 on the Global South?
- How might the Circular Economy impact the world's economy by 2050?
- What changes are we seeing in the world after more than 50 years of fossil fuel dependency?

These help the participants to come up with more specific focal issues. For example, one of the participants right after this said a significant focal point he was concerned with:

"so first, I would like to raise the fact of reviewing thoroughly our business model, I think we talked about this as well in past sessions with checking out the business model, explicitly if it is a sustainable business model. And I am thinking about the licensing model. So if you license the technology to a country like Germany or France, Sweden, European Union country you will have similar regulations, but what if you license the technology to a country in Africa, or in Asia, where regulations and institutions are not as strong as in Europe or North America? So how do we secure the licensing model? And how do we check that things are done properly? How do we check that the materials they use is fully bio-based and circular? Because it's kind of easy to lose. We need to check if the licensing business model can be applied in any country. And if not, how do we adapt it in a way that becomes feasible for other. So that's something I'd like to raise" (Participant 4)

This participant's inputs were thought-provoking and varied, and the team and I suggested that the different topics addressed in his suggestion could be encapsulated in a focal issue framed as 'if you want to go global, what are the challenges you may face as a European organisation?' The team suggested this research question as it seems to be the right balance between not being too broad and not being too specific. However, it was clear to me in this session, after some ideas and contributions from the participants, that the unifying focal issue for them was the complexity of growing as a business.

The team mentioned, maybe not in a very structured way, the different elements that could be disrupted if the DSME were to grow in size and relevance by 2030 by mentioning materials, supply chain, reverse logistics, and business models. If they did not note this, I made the group aware that all of these were interconnected; therefore, the focal issue could be more interesting if we could first connect these elements into one focal issue.

After 20 minutes of discussion and several drafts, the following focal issue with subtopics was finally framed, and the team also came up with the idea of dividing this subtopic into internal and external issues

- How do we build an organisation or group of organisations that survive in the long term by 2030?

✓ Internally:

- How do we map and mitigate risks (political, social, procurement) in the geographical areas we are in?
- How to be honest and transparent in what we do?
- How do we keep flexible in terms of strategy (products, business models, services, locations)?
- How do we keep ourselves in a blue ocean?

✓ Externally:

- Who will our competitors be by 2030, and how will our interaction with them be?
- How will the governments handle the CE paradigm?
- How to be independent financially from external funding?

Having defined the internal and focal issues, I spent the last five minutes summarising the work done and explaining the tools we would use in the next scanning session. These last two points closed this session.

b) The second scanning session focused on introducing the concepts of business, competitive and market intelligence to the participants. I explained what each concept means. These distinctions were essential to clarify before the third session on scanning, as the tool we were going to use included these three categorisations. The definitions can be found in the glossary of this thesis. This session was also important as a step back before starting to scan. I mentioned the following right after introducing the three concepts:

"So for those who were with us on the last session, you remember we talked about what is horizon scanning and what is environmental scanning. And then we ended up talking about the focal issue as the area we wanted to explore on what to scan. So now we are taking a step back, because in order to look at the future through scanning we need to look at our present, and only then we can try to look at the future. This is why this session is focused on business intelligence" (facilitator).

Immediately, right after I mentioned this, the DSME CEO and I had the following dialogue:

CEO:

"so to help the group a little bit. In this specific team, I tried to brainwash them into a blue ocean strategy, which basically means the starting point is that you don't have any real true competitors, since you're going to do different than anyone has ever done before. So in this team, I never educated anyone on the SWOT or on 5 forces, or those kinds of metrics. We don't even do…what is that old model called? The star, the cows. We don't even do the Boston metrics in our company. So I think for the audience you have right now this may be quite new" (CEO).

Facilitator:

"I see also advantages in a blue ocean strategy. But the last session we had the feeling that when we look at the focal issue that you also had a lot of questions of what is currently happening around you, on your positioning, and where you want to go. And sometimes just helps to see what the others are not doing or what you are specifically doing good by enlisting some of this to really see where you're heading. So I can just recommend do that. But of course, that in the end, it's also a company policy if you want to continue" (Participant 6).

CEO:

"No, no, I am simply sharing with you and to the group of people that you have in this session that these specific types of mapping are quite new" (CEO).

Facilitator:

"Great, then, let's have a look a bit about the market and how we can get more insights on that" (Participant 6).

This dialogue helped me as a facilitator to understand more how much to emphasise or not in this session on the concepts of business intelligence, competitive intelligence, and market intelligence. Because the DSME CEO communicated clearly that they were fully immersed in a blue ocean strategy, I explained these three concepts briefly and focused on explaining the available tools.

It is essential to clarify that a market intelligence analysis is not necessarily external or against a blue ocean strategy. According to Havas and Weber (2018) a well-designed and conducted foresight approach identifies and assesses systematically those societal, technological, economic, environmental, and political factors and trends that are likely to affect the organisation’s competitiveness and wealth creation, as it can help turn long-term concerns into urgent priorities.

I moved on to deep dive into the futures scanning part. I explained this term as the systematic process of exploring the environment and the organisation's horizon. During this section, I also explained the Integral Futures framework (Voros, 2018) as we were going to use this as practice in this session and in the next two as the main framework to scan.

A key underlying concept of this framework is to include as many perspectives as possible when exploring a topic, in this case, when scanning for signals. The theory of this framework suggests that four intricate perspectives should be consulted when attempting to understand a topic or aspect of reality fully for a more successful outcome: intentional (subjective), behavioural (objective), cultural (intersubjective), and systemic (interobjective). These four perspectives are represented in a quadrant model included in the Mural board of this session as we did two rounds with the DSME participants. To guide the team in this activity, I included guiding questions for each quadrant, as can be observed inside the green square in Figure 23 below (the link for full access to this Mural is available in the appendix):

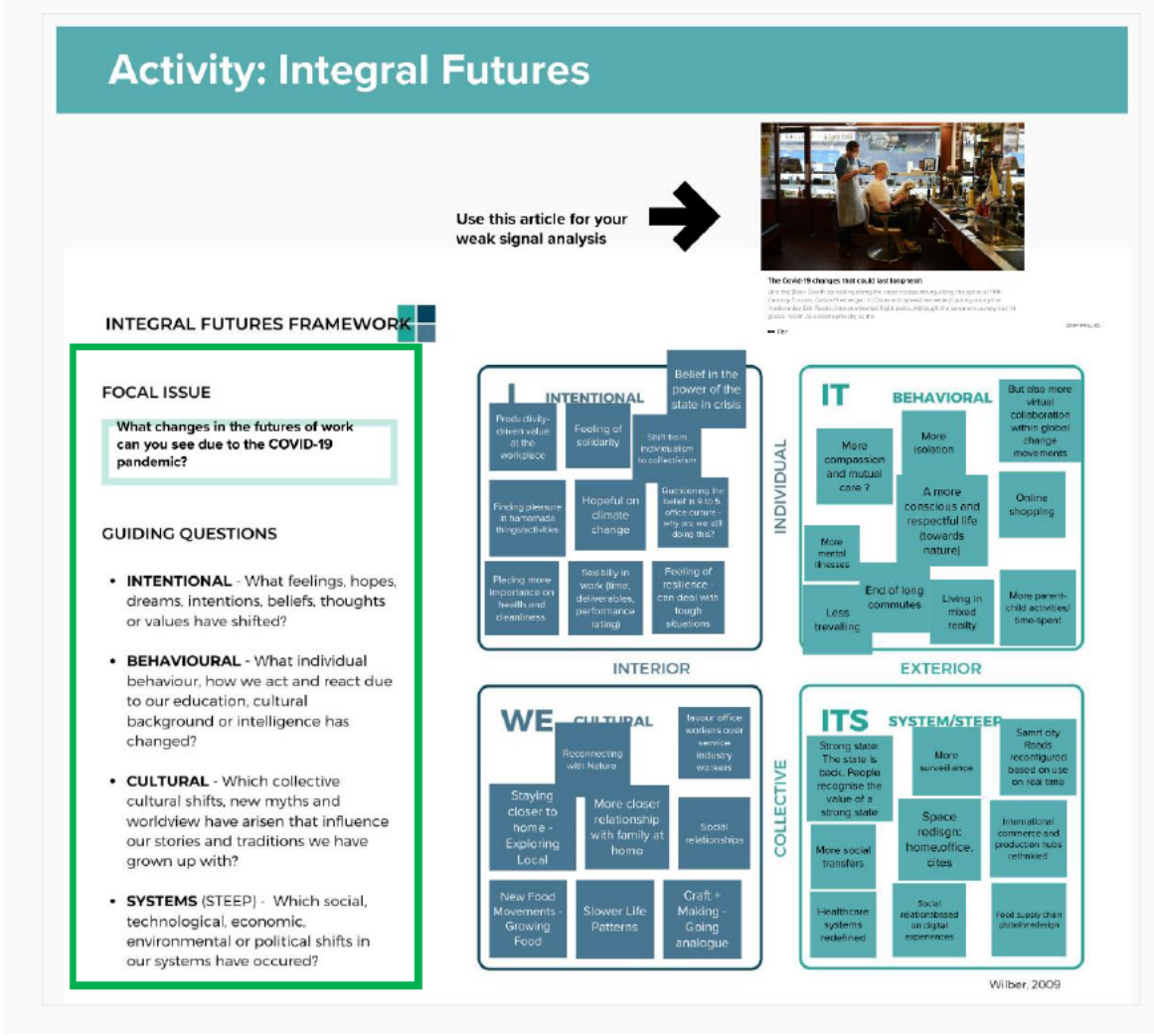

Figure 23. Integral Futures framework completed Mural board.

For the exercise, the participants were asked to read the following articles in two rounds (alternating to different quadrants or lenses): 1) 'Parliament wants to grant EU consumers a right to repair. Available at: https://www.europarl.europa.eu/news/en/press-room/20201120IPR92118/parliament-wants-to-grant-eu-consumers-a-right-to-repair, and 2) 'The Covid-19 changes that could last long-term'. Available at: https://www.bbc.com/future/article/20200629-which-lockdown-changes-are-here-to-stay. The second-round responses are shown in Figure 21 above. The participants practised by analysing these articles to understand how deep they needed to go and to rehearse how to scrutinise a reading when scanning. To analyse each article, participants dedicated 15 minutes per round.

I explained that signals are not articles but are part of an article. The article is just a source as signals can also be found in white papers or conversations on social media. I previously selected and analysed both articles to ensure that several signals might be found. I explained that a signal is not an entire paragraph but a sentence, a few words, or the own interpretation of the reader of a paragraph itself. For simplicity, I divided the participants so that some would analyse the article through intentional, behavioural, cultural, or systems lenses.

After the participants ended analysing the article in the first round, I opened a discussion for participants to share their findings. All participants understood the activity well and could detect signals while reading and analysing the articles. For example, participant 1 extracted six signals while reading the article with 'intentional' lenses. She shared the following:

"So the general feeling is of *rejection towards the unsustainability of the take-make-throwaway model (1),* then there is a *hope for more political courage (2)*. That was at the end of the article in applying these regulations. Then, again, another *hope, ambition, intention for responsible production (3),* but also *responsible promotion and marketing of these products (4)*. They specifically referred to an *intention for labelling products according to their durability (5),* and then again, the *intention, belief, change in value of repairing (6)* versus purchasing new items, which would imply using virgin materials. Yeah, that's it. I hope I got the intentional, right. So hope, dreams, beliefs, and values" (Participant 1).

An interesting finding from listening to the participants was that there were occasions where two participants in the same quadrant extracted the same signal, but that same signal was interpreted different, having different potential implications. My feedback on this was to acknowledge that different interpretations over the same signal were reasonable because the discussion between the participants hints that they understand the environment and the horizon from which the analysed piece of information comes. The critical matter is how each signal is framed and used to leverage the organisation's position. Moreover, it was confirmed not just by implementing this foresight activity, but in general during the whole CFA implementation, that these participatory methods incorporate the different perspectives of the participants; thus, it is crucial as a facilitator to make the entire process inclusive and transparent as possible (Havas and Weber, 2018).

Regarding the Integral Futures framework used, I believe it provided what it claims to be, a tool to scan in-depth, as just a couple of brief readings generated a significant amount of different and insightful signals.

During the last 15 minutes of the session, I opened up the Factr webpage, in which I previously created a private channel for the DSME participants (as shown in Figure 24 below). The purpose was to show how to collect the scanned article on this platform, keep a record of these, label them, write notes, and share them with other DSME members. In summary, how to use this tool as an internal library of scanned material. To make this scanning activity a routine, I suggested during the session to submit at least per week:

- Three scanned signals per individual extracted from at least three different articles
- One description of a scanned signal and share with the others in writing how they feel is affecting their industry or directly to the DSME (similar to what the participants did in the session during the integral futures activity but using the four quadrants)
- Three highlights or things that they keep in mind from the scanned signals
- Five tags around behaviour or topics based.

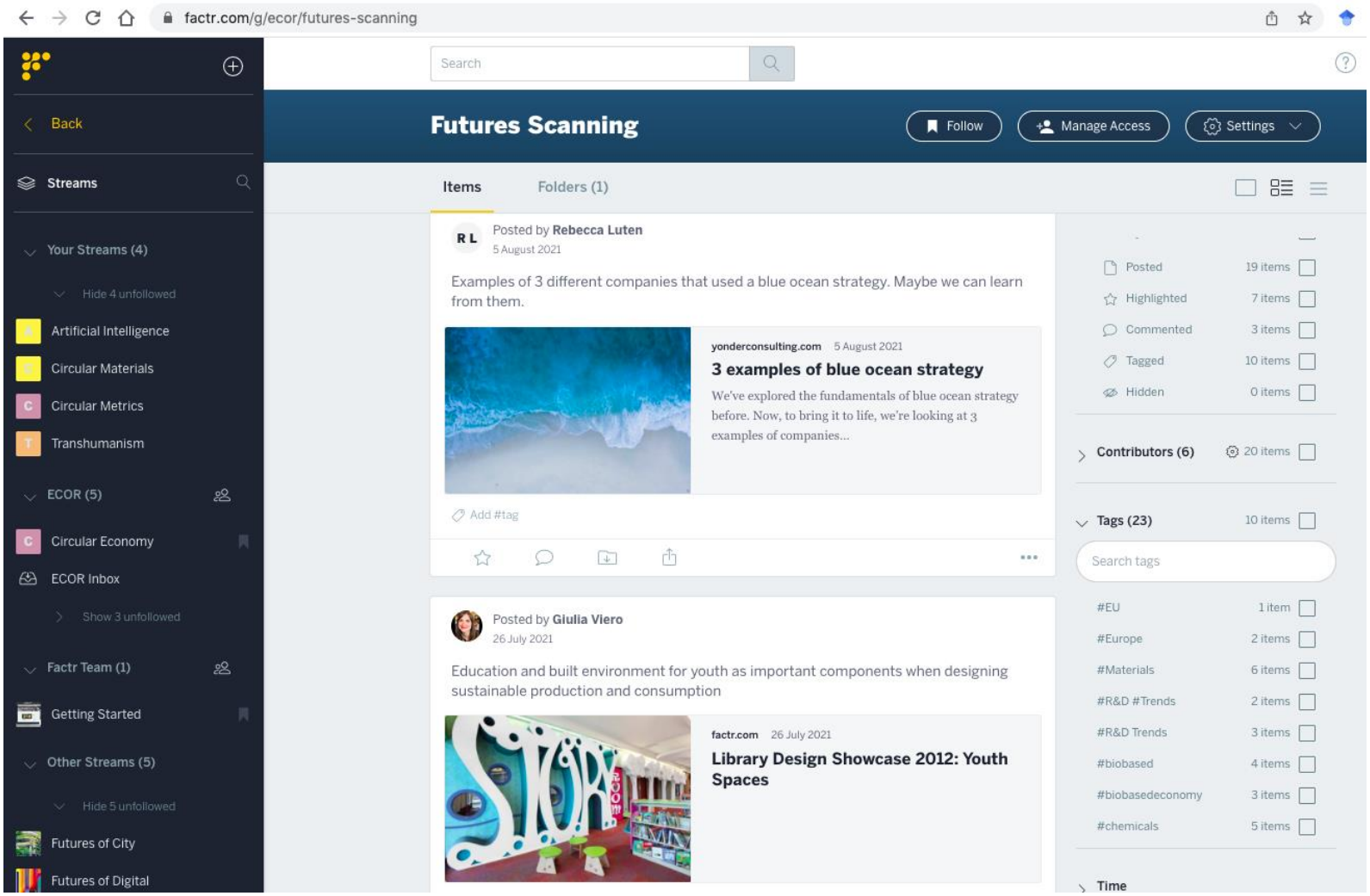

Figure 24. Factr private DSME channel.

Over the last minutes of the session, one participant asked an important question on how to scan, if based on Europe as a scope, globally, or focused on the market where the DSME operates.

My recommendation was to go as global as possible because there might be a little company in Peru that does some amazing stuff that interests or affects the DSME environment, of which the DSME is unaware. I also mentioned that if there is a new competitor on a global level, they should detect this and categorise it in the futures scanning section on Factr, whereas in the case of the business and market intelligence type of scanning, they should be more focused on the region, industry or market the DSME is currently at. This closed the second scanning session.

c) During the first half of this third session, I organised a scanning game called the mad hatter. This scanning method is inspired by De Bono's 'six thinking hats' (De Bono, 1985). The mad hatter creates six artificial contexts for thinking, corresponding to the primary thought modes of objective, subjective, critical, and creative thinking. It is utilised to 'think outside the box' in a creative process. The mad hatter was applied here as a way of thinking while scanning an article. As a 'scanner', the participants were asked to wear one of the possible hats and use it as a lens, a filter, or a focus to spot signals. The six hat options and the perspective in which one ought to think are based on the colour of the assigned hat:

- Yellow: what can I see that is positive, that speaks to a bright situation?
- Black: what can go wrong here? What from this issue can be dangerous or create difficulty?
- Purple: by being your inner child, what do you see through these eyes?
- Green: how does nature look in this context? Can this hint toward environmental balance?
- Red: how does this piece make you feel? How would this make other people feel?

White: does this piece of information have a neutral perspective on the issue? Is this telling me facts and numbers?

At the start of the session, I explained the game and assigned a hat to each participant. All hats were allocated since we had more than six DSME participants during the session. Ideally, each individual would practice this method by wearing a different hat each time a scanning activity takes place while trying to avoid the hat that matches more with the personality of the participant using it, trying to overcome any bias and assumptions, as organisations must explore different pathways in the future. (e.g. if the person is usually

very positive, try not using the yellow hat as this person tends to consume more of this type of information).

To practice this method, I asked participants to look for an article, or a group of articles, searching for the focal issue ‘how do we build an organisation that survives in the long term, by 2030 in the circular economy’. (See Mad Hatter Mural board in Figure 25 below for the completed exercise). The link for full access to this Mural is available in the appendix.

Based on the article and the given hat, each participant was asked to write down on a Post-it their insights based on their hat perspective. The articles could be searched for anywhere on the internet or using Factr, and they could be from any industry. The goal was to find at least three articles per participant and collect at least six signals during this activity. After explaining the activity, I dedicated five minutes to answering questions, but all participants found it clear what to do. Therefore, I gave the DSME team 20 minutes for this activity. When this time ended, each participant shared what their articles were about and explained the signals they found.

It was noteworthy that using the black hat (what can go wrong here) proved to be an insightful hat. The participant wearing this hat was the most fruitful in analysing a current project for the DSME on how to source raw materials. As this participant was asked to use a critical perspective, he could signal what could be dangerous or create difficulties for the DSME supply chain. This participant mentioned:

“so the article is about a company that wants to invest in building a new factory in Serbia, a big chocolate manufacturer. And it's basically about stating facts and the hours invested, the consequences of their financial as well. But I had to be negative. So basically, the way I understood it because I had to be critical, so I talked about the dependence on other parties for raw materials, procurement. So if now, let's say in the future, we would use this company that have waste streams and turn these into panels, then potentially we will be dependent on them. That's an assumption. Dependence on raw materials imported from other countries, as for example cocoa doesn't grow in Europe, so you have to buy it from wherever. So you're dependent on the production. Dependence on natural cycles, of course, the plants so if you have troubles with water and heat and all of that, you might lose everything out of the blue, just like some coffee plants in Brazil lately. So coffee prices are gonna go up, we have to stop. So the next price might vary depending on the provenance or project conjuncture. So basically, if you get raw materials from another body here, potentially cocoa husks, you know, prices can change

because maybe the company decides that it changes or if there's a scarcity of raw materials the price increases. So yeah, I was very negative on purpose, critical. But uh, it's pretty interesting" (Participant 4).

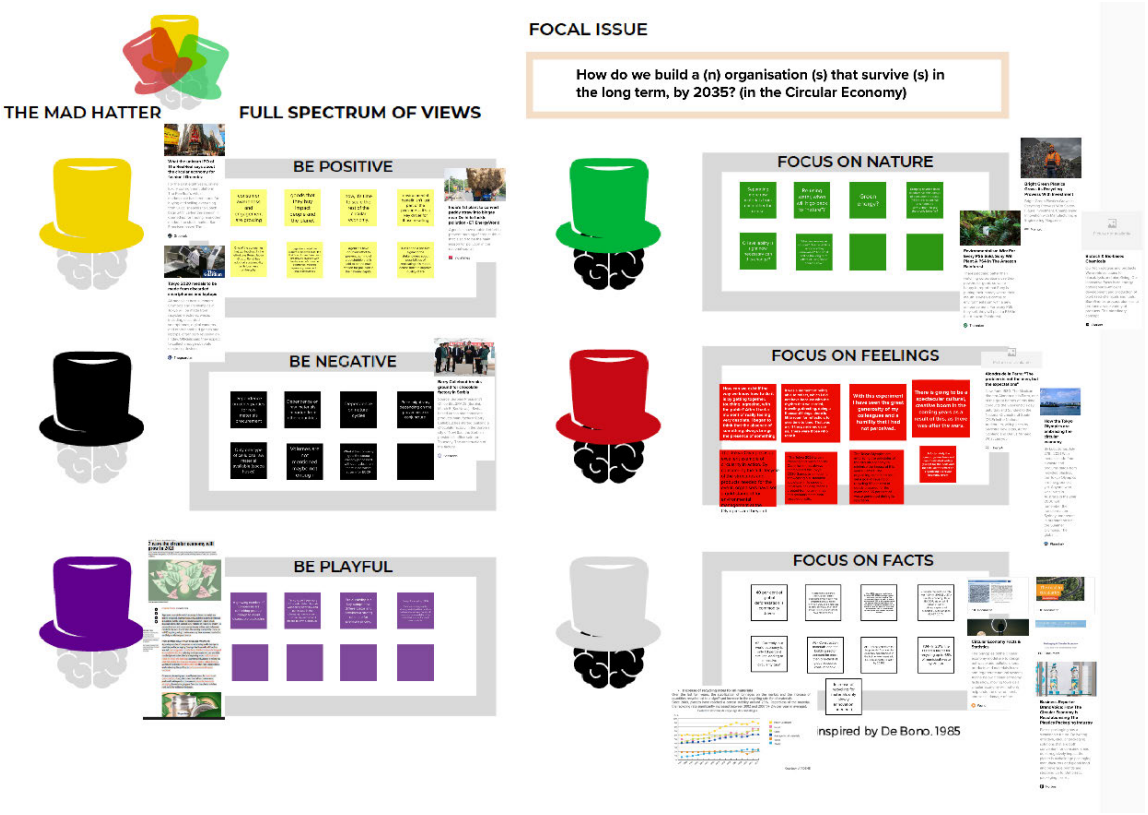

Figure 25. DSME Mad Hatter Mural board completed.

This method also contributed as input for the second part of the session called ‘sense-making and pattern creation’. Therefore, for this second part of the session, I created another Mural in which I included those inputs from the Mad Hatter exercise and the scanned signals from the integral futures exercise performed during the first session.

2) Emerging Issues Analysis. The objective of this session is to combine all scanned signals and put them together in a cluster, looking for patterns or commonalities that, as a road sign, point out a specific future direction for the organisation. Therefore the session objective is to identify those road signals by matching the information gathered during the previous sessions. The only things added to the mural were a group of ‘trend cards’ as inspirational trends already identified by futurist experts.

Within the mural board, each participant had a circle designated to drag the signals considered similar and, therefore, will be part of their created pattern. Next, each participant was asked to go over the Mural board and pick four signals and as many trend cards as needed to create a pattern they thought would go in a particular direction. Lastly, the participants were asked to give this pattern a self-explanatory name of the direction for that future pathway.

At the end of the explanation, I gave five minutes to comment or answer questions about the activity. In this case, the first participant mentioned that this game seemed very futuristic, while a second participant just reiterated what he was asked to do to ensure he understood well enough what was to be done to start doing the exercise. Finally, I gave 20 minutes to complete this activity. The participants created six patterns, as shown in Figure 26 below. The link for full access to this Mural is available in the appendix.

Figure 26. DSME six patterns created.

The description of one of the patterns created by one of the participants was explained as follows:

"for the DSME the upscaling right now requires many things so the DSME as a technology cannot do it alone. We need cross-pollination of different areas working towards the share of information so rather than being linked to the licensing of intellectual property, we need to be more open and focus more on building ecosystems, that's really super important. So that's not red ocean sales anymore, but it's the blue ocean. So we are actually going towards that pattern but not the whole company is aligned on that" (Participant 1).

This pattern was named by the participant 'upscaling required cross-pollination and info-sharing, ecosystem building. The trends used for the participant to create this pattern were: (1) convergence, which refers that the increase of complexity in business, government and society have created new spaces to share practices and tools, fostering an environment of disruption within every discipline, and (2) open-source, in which ownership is being redefined towards openly sharing without expectations of compensation. The main scanned signals used were generosity and humility not perceived before and an individual call to action on the climate crisis.

The DSME managing partner built a like-minded pattern and stated his perception of the DSME's most favourable pathway towards the future categorically:

"I think open-source is very important towards the future. The thought is very simple. It is not realistic that we as the DSME can make alone the change for the world. So what we have to do in the end is also share the technology to enable also others to share" (Managing partner).

The group agreed with his statement and the emerging pattern created by the previous participant. However, most importantly, all the scanned signals supported a DSME transitioning to an open-source movement and establishing the necessary steps to move towards this way of operating by 2030.

As an overall session, I noted that the group was more energised than in the previous scanning sessions. I shared this with the group, and they commented that the work done

in the previous sessions on scanning and the overall CFA session made sense and that all the CFA tools were starting to fit comprehensively.

d) This was the last session on scanning. I gave a quick recap of the previous session since it can be challenging for the participants to remember the details of each of the past sessions, especially when whole weeks passed between sessions.

Following this brief introduction, I continued by asking the participants to take another look on the Mural board at the six patterns created in the previous session and reflect for ten minutes if additional elements could complement any of these patterns and add them if that was the case. I also invited the group to spend another ten minutes looking at the existing signals to see if anything could be incorporated into any of the six patterns.

After 20 minutes, I recapitulated the gathered insights from the last sessions and explained where we were heading during the final minutes. First, I started explaining what we did in the initial scanning session a couple of weeks before, about the scanning they learnt to do looking for trends and signals, to help the DSME understand where the future direction may go for them and what challenges may be there, and the areas of knowledge that the organisation should be interested in exploring. Then I explained how in the last session, the group learnt to group those trends and signals into patterns, merge them, and even give these patterns a name.

After this brief explanation, I mentioned that the following 40 minutes were dedicated to learning another pattern-making framework. Then, I went back to explain the concept of emerging issues analysis in which, based on the number of people being aware (degree of awareness) of the so-called emerging issue, there are at least four existing categories within the FS discipline: weak signals, emerging issues, trends, and megatrends.

I explained that a weak signal is something that we mostly find in social media or if we look into the current discussions on futures communities or interest groups. Weak signals are just emerging on the horizon and are not yet mainstream. For example, there are not even 100 articles or posts about them in any network yet. Here is where we can find some innovations that people can see but that are hard to detect. Following this, I explained that when you combine multiple weak signals into a direction when for example, multiple articles are going towards the same path, this may become an emerging issue, where scientists start to discuss it, and it is where knowledge on the topic starts to get into the surface.

Continuing to develop these concepts, I explained that trends are pieces of information we can find in magazines, newspapers or journals. Whereas weak signals are rising, trends have existed for quite a long time (X-axis on Figure 20). Lastly, I explained that trends

that have been even longer are called megatrends, but as shown in Figure 18, not all trends merge into megatrends. Megatrends usually have an observable direction, such as urbanisation and digitalisation, which governmental institutions use a lot in an extensive framing, and in terms of awareness, they are always on the global level.

At the end of this conceptual explanation, we ran another exercise to put these concepts into practice. For this, we used all the previously gathered information (scanned signal, trends, signals, six patterns, and all scanned articles uploaded in Factr) and created a 'pool of signals'.

We started by analysing each of the six patterns created while trying to answer the following questions for each pattern:

On weak signals:

- What is novel and surprising? (any observation which is amusing, ridiculous or annoying)
- What is increasing or decreasing? (any observation which tells about change and makes sense to you)

On drivers:

- What are the issues which may start emerging? (a push or potential seeds of change)
- What is needed and, therefore, can be expected? (a pull or demand of change)

On trends:

- What slows down or prevents the emerging change? (blockers of change)
- What are observable megatrends? (Inevitable large change processes).

The completed exercise is shown below in Figure 27. The link for full access to this Mural is available in the appendix.

Figure 27. Segmentation of the six patterns created.

It took some time for the participants to fill in the blanks as it needed to be understood entirely. This required my support as a facilitator, especially in guiding them to locate the patterns. Nevertheless, the activity generated a positive discussion because, at first, there was no consensus on where to locate a pattern, for example, if a pattern should go to a trend that is blocking change or creating an inevitable large change process. An example of these discussions between two participants on where to place sustainable production and consumption was:

Participant 6: "Sustainable production and consumption would then maybe be still a weak signal, because we don't know if it's increasing or decreasing"

Participant 5: "It is weak? I mean, what I think about it is like getting more vegan and vegetarian options, and that's actually a big trend right now"

Participant 6: "I wouldn't put it as a full trend yet. It's more like a building bubble. In Berlin they say everything is vegan. Everything has a sustainable approach, but if I go where I am from, which is an industrial area in southern Germany, where they still have coal mining, there you find 10 restaurants, with not even a vegetarian option on it. So I think there is some shift in the young generations, but if I see the 50's and 60's years generations I think the sustainable production and consumption mindset is not yet there"

Another rich discussion between four participants focused on where to position the pattern 'DSME as a CE enabler'. A discussion to agree on this was the following:

Facilitator: *as one of the patterns, we have the DSME as a CE enabler. Or in more general, we could see there will be in general, more companies doing CE or enabling other companies to do CE. Why do you think is this? And keep in mind that you can also replace the DSME by other companies as well. Are there many CE enablers in the market at the moment?*

Participant 3: *Not that I know of. I would still say novel and surprising actually. Maybe increasing as with the trends we've seen last year, and the popularity we've gained.*

Participant 2: *I think it's a bit of a driver.*

Participant 3: *yeah, but isn't it a bit too soon for that? We've not proven scalability that well yet. Right?*

Participant 2: *Well, I think we'll probably, you know, we are hopeful.*

Participant 3: *That's right. But that's why I'm being sceptical.*

Lastly, there was another discussion on the pattern ‘only by sharing the world can really improve’. It is worth sharing here as it touched upon a relevant topic for the DSME regarding its technology.

Facilitator: *Where would you place this pattern?*

Participant 3: *I want to elaborate on this pattern. It’s of course great if you start a circular supply chain or create circular products or become more sustainable. But you won't motivate anyone if you don't share. You won't. Your image won't improve and improving your image is a large drive for companies. It's. It breeds competitiveness between them. So I agree that only by sharing the world can really improve.*

Participant 6: *I think you did not join the previous session in which the Managing partner (who created this pattern) explained where this pattern came from, and it was regarding intellectual property. That an emerging trend was about sharing and being open source rather than protecting your technology, or your intellectual property. I think this is a good topic for discussion. Where should we place this pattern?*

Participant 5: *I will put it top right, because to me, it is quite a weak signal. I don’t see a lot of companies or people out there doing it, but still makes sense to me.*

Participant 7: *You see a lot of sharing economy across consumers. Ride sharing, car sharing, Airbnb, but there’s not knowledge sharing that much across organisations yet.*

Participant 6: *I agree with you. In a current project we did, both of the organisations we worked with, which are direct competitors, they wanted the exclusivity of the innovation. They did not say ‘okay, let’s both share this innovation for the benefit of the whole industry and its consumers’.*

Participant 2: *Because if it's like potential seeds of change, I think that's how we should look at it. So sure, good to be you know, there's part of it that it could be driver and, and on the other hand, you know, it is increasing. So,, it is kind of how you do want to look at it maybe, you know, I don't know what others feel about it.*

Participant 6: *If you analyse globally the Ellen MacArthur Foundation has about 100 organisations that are part of the CE movement. Actually, you see many more SMEs also trying to make a transition. So, I will put it between the increasing or the start emerging.*

Participant 5: *So how are we reading this post? As a DSME? As any company that does enable CE? Or is it specifically our DSME as a CE enabler? Because there are three different answers then.*

Facilitator: *Well, if you put the DSME, you would need to see that from an external perspective. Do others see the DSME as CE enabler? And if you would replace the DSME by organisations, or sustainability organisation as a CE enabler, do you see other organisations as the DSME out there? Doing this already? Normally we should be looking as an external view. So this is why I say I would actually replace this with other organisations because for you would be interesting to see. Because you should look and start more searching, are there other organisations doing similar things as you currently do? And how many there are emerging. If you put as an emerging pattern the DSME as a CE enabler maybe this is already your preferred future. But what if externally, organisations already look at you this way? And if not, then it might be worth first to see and to look, are there any other organisations out there like this, already as CE enablers? And how can you be seen similarly like them?*

The results of this last scanning activity are shown below in Table 3. The created patterns are in italics:

Emerging issue	What is novel and surprising?	What is increasing or decreasing?
Weak signals	-Ignoring the plastic pollution problem. -We will see more established brands wondering how they can participate in the changing norms around membership and what it means to own a product.	-A growing number of companies are rethinking product design to avoid disposable packaging. -Sustainable substitutes are becoming the key focus for investments. *-Only by sharing the world can really improve.* *-Organisations as a CE enabler.*
Drivers	**What are the issues which may start emerging?**	**What is needed and, therefore, can be expected?**
	-Transition towards a more responsible and sustainable form of consumption. -Society demands cleaner solutions. -The younger generations are getting proactively involved.	*-New logistics/supply chains and production cycles for more sustainable societies.* -Zero waste movement. -Reject single-use plastics. -Reduce fossil fuel dependence. -Demand global systemic shift.
Trends	**What slows down or prevents the emerging change?**	**What are observable megatrends?**
	-Blocked by large organisations. *-Upscaling requires cross-pollination and info sharing, ecosystems building.* *-Pricing and market focus are preventing sustainable production/consumption* -Mistrust in governments and politicians	-Separating more raw materials from each other for re-use. -Increase of recycling rates for all materials. -Use of green energy. -Circular Economy.
	Disruptors	**Promotors**

Table 3. Results of scanning activities.

Reflecting on how we closed the scanning activities with this exercise and analysing the participants' verbal and non-verbal communication, I think this activity was incredibly exhausting and demanding. Based on this learning, I think this exercise could be better applied after some training as a periodically internal activity for the DSME.

Furthermore, if I implement the CFA a second time, I would bring most of the scanning findings back to a core team while doing a pre-session analysis. I would have created some patterns based on the findings, and then I would have a conversation with the whole organisation to agree on where and what it is more recommended to scan and where the organisation should also add a few more things after further scanning.

In summary, while this activity is necessarily beneficial for the organisation, changes are needed to the process followed in how it is presented and implemented. Furthermore, suggested improvements to the CFA are on deciding previous to its implementation, the activities that need direct interaction with the SMEs and the activities, information or actions that could take place without the organisation's participation. Additionally, it could be that just having one or two people from within the organisation participate actively with the facilitator in those activities previous to the workshop exercises.

Alternatively, as the scanning activities outputs are inputs for the Futures Janus cone and the Futures Wheel methods activities, a task from the facilitator could be to give created patterns to the organisation and that the participants run the Futures wheel exercise and analyse the impacts of these patterns following the steps of this method.

In summary, all the scanning exercises were needed during the CFA implementation process because the purpose was to test it and develop futures literacy in the participants. However, if the CFA implementation would take place in an organisation with these skills already developed, the facilitator could speed up the process by doing previous scanning work himself.

3) Sense-making. This activity proved to be the result of all the hard work done during the scanning activities. Patterns create emerging issues, and those emerging issues can become megatrends, or in some cases, emerging issues stay as they are or fade away, or they can become significant trends for a specific industry. For this reason, it is essential to look at the patterns created in the previous sessions and analyse them as emerging issues using an uncertainty/impact matrix. By using this matrix, the participants see more comprehensively the potential impact of these patterns. This matrix works by placing all of the emerging issues captured in the previous sessions within the uncertainty/impact matrix, based on how low or high each emerging issue is in potential impact and

uncertainty. The participants' discussion is essential when filling this matrix as it needs to be an agreement on where to place the emerging issues. Figure 28 shows how the participants placed each of them (the size of each bubble is irrelevant). We also used the outputs or results from the present and future Butterfly diagram as input for this activity.

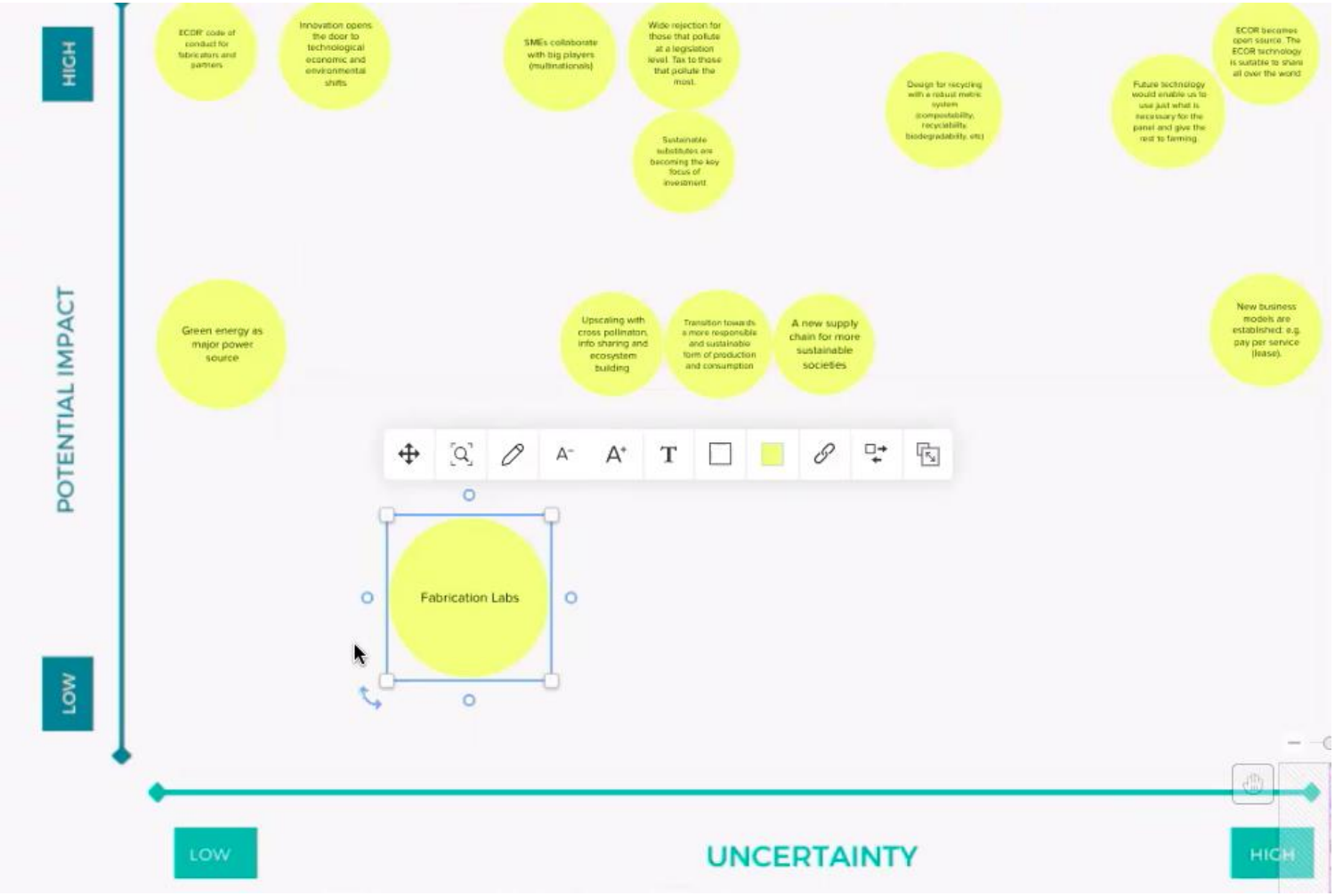

Figure 28. DSME Potential Impact /Uncertainty matrix.

When the participants finalised placing all the emerging issues into the matrix (as observed in Figure 26 above), it was still necessary to communicate how these will most likely impact the DSME industry and guide the organisation to categorise and address each issue effectively. We used a complementary layer to the Potential Impact/Uncertainty matrix to address these needs. This layer has four categories: predetermined elements, trends, critical uncertainties, and secondary elements (as shown in Figure 29 below).

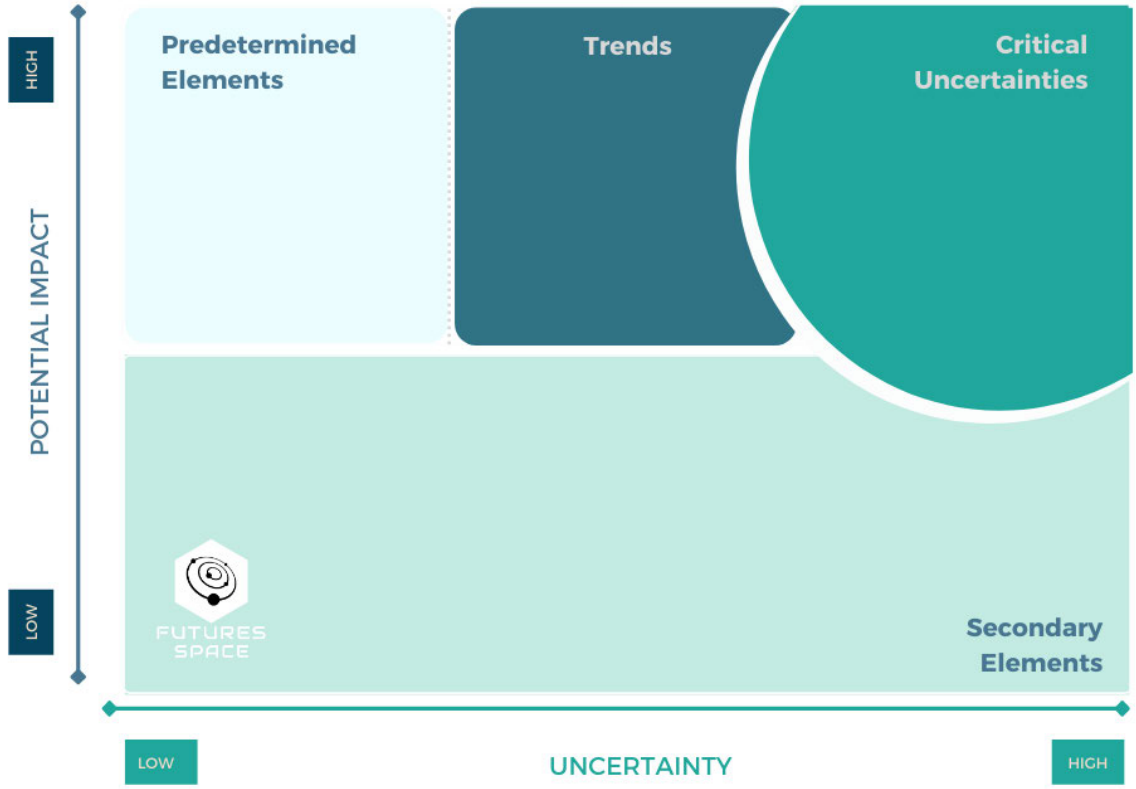

Figure 29. Impact Uncertainty Matrix layer.
(Futures Space, 2022).

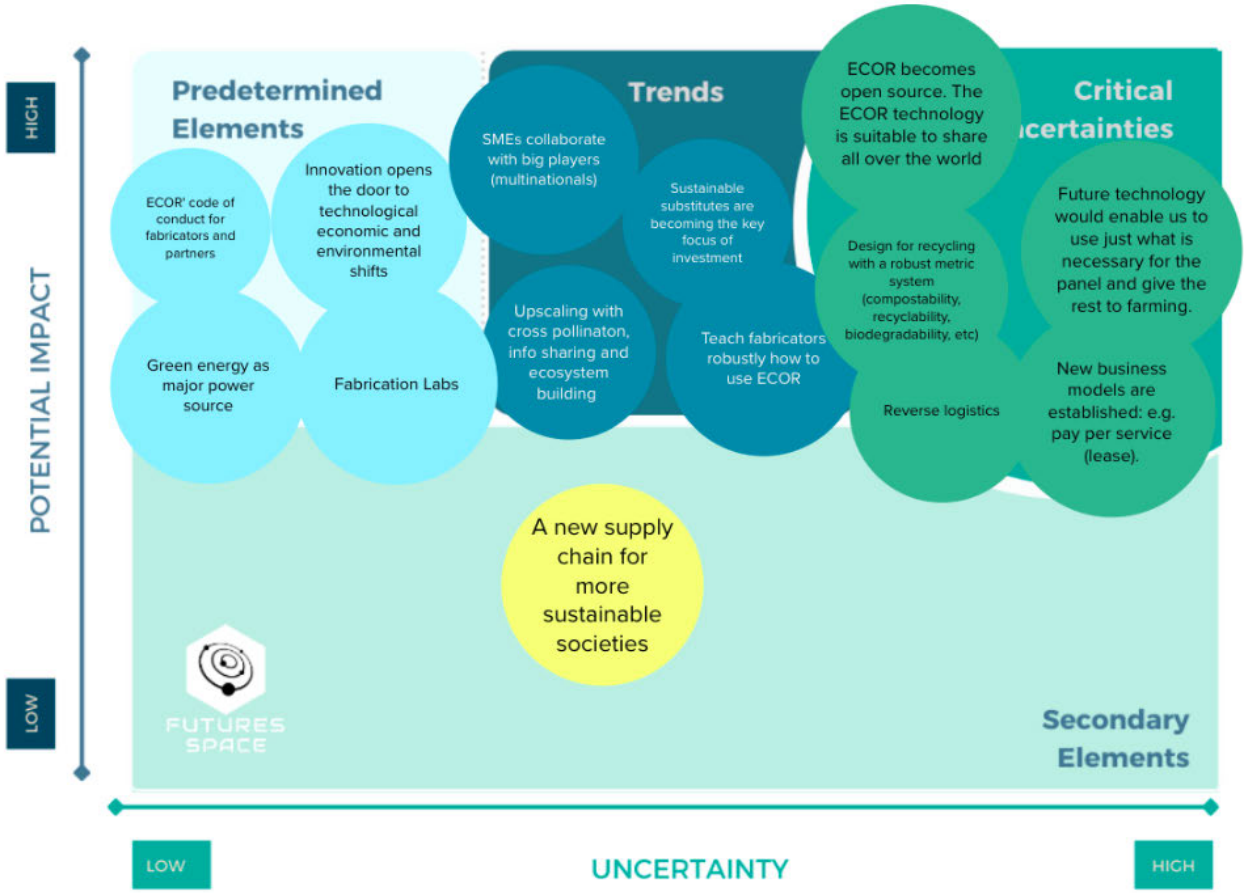

Figure 30. Impact Uncertainty Matrix completed by DSME.

After merging this layer with the first matrix, each emerging issue bubble fitted into one of the four categorisations, as observed above in Figure 30.

Moving from left to right, as can be observed, four patterns belong to the predetermined elements category. These are things that everybody is aware are happening or will happen, and we will use these four emerging trends later in the scenario-building activity as guiding patterns. Another four patterns belong to the trends category, and these tell the organisation that they are not new and surprising but still significant and impactful for the DSME industry. In the third category, we can observe another five patterns. This category is called critical uncertainties because we are not sure if they will happen, but if they happen, they will significantly impact and create major changes in the DSME industry. Lastly, only one pattern can be observed in the secondary elements category. Patterns in this category are not impactful, so the organisation does not need to act against them in response.

In Figure 28, we can see all of the bubbles within one of the four categories each, but it is essential to clarify that there were patterns initially at the intersection of two categories during the session. For this reason, at the end of the session, the participants spent some time deciding where these patterns should move. The final results are shown below in Table 4:

Matrix category	Pattern (s)
Predetermined elements	Code of conduct for fabricators and partners Innovation opens the door to technological, economic and environmental shifts Green energy is a significant power source Fabrication Labs
Trends	SMEs collaborate with big players (multinationals) Sustainable substitutes are becoming the key focus of investment Upscaling with cross-pollination, info sharing and ecosystems building Teach fabricators robustly how to use DSME material
Critical Uncertainties	The DSME becomes open-source. The technology is suitable to share all over the world Design for recycling with a robust metric system (recyclability, biodegradability, etc.,) Reverse logistics New business models are established (e.g. pay per service) Future technology would enable us to use just what is necessary for the DSME panels and give the rest for farming.
Secondary elements	A new supply chain for more sustainable societies

Table 4. DSME results from Impact Uncertainty Matrix.

4) Butterfly Diagram [future]. As in the Mapping phase, I asked the group to complete the Butterfly diagram specifying their vision for the company in each section, with a timeframe to reach such a future vision. The reason to put the scanning sessions before this activity is because the scanned signals could be used as insights to complete this diagram. Because this exercise must be completed based on how the participants envision the DSME performing in the future, participants must justify their answers.

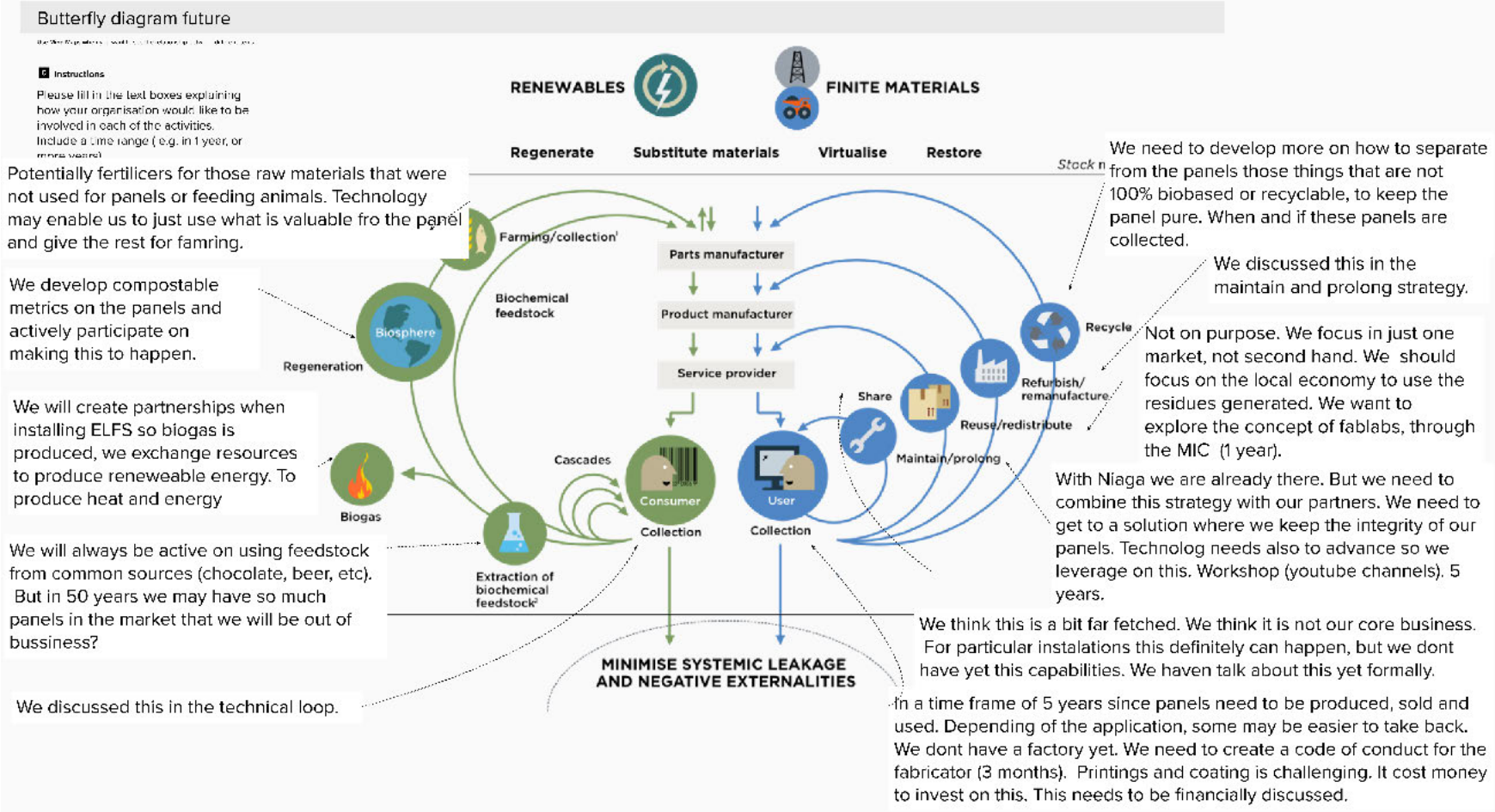

Figure 31. Completed Butterfly [future] diagram.

As shown in Figure 31, most participants envisioned that the selected future actions would take place in the next five years. Therefore, the participants initially could complete this exercise without significant challenges. However, during the session, the team struggled to map future actions when evaluating time and money constraints for the DSME. For example, when discussing the possibility of the DSME putting a reverse logistics system in place, where the organisation takes back panels from its users, one of the participants mentioned:

Participant 2: *well, I'm thinking you know that it's good to talk about if it's possible, but then of course the other aspect is how much time and money is to add so I think you also need to take that into consideration and in the business plan kind of like well if we want to have that option, how does it offset for the rest of course, and also what in the end we get as an end result. Just like Participant 5 said we can't disintegrate it (a panel), but that could be really small particles and molecules in there. So what is the quality then? So I guess there's still a lot of aspects that needs to be considered and to see how viable that is I guess.*

When we moved on to the second technical loop, a sharing business model, another participant gave valuable insight into how dedicated or proactive the DSME was concerning progress on the CE. She commented:

Participant 5: *if I put in my two cents here, for certain business of course where we will sell or rent panels, I think it could be viable (a pay per service business model). If there is a piece manufactured with our panels that comes by every month or every three months, and they don't just want to buy the panels, because then they also have to store them, maybe they don't have to storage, then definitely, that's something that we or at least a certain dedicated aspect of our company that we do not yet have could do. But I'm not sure if it's something that we will already be doing in 2030. Just because we haven't talked about it as a company yet. I've never heard it in the hallways yet, but doesn't mean it wouldn't happen.*

Based on these comments from the participants, I wanted to understand if they thought the industry they are part of was pushing them to innovate by implementing CE business models or not. I specifically asked:

Facilitator: *Do you see also the market that you are pushing the DSME towards CE business models, or the industry, or another industry where gradually more organisations are doing this? So therefore you need also to react? Or do you see also these very far-fetched for competitors and another industries?*

To this question, one of the participants responded:

Participant 1: *I think we need to react. And the reason why for me this question is tricky is because we haven't defined, we haven't talked about this within the company. This is difficult to think about, because it implies the ownership of the panels, if we decide that we are going to always own this panel, even when they're used then it might be very straightforward. Yes, we collect them, because we want to ensure the quality for recycling. Yes, we, we want to implement the sharing model but that means that we need to add this particular department then within the DSME. It's opening up more like management strategic decisions.*

Based on these insights, it made more evident to me that there was no consistency in the DSME ambitions regarding being a 'circular economy enabler' and the actions that were taking place or planning to take place to enable other organisations to reach that transition to circularity. Furthermore, in all the strategies of the technical loop (recycling, refurbishing, maintaining, sharing, and collecting), the DSME could not prove they were operating in line with the CE principles and these circular strategies. Moreover, based on the inputs from the participants, there were no plans to make progress. Lastly, the DSME statements on the Butterfly diagram [present] were not backed up by certifications, endorsements or other evidence. A summary of the present work on CE strategies and the potential actions in the next five years are included in Tables 5 and 6 below:

Technical loop CE strategy	DSME present	DSME future
Collection	During a project, liner waste was used to make panels. These panels were used for an exhibition. After the exhibition, the panels were put back into the DSME warehouse. Then the same panels were used for another event and went back into the warehouse.	In a timeframe of 5 years, depending on the application, some panels may be easier to take back. The DSME will create a code of conduct for the fabricators. This needs to be financially discussed.
Share	No action.	The DSME thinks this is a bit far-fetched and is not our core business. The DSME does not have these capabilities yet, and they have not discussed this formally.
Maintain / Prolong	For internal applications within the DSME office, there is testing on this. For example, damaged panels are sanded to prolong their life.	The DSME needs to combine this strategy with our partners. They also have to get a solution where they keep the integrity of their panels. The technology also needs to advance, so they leverage this. Maybe this will take place in five years.
Reuse/ Redistribute	No action is taking place.	The DSME does not do this on purpose as they just focus on one market, not on the second hand. They said they should focus on the local economy to use the residues generated. They want to explore the concept of fabrication laboratories. This should take place in one more year.

Refurbish / Remanufacture	No action is taking place.	The DSME discussed this in the maintain and prolong strategy loop. Similarly, the technology also needs to advance to leverage this. Maybe this will take place in 5 years.
Recycle	The DSME claims panels are 100% recycled and 100% recyclable.	The DSME needs to advance more on how to separate from the panel those things that are not 100% biobased or recyclable to keep the panel pure when and if these panels start to be collected.

Table 5. Butterfly diagram present and future (technical loop).

Biological loop CE strategy	**DSME present**	**DSME future**
Farming / Collection	The DSME claims panels can disintegrate in the water without harming nature.	In the next five years, technology may enable the DSME to use just what is valuable for the panel and give the rest to farming.
Regeneration	No action is taking place, but the DSME claims it produces panels with raw material that otherwise will damage nature. The DSM also claims the panels can be food for the soil and that store carbon.	The DSME will develop compostable metrics on the panels and actively participate in making this action (regeneration) happen.
Biogas	No action is taking place.	The DSME will create partnerships when installing manufacturing facilities for producing biogas. We will exchange resources to produce and use renewable energy.

Extraction of biochemical feedstock	No action is taking place.	The DSME will continue and always actively use feedstock from abundant sources.
Collection	No action is taking place to take back the panels. On raw materials to make the panels, the DSME collects some of these residues from their customers.	This needs to be financially discussed and evaluated.

Table 6. Butterfly diagram present and future (biological loop).

5) Futures Janus cone. The participants already had experience completing the Janus cone but focused on past events. To start completing this exercise focused on the future, we used inputs from the previous activities, especially the scanned signals, the patterns created, the futures Butterfly diagram, and the results of the Impact Uncertainty Matrix. The first part of the activity was to identify what pieces of information from these sources the participants could use to fill in the Janus cone and place it in the years the participants believe it will happen, according to the established timeline on the cone.

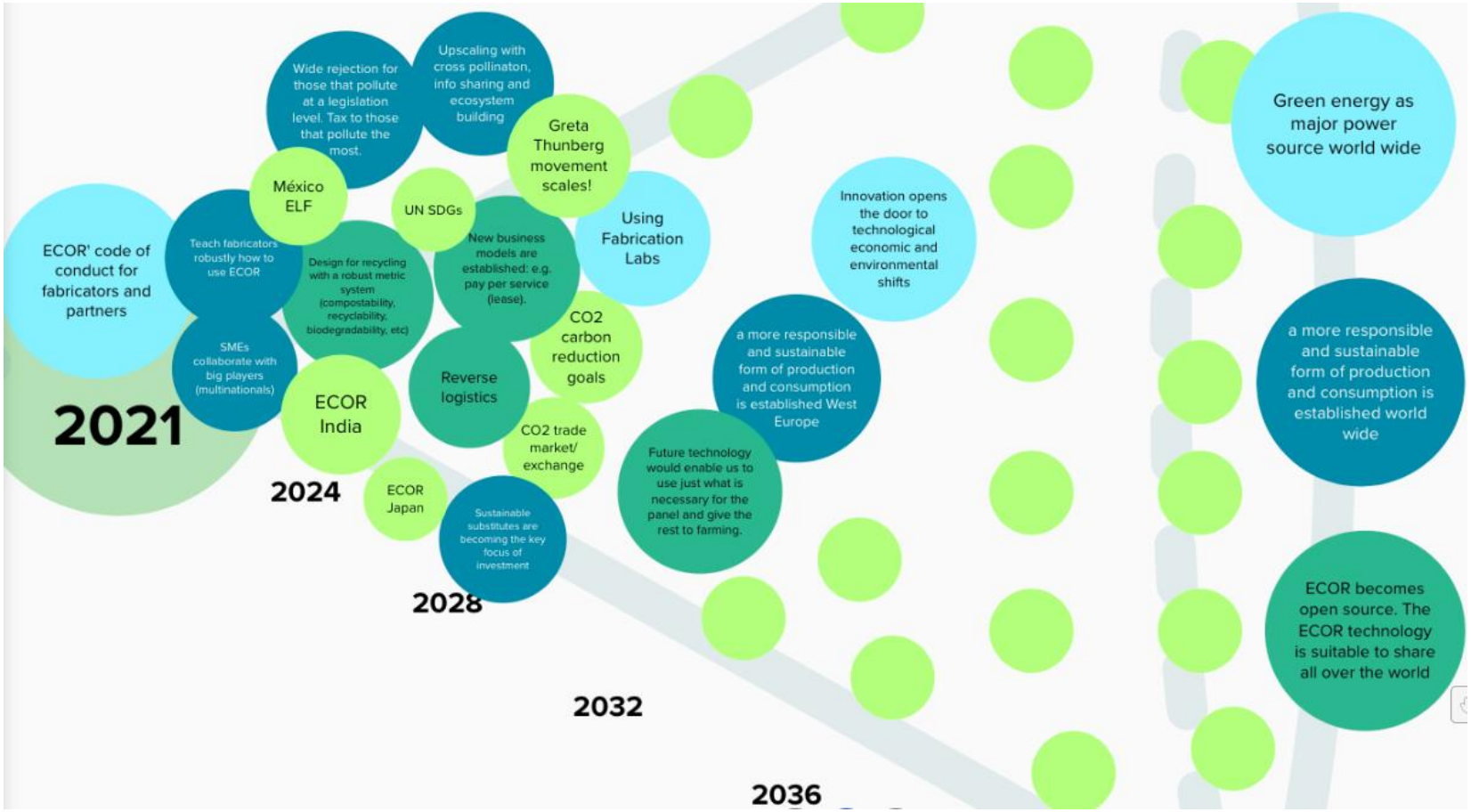

Figure 32. Futures Janus cone completed by the DSME participants.

This activity generated a vibrant discussion as the participants needed to agree on when each of the specific actions of the DSME will take place. However, there were times when participants did not reach a consensus, as they had contrasting opinions on some trends that needed to be placed in a specific year. The most relevant pieces of the discussions were the following:

On **COVID-19,** when this pandemic was placed in 2024:

Participant 4: in 2024? *This is in three years! (Laughs), stop it.*

Participant 5: *we will have this for the rest of our lives (sarcasm)*

Participant 4: *no way, if COVID-19 is still around us in 2024 then that's political stuff and no actually something else. No way. Three years guys?*

Participant 6: *I think it will be with us, like flu is with us.*

Participant 4: *yeah, but not like a crisis, not like something that will shape the DSME future. It will just become a normal disease. We are talking here about events that have influence.*

Facilitator: *we could also reframe it, not just as COVID-19 but the remnants of COVID-19.*

Participant 4: *I understand, but things are kind of normal here in The Netherlands. Ok, maybe, but the effects are not going to be as high as last year, I hope (laughs).*

Participant 6: *I know, but the effects are still here. For example, we need to show the vaccination status every time we fly to other countries.*

Facilitator: *and I think there are other things that we don't see like the effects in people's mental health. For example long COVID-19 effects affecting the work environment.*

Participant 4: *yes, if you take all of these elements into account yeah. That might have some effects.*

On the opening of several **DSME manufacturing facilities between 2021 and 2024:**

Participant 6: *what about the opening of the manufacturing facility in India? Do you see that happening?*

Participant 2 and Participant 5: *yes*

Participant 6: *ok, let me write that down*

Facilitator: *Oh? It did not happen in 2018?*

Participant 5: *we just started it.*

Participant 6: *the project was highly affected because of COVID-19. Several people from India who were involved in the project passed away and funding became restricted*.

Participant 6: *maybe we can also put the manufacturing facility in Mexico around 2024?*

Participant 2: *yes, ok. Also one manufacturing facility in Singapore.*

Participant 5: *but is it our colleague based in Singapore speaking of a manufacturing facility in Singapore? Because I have not heard anything about that.*

Participant 2: *no, but I think that is the aim. Maybe is not 2024.*

Participant 6: *but you are right, most of the places where we have satellite offices aim to become sooner or later in manufacturing facilities isn't?*

Participant 5: *why?*

Participant 6: *because that is what we are trying to do, to build the ecosystems, to have projects and then to produce the panels locally, rather than transporting them from Serbia or The Netherlands.*

Participant 2: *exactly*

Participant 5: *yeah, but don't we want to do it at a place where there is actually raw material that we can use?*

Participant 6: *yes, that's true*.

Participant 5: *I mean it does not have to come from The Netherlands anymore in 2024, but maybe from Japan, or China, from a manufacturing facility that is nearby. That is what I am trying to say.*

Participant 6: *I think the Japan manufacturing facility makes more sense than the one in Singapore, because the one in Japan would produce panels made from abundant rice straw.*

Participant 2: *yes, let's write down DSME manufacturing facility Japan because we are already doing R&D and prototyping projects in Japan. It is more logical.*

A complete list of the events happening in the future according to the DSME participants using the Futures Janus cone is shown in Table 7 below:

Year	Events taking place
2021-2022	-DSME code of conduct for fabricators and partners. -Teach fabricators how to use DSME material. -SMEs collaborate with big players (multinationals).
2022-2024	-Mexico, India and Japan manufacturing facilities open, -Design for recycling with a robust metric system. -Upscaling with cross-pollination, info sharing and ecosystem building.
2025-2028	-Greta Thunberg's movement scales up. -DSME starts using fabrication labs. -DSME is actively in the CO_2 market exchange. -Sustainable substitutes are becoming the key focus for investment.
2029-2032	-Innovation opens the door to technological, economic, and environmental advancements. -A more responsible and sustainable form of production and consumption is established in West Europe.

	-Future technology would enable us to use just what is necessary for the DSME panels and we would be able to give the rest for farming (e.g. proteins from fibres).
2033-2044	-Green energy as a major power source worldwide. -Mars or other planets become populated. -A more responsible and sustainable form of production and consumption is established in worldwide. -The DSME becomes open-source. The DSME technology is shared all over the world for a positive impact.

Table 7. DSME future events 2021-2044.

At the end of the session, I did a summary around the inputs of the session, namely a recapitulation of the events mapped, as shown in Table 7 above, and also emphasised that this was the first session where the DSME participants have identified that most of the mapped events will happen first in western Europe before they also spread out globally. This session closed phase three of the CFA approach.

5.2.4 Cruising

1) Futures Wheel. I used this FS method to discover the implication of trends and patterns identified by the DSME participants in the previous stage. For this session, I used a Futures wheel updated technique that includes an additional dimension called the Point of Impact (The Futures School, 2022). I did this to ensure the mapping of a broad and more robust set of implications, which I believed the conventional Futures wheel could not provide. This session lasted 60 minutes, and I started by explaining the steps to complete the activity. Figure 33 below contains the point of impact wheel completed by the DSME participants using the corresponding Mural board (the link for full access to this Mural is available in the appendix).

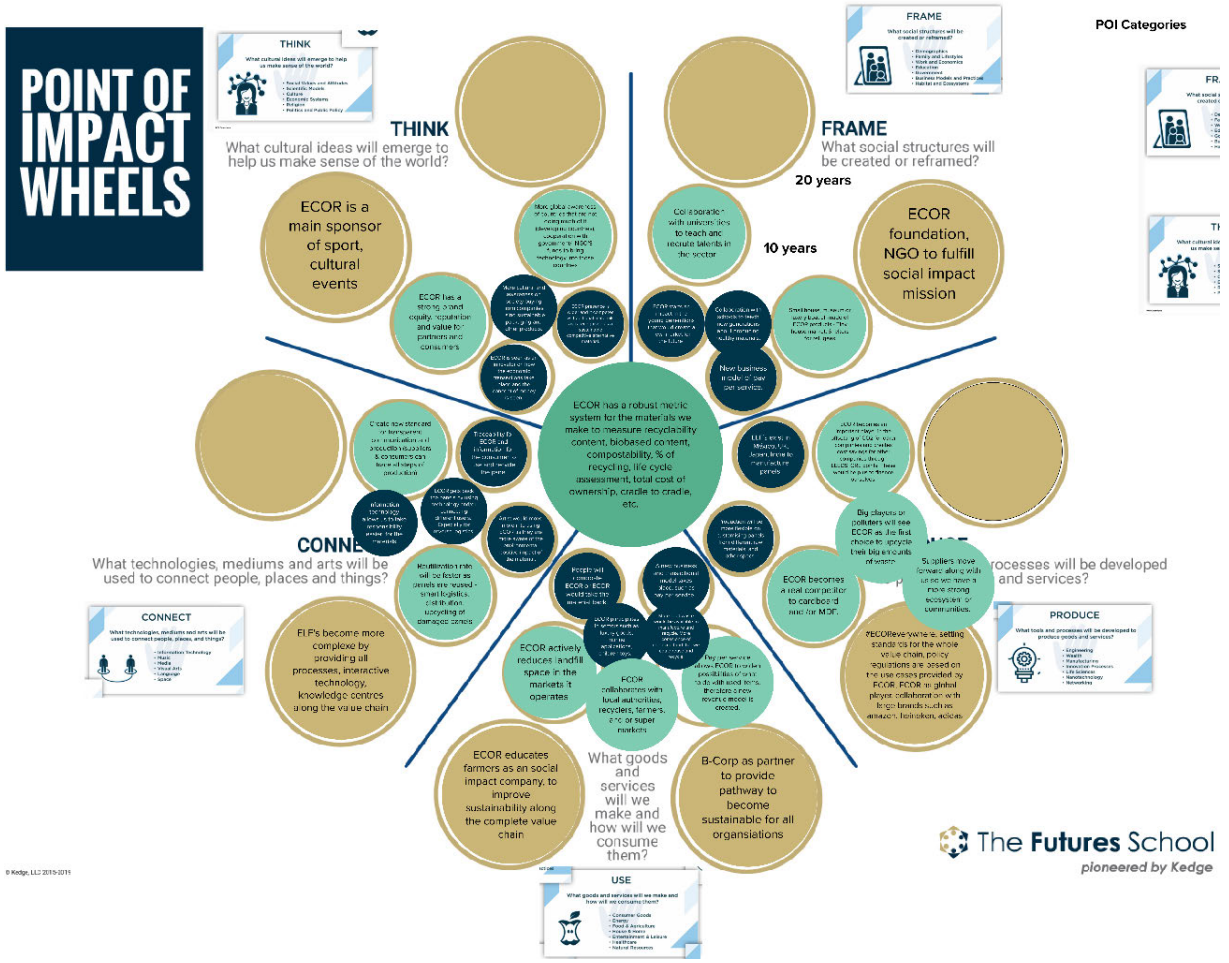

Figure 33. Point of impact Futures wheel completed.

As I explained during the session, the first step to start using the method was to select the pattern or trend the DSME team wanted to scrutinise. Therefore, before the session, I asked the participants for their pattern selection. As the selected topic was unanimous, I did not need to create a voting session (which I recommend in case there is no consensus).

The participants selected one of the patterns created during the previous stage: 'the DSME has a robust metric system for the panels they made to measure recyclability and biobased content, compostability, % of recycling, life cycle assessment, total cost of ownership, cradle to cradle, etc.,' (this was placed at the centre of the wheel).

Immediately after this pattern was placed, I asked the participants to assume that this pattern had already taken place and to think of the possible implications of that pattern in the next five years (subsequent group of circles in dark green colour) called first order of implications. The same logic continued with the second-order of implications (in mint colour) but based on a timeframe of ten years implications. Lastly, the third-order referred to the expected effects of the selected pattern and first and second-order implications in 20 years.

The participants started to fill in the blanks. I only assisted the team in framing the implications, insisting on being as specific as possible, not giving over importance, or neglecting any of the points of impact categories.

As can be observed in Figure 31, there are five segments in which the point of impact wheel divides the implications of a pattern: (i) frame, which focuses on what social structures will be created (e.g. demographics, lifestyles, habitat, and ecosystems), (ii) think, focuses on what cultural ideas will emerge to help us make sense of the world (e.g. public policy, religion, scientific models), (iii) connect, or what technologies, mediums and arts will be used to connect people, places, and things (e.g. music, media, visual arts, language), (iv) produce, or what tools and processes will be developed to produce goods and services (e.g. manufacturing, engineering, nanotechnology), (v) use, or what goods and services will we make and how will we consume them (e.g. consumer good, energy, entertainment, healthcare). In Table 8, I enlisted the completed exercise:

Point of impact category	1st order implication	2nd order implication	3rd order implication
Frame	The DSME started to impact young generations that would create a new market for the future. Collaboration with schools to teach new generations about producing and consuming healthy materials. New business model of pay per service started.	Collaboration with universities to teach and hire talent. Small houses, shelters, museums or yachts are made of DSME material.	DSME foundation or NGO to fulfil social impact mission.
Think	The DSME presence is wider and competes actively against traditional materials, as it is recognised as a sustainable, competitive, alternative material. The DSME is an innovator in how economic transactions	More global awareness of countries that are not doing much on sustainability. There are several governmental funds to bring clean technology into those countries. The DSME has substantial brand equity, reputation,	The DSME is a main sponsor of cultural and sports events.

	take place and how the concept of money is seen. More aware society buying from companies that use sustainable packaging.	and value for commercial partners and consumers.	
Connect	Traceability for the DSME panels and information for the consumer to use and recycle the panel. Information technology allows the DSME to take full responsibility for the panels. The DSME gets back the panels using advanced technology or connecting different users. Especially for reverse logistics.	Create new standards for clearer communication and production (suppliers and consumers can trace all the steps and details on production). The reutilisation rate is faster now that panels are being reused. The DSME is also upcycling used panels.	The DSME manufacturing facilities became more complex by providing transparency on all processes. Its technology is interactive, and knowledge centres are in place near the value chain.

	Artists would use DSME panels as they are more aware of the positive environmental impact of the material.		
Produce	Manufacturing facilities are open in Mexico, the United Kingdom, Japan, and India.	The DSME becomes essential in offsetting CO_2 for other companies and creates cost savings through certification points. In addition, these actions would help the DSME to finance itself.	The DSME is everywhere. It is setting standards for the whole value chain. Policy regulations are based on the use cases the DSME provides.
	Production of customised panels is more flexible in terms of used raw materials and specs.	ECOR has become a serious competitor to cardboard, HDF, and MDF. Multinationals see the DSME as the first choice to upcycle their processed residues. The DSME has a rich network and solid ecosystem of suppliers, fabricators, customers and partners.	The DSME, a global player, is a panels supplier to big corporations such as Amazon, Adidas, Heineken, etc.

Use	Consumers will put DSME panels in compost, or the DSME will take the panels back.	The DSME actively reduces landfill spaces in the market it operates.	As a social impact organisation, the DSME educates farmers to improve their sustainability impact.
	A new and circular business and transactional model is installed in the DSME operations, such as pay per service.	The DSME collaborates more with local authorities, recyclers, farmers, and supermarkets.	The DSME becomes a B-Corporation.
	The DSME is active in luxury goods, yacht applications, and children's toys.	Offering a pay per service model allows the DSME to widen the possibility of what to do with the used panels. A new revenue model is created because of this.	
	More food waste will be available to manufacture panels. In addition, there will be more awareness and consumption of food that could be reused and recycled.		

Table 8. DSME Futures wheel Point of Impact.

The results are contrasting based on the inputs of this session in comparison with the Butterfly diagram [future] inputs from the previous stage. As the Butterfly diagram is CE-related, and the Futures wheel is FS-related, it can be deduced that using a FS method

facilitated envisioning the state they wanted for the DSME in five, ten and twenty years, while the Butterfly diagram did not.

The Point of Impact Futures wheel revealed how the pay-per-service business model is crucial for the DSME future, while it was considered too far-fetched during the Butterfly diagram activity. It could also be that using the point of impact framework contributed to evidence the importance of circular business models as the DSME envisions. However, the Butterfly diagram, as it is not designed to think about and explore the future, was not as helpful as this exercise in offering valuable insights for the subsequent CFA activities.

It is also pertinent to mention that going over the Futures wheel exercise was inspirational for the participants. This can be concluded from the following comments from the participants:

Participant 1: *I don't know if it's in this category, but at least it inspires me when we are having this discussion. So don't you imagine that in 10 years we can have for example a small house made with the DSME panels?*

Participant 2: *many ideas! Amazing!*

Participant 4: *Yeah! I loved Futures wheel because I think it really created some relevant ideas for the organisation. Some goals were a bit idealistic, but I think it really showed what a company could potentially do, where you could end up, and I think we created very good input for the next sessions.*

Lastly, it is important to mention that the CEO did not attend this session, and the participants were notably sharing their insights more proactively and freely than in past activities when the CEO was present.

2) Causal Layered Analysis (CLA) - part 1 (present). The CLA is an FS method to imagine and create preferred futures effectively. Implementing this method helped the DSME participants to identify and analyse different levels of understanding before creating new futures because CLA helps to identify the root cause of a problem by 'peeling' an issue layer by layer to get a deeper understanding of the issue being analysed. In the CFA, the CLA method is divided into two parts. This is the first part, which helped the DSME participants understand the present state of the organisation and shed light on what may be needed to transcend to a preferred future. The steps in the workshop for this session and the most important findings were the following:

As this is the method that perhaps is the most complex to implement and participate in, I needed to make sure more than with other methods, that the instructions were well understood. For this reason, a robust step-by-step introductory section was needed. In this initial stage of the workshop, I explained the four layers of the method. I started by explaining the first layer, 'litany,' where the participants must answer the question 'what are the things that you repeatedly see in the DSME, or constantly repeated statements?' The litany should present an obvious plain issue, as stated in a newspaper's headline.

In a previous task to the session, I preselected as options of litanies seven statements from the CFA previous sessions inputs. The preselected litanies were:

1. The DSME panels are 100% recyclable, recycled, compostable, non-toxic, biodegradable
2. The DSME has developed enough recipes and products that interest the market.
3. Significant cultural and business differences exist between the DSME offices in The Netherlands, the United States and Serbia.
4. The DSME has been on the market for enough time to reach the next level.
5. The DSME is an understaffed organisation.
6. The DSME is not very good at order fulfilment.
7. The DSME team is highly committed to reaching its vision.

To choose a litany to work with, I asked the participants if they believed one of these seven was particularly relevant or if they predominantly agreed with one more than the others.

While a rich discussion progressed to pick one of the litanies, the litany that got most of the votes was number three: 'there are significant cultural and business differences between the DSME offices in The Netherlands, United States and Serbia'. The main reason behind choosing this litany was because the participants believed this was also causing the other litanies to exist. One of the participants commented:

Participant 3: *I think we are not very good at order fulfilment and that there are significant cultural and business differences, and these two combine very well because not being good at order fulfilment could be a consequence of the cultural and business differences.*

Having the chosen litany defined by the DSME team, I explained the second layer, 'system'. In this layer, the participants ought to answer the question, 'what systems or processes cause the litany to exist or encourage it to increase?' Usually, this layer is evidence of the litany's existing social and systemic causes. These could be social,

technological, economic, environmental or political systemic causes and processes or hierarchies feeding the litany.

When analysing the litany from this second layer, the participants responded that the systemic causes were:

8. Direct communication (NL) vs indirect communication (US and Serbia)
9. Blue ocean strategy (NL) vs red ocean strategy (US and Serbia)
10. Flat (NL) vs vertical hierarchies (US and Serbia)
11. Dutch culture outreach, US imperialist and protectionist, Serbia defensive culture.
12. Short meetings reach conclusions approach (NL) vs the US has a longer decision-making process.

The most descriptive assumptions by the participants around these systemic causes were:

Participant 1: *the red ocean strategy is more typical of the Western American world. And then the blue ocean strategy, which is more typical of sort of, like, ecosystem start-up environment, especially in Scandinavian countries. So that would be for the cultural one.*

Participant 2: *I think the Dutch approach is quite direct, we don't mind. You know, confronting somebody, well, I think the US and Serbia, they are not. So that means you're either something like, you have a conversation, and then later, maybe you get an email or a manager calls you or comes back to you like, well, what happened?*

Participant 3: *Like when you have a meeting with US, and you make it, you have an agreement, and you've talked for hours about it, and everyone, you know, is in agreement. And then an hour later, you get an email saying 'you know, I think maybe we should change this', instead of moving on to a different subject or something. That's a major cultural difference with directness and 'okay, we've decided this, let's move on' like in the Netherlands.*

After completing this second layer, we moved on to discuss the third layer, called 'worldview', in which the participants ought to answer the question 'are there any triggers, events, regional or cultural roots causing the way things are in the organisation?' I developed more on this layer as the team took more time to come up with their answers. Finally, I elaborated more on this layer, explaining that these are the more profound, unconsciously ideologies, biases, traditions or assumptions found in the organisational

DSME culture. After a couple of minutes, the team came up with more than a handful of statements:

1. We really do not know each other cultures
2. There are many unsolved past experiences.
3. The management team is underrepresented by women
4. We are learning the value of equity in terms of time and inputs
5. We are learning to describe our emotions in a professional setting
6. There are generational differences which affect the work-life balance.
7. There are differences in the way men and women are treated within the organisation, for example, when there is an individual accomplishment.
8. The remuneration system is not aligned (pay for problems solved vs for hours worked).

The most remarkable description from the participants that led to these statements (especially for statements 2, 3, 5, and 7) was:

Participant 1: *So the environment is always very respectful, but sometimes the wording of the appreciation is different (based on gender). So for a guy is a pat on the shoulder or a pat on the back. 'Oh, you did great'. For me, it did happen 'Oh, she's so cute, she's great', and in my head is 'I don't want to be fussed, I want to be good at what I'm doing'. So the complementing in words is different, that doesn't mean that I'm respected. But it seems like it. And it could also be the other way around, it's not just for females, but at the same time also for males, because somehow you need to be always fine. You need to be always strong. You need to receive a pat on the shoulder and then you will be okay. No one would ask you how it is going. You know what I mean, it goes two ways.*

As this comment came from what I believe was a deeper level of analysis and communication, it made a nice transition to deep dive to the fourth and more profound level, the 'metaphor' layer—the last layer to analyse using the CLA method.

This layer describes the unconscious dimension of an issue. Since this dimension is often stated using an image or a narrative, I suggested to participants close their eyes and imagine, as if they were explaining the current issue or situation to a four-year-old child, which narrative, image, or comparison would come to their minds? Based on this, the participants briefly discussed their metaphors and gave the following narratives accompanied by available images on the Mural board.

Besides, this layer is usually the most complicated of the four, the participants did not find it more complex than the others. Instead, they could describe through well-known metaphors how they felt at that moment in time within the organisation.

Participant 6: *I thought about the story from the Bible about a tower that in the past, everybody was speaking the same language, but it says that God made everybody to speak a different language, so they couldn't really communicate to each other. I think it is called the tower of Babel (Figure 34).*

Figure 34. Tower of Babel (The Museum of Unnatural Mystery, 2022)

Participant 6: *it's a different metaphor, but you know the story about the guys that are blind. And then there's an elephant, so one is holding the leg. And he said, oh, this is a three. And then the other one is holding the ear. And he said, oh, this is the leave of a palm tree. And then someone that trunk Oh, this is a snake. So everyone has a different interpretation for basically the same thing.*

Figure 35. Blind men and the elephant (Medium, 2022)

Participant 2: *I want to find an image of someone desperate, pulling the hair out.*

Figure 36. Desperate man (Kakos, 2022)

Participant 3: *I was thinking on Plato's cave of shadows, that you know, you have this one guy and he's sitting there in the dark cave, and then someone behind him holds up, he shows shadows on the wall and all that the person sitting knows is the concept that this shadow shows. This is an example on how people within our company have just an image but are not fully aware on what the projects that everybody is doing is all about.*

Figure 37. Plato's cave (ThoughtCo, 2022)

After this discussion and the shared metaphors, the participants unifying description in words of how they felt was stated as follows: Cultural differences lead us to see and approach projects or challenges differently.

As a point of reference, having finalised the activity by completing each layer, I explained that in the CLA part-2 (future) session, we would go from the preferred metaphor to the preferred litany. Over the last few minutes, the participants' feedback was that they enjoyed the session and found the method's purpose self-explanatory as they filled in each of the layers. The completed CLA activity on Mural can be observed below in Figure 38 (the link for full access to this Mural is available in the appendix).

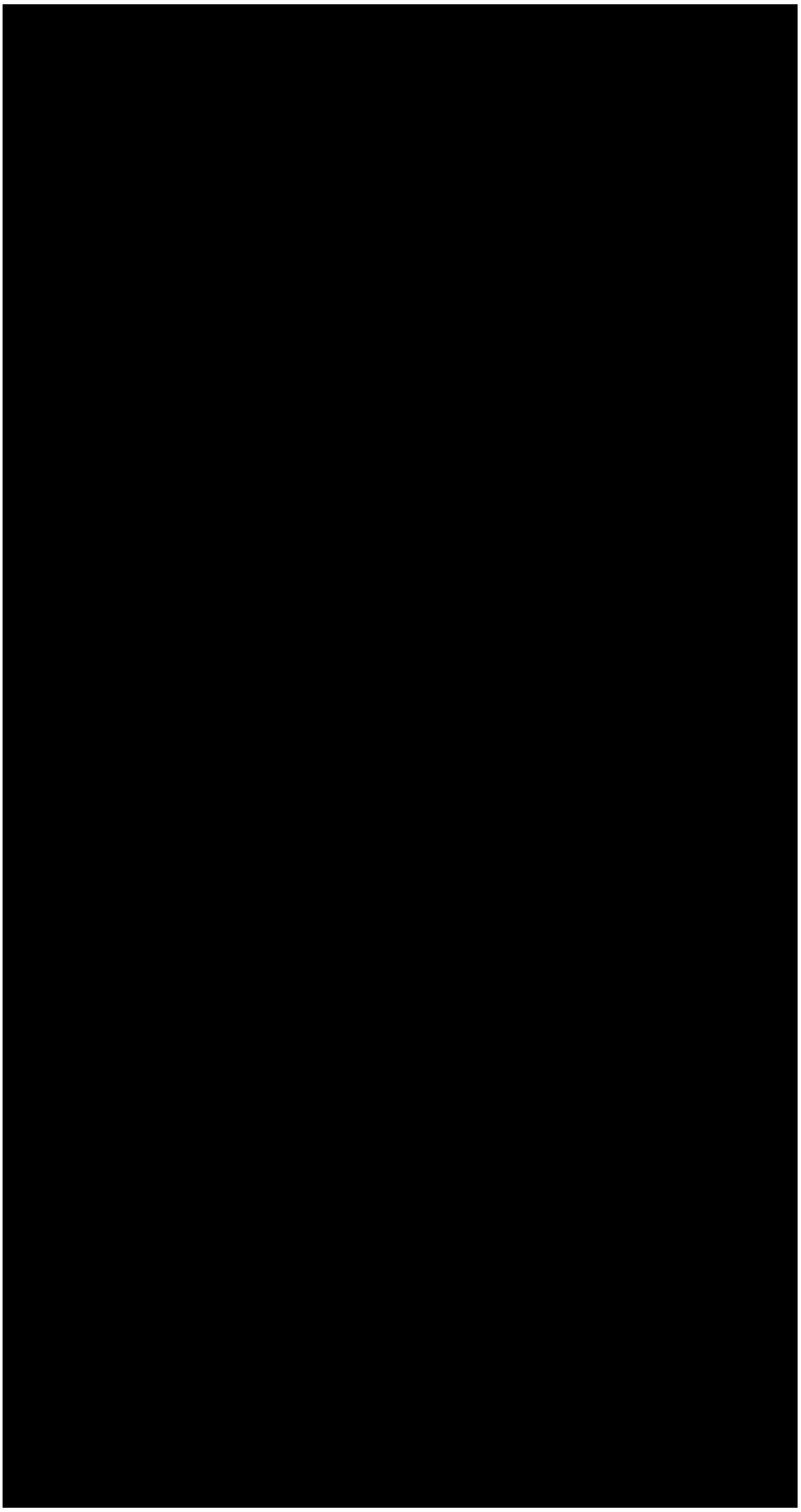

Figure 38. CLA part 1 completed.

5.2.5 Encountering

1) Scenarios (part - 1). This is one of the CFA's core methods and the best-known within the FS field. While the previous sessions have been very robust in obtaining data, scanning, and analysing, not it is time to become more strategic.

As with the other activities, a Mural board was previously assembled. When everybody accessed the board, I started the session by inviting the group to join me in four new worlds in 2030. I explained that the group would be divided so that all four scenarios would be explored, and then we would present and share the experiences with the other participants. I dedicated the next seven minutes to explain each scenario in detail.

We had four scenarios, and they are built on two axes, which helps to expand them. One of the axes is economic paradigms. So on the top of the quadrant, there is a new economic paradigm. So capitalism has been transformed into something else. At the bottom of the quadrants is the old economic paradigm, where we would work and trade in the same world we currently do.

On the left of the quadrants, we have a shift through centralisation, where decisions, structures and supply chains are centralised on how people work compared to the decentralisation network on the right side of the quadrants. I shortly presented the four scenarios based on the combinations of these four variables. I also made available to each group an audio piece they could listen to before they started to work on the scenarios, explaining each of the four possible worlds or scenarios.

Before explaining each scenario, I invited the participants to feel free to close their eyes and listen to my voice while explaining the four different worlds they were invited into (see Figure 37). The scenarios are based on the publication *Doing Business in 2030* (BSR, 2021)

The first one is ‘a tale of two systems’. It is a scenario characterised by automation and environmental disruption, causing global turmoil. China promotes a vision of prosperity, order and sustainability and draws emerging economies into its orbit. Western governments and business leaders realise they must reform the social contract if free-market capitalism is chosen. In this scenario, there is a dramatic job loss due to automation. It is chaotic, with weather flooding, wildfires, coffee, and chocolate having become super expensive, and much of the world depends on what China does.

China is prepared to prosper from this scenario. This scenario is the end of capitalism, and the economy should serve human flourishing in the new economic paradigm. So,

whatever happens, we should be serving human rights, privacy, and freedom. In this scenario, there is also universal basic income.

The second scenario is called ‘move slow and fix things’. This world is about health concerns, misinformation scandals, and the global recession undermining trust. People become overwhelmed with consumerism, big business, and social media. More localised economies emerge as people rediscover the benefits of the community. Also, a culture of healing starts to take root.

Plastic has been discovered to be damaging to male reproduction health. Farmers' markets were overrun, with retail businesses going down. Everyone is looking for organic food. There are also deep fake and viral videos. So people pretend to be different on social media from whom they are. For this reason, there is an opt-out movement from social media that unplugs from it.

The world entered a global recession, and local communities are working more together to become autonomous. You would rather be local than think global. Europe trends away from consumerism and the falling demand and trust lost in businesses. There are smart villages, like small communities that become independent and authentic with small-scale agriculture, solar energy, and local and regional businesses. It is about bike lanes, electric vehicles and growing interest in healthy bodies and communities.

The third scenario is called ‘tribalism’. The notion that all businesses are political drives new tribes to emerge with profoundly different experiences of reality as collective action becomes increasingly difficult. Some of these tribes experiment with radical approaches to global challenges like climate change. In this world, there is also deep fake and mistrust on social media coming to a close that people would only buy from people whom they trust. They will also get a recommendation for people they would trust and have the same beliefs. So selling and purchasing are linked to your political beliefs.

Autonomous driving exists in cities, and in long distances, there is a right to drive movement on the opposite. So some people do not want to drive anymore, and others fight for the right to drive. Also, people began moving to where they belonged because of their political interests. There is, on the one hand, labour-intense work versus technical automation. So it is a little bit of both worlds, but coming together into small pockets. So in this scenario, there could be people focusing on a green economy, a high automatic tech economy, and so on. Global growth has slowed global trade, but travel and customs restrictions also made it more local and national than the global focus. We have cryptocurrencies and local currencies to avoid tax. So this is a world that is divided into tribes.

The fourth scenario is ‘total information awareness’. It is a world with highly personalised artificial intelligence (AI) companions. This scenario concentrates on networks of businesses that leverage extreme data to provide affordable, effective, and seamless service. Privacy is gone, and many jobs are automated. Most people embrace this new reality. They believe that automation and AI will make better than human decisions. It is like the Alexa of the future, and as a device, it sits like an earplug and assists you in deciding on what to buy or even helps you to order products and services directly from the internet. It is a wearable ear device which combines earphones, a fitness tracker, and an enhanced phone. It is called Scarlett, and Scarlett can hear us think. She analyses emotional patterns to gain insights, order, and buy what she thinks we need and want. Therefore, the business needs to invest in AI to leverage the insights because they no longer sell directly to people. Instead, they are selling to the AI. Scarlett also improves workers' productivity, security, and skills because she observes their behaviour and knows when they become tired.

Nevertheless, there are more and more people looking for the human touch. So face-to-face interaction and serving jobs are booming. The four-day work week has been established. Technology and geoengineering try to solve climate change. So there is here the counterbalance of human interaction, whereas the world itself is highly technology aware.

Figure 39. Doing Business in 2030 scenarios

(BSR, 2021).

After describing these four scenarios, I gave five minutes to answer any question from the team and put the participants in their previously assigned corresponding scenarios through Zoom breakout rooms. There were also about ten minutes for the participants to

get more familiar with the scenario while also hearing a five-minute recording where a narrator takes you through the scenario, including sounds that help you immerse or transport yourself easier to that scenario. Finally, in each of the four scenarios, I would now and then make rounds to assist the team with any questions or suggestions.

After the time given to get familiar with the scenario, I introduced the CE canvas, available on Mural as a free template. Then, I briefly explained how to fill out the canvas by giving a couple of examples and proceeded to ask participants how the DSME would operate in this world in 2030 based on the characteristic of their scenario. As guidelines, I also told the participants that an ideas bank was included in the Mural board in the form of Post-its, with all the insightful information gathered from the previous sessions. Participants could drag these Post-its and add new insights to the corresponding area on the canvas. I gave participants 20 minutes to complete this task.

At the end of these 20 minutes, the teams re-grouped back in the main Zoom room. Before the group started sharing their answers, it was vital for me to acknowledge that this was a super-fast scenario building; therefore, it could have been difficult since sometimes scenario building processes take up to six months. I express that for my research, this scenario building needed to take place as fast prototyping by using scenarios that were already built that I thought fit the DSME situation so that we could be more efficient and agile.

I proceeded to ask the four teams to present what their circular business canvas looked like based on their assigned scenario. The most critical insights from the four scenarios and canvas are included below:

1. A tale of two systems:

The main elements of our scenario are the environmental crisis and the automation so we worked based in these two elements. We think that if these happens by 2030 we will have more customers automatically attracted to our business because our organisation competes against traditional materials. We believe also the local governments will most likely help us with funding (to help mitigate global warming) and that we will partner with like-minded organisations and local governments. We also believe we will have negative impacts because national disasters can also harm our business, affecting the raw materials we use, which we can't harvest, so we can't produce panels. That's the reason why it could be harder to run the business. Energy wise and transportation wise also could harm our business. The stronger power from China could be a negative impact too, because they could take things over (by consuming most of the available resources). We would also perhaps struggle to maintain our core organisational culture. Since China

it's a big power by 2030 and also the block of Europe, and we do business in both blocks what is our core culture? Are we more Asian based, more European based? And the way we do business may fit or not these new circumstances. Lastly, on the revenue streams, I think that is interesting. We could have a new revenue stream from CO_2 offsetting. Since we also believe we will have other manufacturing facilities around the world, we will get the royalties agreed from those licenced factories. We would have created continuous off-take agreements with big corporations. So a steady monthly income and a new revenue stream from the new circular business models we would have implemented by 2030. However, all these would imply additional costs since we need to increase expenditure in a logistic fleet. We would also give back to society, in terms of social contributions, so that would have an increased cost. We would be a global organisation, so we will have to spend in marketing, and of course the labour and manufacturing costs.

In the second scenario, the participants shared:

2. Move slow and fix things:

So our scenario was quite interesting in the sense that there were a lot of things that we have already achieved or that we know that we could become. So consumers are more aware for honest, transparent, circular, and sustainable materials. So what was new for us, and I would like to start from the mission in the business canvas. So our mission is that we move from traditional manufacturing to rural manufacturing, so being present in many other places, for example, with decentralised energy, which was one of the conditions of our scenario, then we're able to decentralise grid to place a manufacturing facility in the middle of the desert, and then use our material for reforestation programs when the panels are composted. Then several activities, they're all about building ecosystems but also technical advancements, in the sense that we're not gonna make just panels anymore, but we are going to make already 3D molded. We had discussed on the cradle to cradle certification and on the DSME being a B Corporation. But we said we're just going to be ourselves and we are going to accomplish European regulation be based on our DSME case study. So central for us is health, more consumer awareness. People, power, putting capacity building at the centre of this and reach out to more remote areas in the world.

3. Tribalism

So this is the world of tribes, everything is localised, everything is politicalised and so that's the world we're living at in 2030. When everything is a tribe, the DSME has been building community from the very start. So craftsmen, designers, experts, and partners. So when everything is politicalised then we become like a religion, you can believe everything you want, but when you turn into religion, we became atheist. So we adapt to the local ecosystems on whatever is there and the positive impact will be material difference. We will empower the local tribes by the technology. Our primary goal will be reducing CO_2 impact on climate change. We provide for a healthier environment for living and working space in those different tribes. We will give away panels for free, and our revenues will come from the positive impacts we will create locally. On the partnership, they're still continuously building on the communities. One of the big technical resources we will change to is that we will need to have green energy, predominantly on hydrogen. We want to be independent from drinking because most of the fibres always travelled to the coast we will have desalination plants at our facilities. We don't sell our stuff (panels) anymore, we provide access to the technology and the material. So we work in a business to consumer more and more. And they pay for the access and use of the material instead of a transactional model where you sell panels. Distribution is gone because there's been in this world of tribes, it has been the end of global supply chain, which actually fits us because we follow where the fibres are. On the negative impacts so you're only as big as how you present yourself, people will have a dependency on our material when you've got a subscription model to access our material and technology. That's a negative impact as such, but it is good for our company. Every facility will be on a standalone basis, but we will provide for cross pollination model. So two things we really need to take in to consideration: we have to make sure that we give back minerals to the soil from the biomass we extracted from that soil, and we have to be absolutely aware that we don't extract fibres that could still function as food. So for this group, everyone knows our challenge with having proteins into a ceiling tile, when you make them from spent brewers' grains. Those are two things, which could have given negative impact on the not really sure on this one, and focus on this one. On revenues and costs we will make a living out of CO_2 credits and access to the model, not by selling stuff (panels) anymore.

4. Total information awareness

So the scenario follows the idea that in 2030 we all have this AI earpiece, and what the earpiece basically does is that it's connected to your consciousness so attracts your thoughts and manages your calendar, your habits, your spending, everything, not just to make better decisions according to some global idea of health, and therefore also instantly purchases products you need. The idea is that everyone is now connected. All information is public, meaning that global corporations have access to your information and can manage it however they want. So I'm not sure if it's anonymised or not, but I assume not. The question then becomes in 2030, when we have access to all this information what would our mission be. We said we will have many manufacturing facilities so my idea always after the moment that we have a large amount of factories would be sustaining the integrity of the material cycle. So, which would be very easily done using this technology, I should have access to every action that's taken. Well, that has the fact that your panels when are returned, you will know exactly what materials, what chemicals, its put in contact with and it makes recycling so much easier. So at this point (in 2030) that would also have been achieved as we have that information. The question then becomes since the machines purchased for us, how do we still make a business? How do we make a profit? So the question is, we have factories, and we have a way to maintain our materials integrity, what do we do now? Since the machines are purchasing for us, but it's influenced by our consciousness, there is however, clearly stated (in the description provided for this scenario) that there is no marketing anymore. So no branding. My idea is to focus on social responsibility in the way that we have to influence people's subconscious and their perspective, the way they perceive the company, in order to influence the machine to spend money, and to buy our product, or to get all companies to purchase it, since the interaction with the customers is completely gone, we can automatically find them, if they misuse the product, as to add certain chemicals to it, but they also spend it automatically we need to create a different system, to build their trust in our product and to get their interest in the company instead of in other companies. Therefore, I set social interactions such as products, as we have with India, such that information about the project and its reputation can spreads by word of mouth, or well, news and different outlets. So what we focused on in this case is environmental impacts. So projects such as the India project, where we reduce the CO_2 in that area by creating DSME material or building refugee camps using out material to spread the positive image of the company and influence people (those devices) eventually to buy our products and services. The negative impacts that we thought we'd be careful

with are so since there's no actual interaction with clients, per se, is that we will need to focus on how to build trust that it doesn't necessarily exist there. When you remove this human connection, how do you make a connection? Which I think it's the case for a lot of this kind of digital AI and type of systems that we're trying to create to really be careful how not to completely disregard the human touch, or human mistakes or the loopholes that can be happening there. So that we will need to really figure out a different customer interaction in the sense and one of the activities that we thought is we don't know how to call it yet. So it's right now just call 'way cooler hackathon'. (The idea with this hackathons is that) since there's no branding or marketing in this world, we would need to really somehow show that we are doing all this for the environmental and social impact and invite the clients to be aware of these events and cooperate with them as well. Like a price system or conventions, inviting people to interact with the product.

The description by the participants of scenario four closed the first part of two sessions. The objective of the second session was to choose the preferred future, selecting one of these four scenarios as the core preferred elements and subsequently complementing this scenario with some key elements from the other three scenarios that would fit the preferred scenario. This first session about scenarios was for the participants to feel more comfortable with uncertainty gradually, to analyse options from the different scenarios and to be able to adapt and shape as we moved into the next session. The main objective is to be proactive and work on the preferable future, to evaluate what is possible and what is preferable to create the future that the DSME wants.

The CEO and participants' engagement in this session was remarkable, and at the end of the session, as feedback, they mentioned:

CEO: *I love doing this. Thank you for your guidance.*

Participant 3: *Yeah, that was pretty fun!*

2) Scenarios (part - 2). This second session on Scenarios occurred a week after the first session. I started with a summary of what was accomplished during the previous sessions. Then, I briefly summarised each scenario's characteristics during the first five minutes. After this, I assigned each participant one vote and asked them to place their votes on their preferred scenario. The scenario with more votes at the end of the voting session should be the DSME preferred future. The preferable future is concerned with what we 'want' to happen. What is preferred depends significantly on who is doing the preferring,

so the question to ask for preferable futures is: what do we want to happen? Furthermore, an equivalent question might also be: what should happen?

Before the participants assigned their votes, I reminded them a couple of basic things about scenarios; firstly, that these scenarios will not happen precisely as they are described, and secondly, the purpose of scenarios is to observe and evaluate possible options. It was important for the participants to know that all these four scenarios are possible but that the session's main objective was to choose which one was the preferred future for the DSME and build an image of the future from this scenario.

The voting session took place using Mural, which has an embedded option for voting sessions. There was a tie during the first round since the same number of votes were assigned to three scenarios. To untie, a second round took place. I reminded them that the votes should not be assigned to the scenario they think is more plausible, but to the one they would want to happen instead.

After a few minutes, one of the participants shifted its assigned vote to the 'tribalism' scenario, making this scenario the one with more votes and, therefore, the most preferred one by the DSME participants. Right after this, I explained the main activity for this session. First, I clarified that now that a preferred future was chosen, there were some elements from the other three scenarios that they did not choose that perhaps would fit with the tribalism scenario and make this scenario even more preferable. To do this meticulously, we went through each scenario circular business canvas and analysed category by category those elements that they would like to drag to the same category within the tribalism canvas. I also explained that when there were contradictory elements from the preferred scenario and the other three scenarios, they would need to pick the most preferred one because having contradictory elements in the same scenario would break this scenario or make it unreasonable (e.g. owning a robust logistic system in place vs no owned distribution). For 40 minutes, the participants worked on this task, with me as a facilitator, asking questions sometimes on contradictory details, so they had to justify their decisions. Participants also had a rich discussion on their different perspectives of the DSME by 2030. The final circular business canvas has the following elements, as shown in Table 9 below:

Circular business canvas element	**Preferred scenario and complemented characteristics**
Positive Impacts	The DSME -Makes a material difference

	-Empowers local tribes -Reduce CO_2 impact -Provides a healthier environment for living and working -Supports farmers with new income -Teaches farmers organic farming -A material excellence centre is active regionally
Negative Impacts	The DSME -Extracts minerals from the soil -Extracts fibres that could function as food -Creates a dependency -Does not fit the economic paradigm in 2030 -Struggles to maintain a core organizational culture -Is affected by natural disasters -Struggles with trusting potential clients -Lacks human interaction -Exports are limited to other regions
Key activities	-Makes panels -Application through 3D models (housing, shelters) -Sells and builds manufacturing facilities -Reuses, redistributes, and upcycles panels -Focuses on social projects -Organises hackathons
Mission	The DSME -Is recognised as a sustainable alternative to traditional materials -Is the top-world healthy material, with manufacturing facilities in local areas using decentralised grid -the material is used for reforestation when it is composted **-Give away panels for free since a source of revenue comes from the positive impact created**
Partners	-Fabricators -Global brands -Suppliers of fibres -Breweries -Local governments -Local stakeholders

	-Universities -Craftsmen -Artists
Revenues	-CO_2 credits -Access to the technology -Ecosystem building services -Projects with global partners -Royalties from selling manufacturing facilities -Recurrent sales -Circular business models
Costs	-Marketing -Cost of logistics (third parties and reverse logistics) -CAPEX -Artificial intelligence additional costs -Social contributions -Sponsorships
Natural resources	-Water -Cellulose fibres from plants -Other organic waste material -Most abundant cellulose fibres waste in 2030 -Cellulose fibres without protein
Technical resources	-The DSME can make 3D models instead of just panels -Tracking of materials along the user's cycle -Vertical integration in the supply chain, on products and applications -Vast amount of data, robust integration -Circular Economy is embedded in all the DSME processes -DSME material is traceable, and information is given to the consumer on how to use and recycle the panel -Technology enables the DSME to use just what is valuable on the cellulose fibres to make a panel. The rest is given for farming
Energy resources	-Reduced fossil fuel dependency -Solar energy gives powers DSME manufacturing facilities -Hydrogen -Biogas produces heat and energy.

	-Facilities are near the coast and desalinate water -The DSME uses the exceeding energy from other factories
Value proposition	-Flexible organisation adaptable to the local environmental context -Collaboration with schools to teach about manufacturing healthy materials -CO_2 credits -Zero waste -Cost savings to other businesses through LEEDs credits -Education to farmers -Resilient from the raw material price fluctuations -Supports SDGs -Creates monetary value by mitigating CO_2 and the further climate impact
Users and contexts	-Presence in the local businesses (train stations, airports, shopping malls) -Business-to-business provides access to consumers through local conversation facilities -Users pay for access to technology and knowledge -Collaboration with global brands -Part of a consortium -Part of a foundation with like-minded organisations
Next use	-Reuse, redistribution, and upcycling of panels -Pay per-service model for multiple users cycle -Material is tracked down by artificial intelligence -Users provide materials (e.g. furniture) and bring these to the DSME factory to create panels. -Customers will be able to put panels in compost, or the DSME will take panels back to the factory
Distribution	-Online track & trace of materials -Reward those customers that keep the integrity of materials -No owned distribution by the DSME but by a third party (also reverse logistics) -Easy access to the material depending on the code of conduct

Table 9. Completed DSME circular business canvas 2030.

One of the most relevant dialogues that capture the type of discussions that occurred during the session to create a preferred participatory scenario was the following:

Participant 6: *I think this is somehow contradictory. About the supply chain. We have a very robust logistic system in place but in the 'tale of two systems' scenario, and in the 'move slow and fix things' scenario we have local distribution, but in the 'tribalism' scenario, which is our preferred future, there is no distribution by the DSME, so everything is done by a third party. So what do you think about our preferred scenario?*

Participant 2: *I think the local distribution, local impact from the green scenario (move slow and fix things scenario) would fit. But if then we go to the same green scenario there is an online track and trace.*

Participant 3: *That is not possible then right?*

Participant 2: *No, that wouldn't because it's too much of tracking or being in charge, so I think that we need to change it or take it out.*

Facilitator: *I agree but I wonder how these localised manufacturing facilities and tribes communicate with each other. Do they communicate to each other?*

Participant 3: *Of course, it is not isolationism. The scenario just calls for the chains of materials being localised and that people prefer to work with tribes and things that are affiliated with their tribe, but it does not excludes the possibility of working with others.*

Facilitator: *Ok, it is important to discuss how we plan these communications to be like, and this is also a question about traceability. For example how these local communities learn from each other? The description of the scenario says that through bilateral arrangements.*

Participant 3: *The DSME itself could have bilateral arrangements between the different communities. The DSME could have its own track and trace of materials, not necessarily related to the consumer.*

At the end of the session, and having completed a preferred scenario, the last activity was to describe in one sentence the image of the DSME by 2030 based on the preferred

scenario. For 20 minutes, the participants worked on the Mural board drafting a unifying sentence, which after several adjustments, ended as:

'The DSME in 2030 is an organisation that is part of a regional ecosystem with like-minded organisations that exchange local learning through online platforms. The DSME leverage from these partnerships in what each part produces. The DSME produces materials (panels and items) with cellulose fibres. Carbon credits is a significant source of revenue (each year more). The DSME has fabricators at a close reach and has satellite collaborators and consultants. The DSME generates new business models for the local communities and tackles local problems (abundance of local waste).'

Having finalised this DSME descriptive image of the future, we had the necessary input to work with for the next session, the CLA – part 2, where this description was going to be transformed into a metaphor and then work the way up on the CLA diagram looking to transform the worldview, system, and litany of the organisation.

3) Causal Layered Analysis (CLA) – part 2 (future). The previously implemented method, CLA – part 1 (present), was the end of the fourth phase within the CFA. Now, in this fifth stage, we continued with the complimentary session on CLA to create alternative futures by shifting the current metaphor of the organisation and outlining the needed changes to reach the preferred future. The instructions for this session were very similar to the previous one. The only two differences were that now the focus was on the future rather than on the present, and the second difference was that we started discussing first the fourth layer 'metaphor' and worked our way up, opposite to what we did in the previous session in which we started from the top with the first layer.

As the two sessions took place two weeks apart (since the week after the first CLA the Scenarios session took place), I did a brief recap of what we accomplished during the first CLA session, going over the technique we used to select the current litany and then going over layer by layer showing what it was filled in the Mural board.

Finalising this brief recap that it should not take more than five minutes, we dedicated the remaining 55 minutes to the session's primary objective. Within the same Mural board, I started by showing the participants the description of the preferred scenario from the previous session:

'The DSME in 2030 is an organisation that is part of a regional ecosystem with like-minded organisations that exchange local learnings through online platforms, and we leverage from each other in what each entity produces. The DSME produces materials (panels and items) with cellulose fibres. Carbon credits is a significant source of revenue for the organisation (each year more). The DSME has fabricators at a close reach and also has satellite collaborators (consultants). The DSME implements new business models for the local communities and helps to tackle local problems (abundance of local waste)'.

Based on this, I asked the participants: how would you transform this statement into a shared metaphor (the desired image, a saying, or a narrative) on how you wishfully see the DSME by 2030. Surprisingly, not even five seconds after the question, the CEO replied that he already had a metaphor in mind. He described it in words as follows:

CEO: *'a friendly alien magician'*

Subsequently, using the Mural board, and with the guidance of the CEO, I asked how he would construct this metaphor using images. Based on his inputs, the following pictures were used, shown in Figure 40 below:

Figure 40. DSME shared metaphor.

As this was the metaphor shared by the CEO, I asked the participants if they would agree, disagree or complement this with additional elements or descriptive metaphors. I asked this question emphasising and explaining that the purpose of the method and the overarching CFA was to have a shared metaphor and a shared vision and preferred future. Because the participants agreed with the CEO's metaphor, I insisted and asked if

something was missing in this metaphor. There was silence after this question. The participants were cautious in expressing themselves. As an improvement to this session, I would have preferred as a preliminary idea to divide the teams into two or three groups so each group would have to come up with a metaphor in a first-round and then in a second round, they would need to unify the two or three metaphors in one.

As the participants remained quiet, I asked the CEO, based on the content of the interview mentioned in section 4.6:

Facilitator: *how do you see that this DSME in 2030 is different compared to the initial DSME where the idea metaphor of the magician you explained during the interview was already there?'*

The CEO answered:

CEO: *I think when you got an archetype (the magician) the biggest challenge you would have during the course of this years (2008 to 2030) is to keep close to your values and ambitions and to your DNA that was the driver back then when you initiated what you wanted to do. The impact on the DSME technology on the application that could be when people start co-creating I think we will be surprised of what they did come up themselves. So there will be a continuous form of surprise and we will continue to surprise ourselves. Especially when you learn in different local regions and then you go back for cross-pollination and sharing of knowledge and skills. Like all magic, tricks ought to be as simple as possible.*

As this answer from the CEO was quite elaborate and brought much value to the discussion, I wanted to ensure that I understood exactly what he meant. I replied:

Facilitator: *if I try to tell you back what I understood from what you just said, comparing the DSME in its initial time (2008) and how you envision by 2030, in the initial time the DSME was alone but in 2030 or sooner, the DSME will have an ecosystem that the DSME contributed building and therefore the DSME will have presence in more regions.*

The CEO agreed to my interpretation and elaborated more, adding:

CEO: *and the ecosystems will vary tremendously form each other. So it's quite magical on where we can then go, and on the forms and shapes we can adopt and advance, and then the combined forces can help us to improve.*

After this dialogue, I thought it was time to move upward and address the third layer, but again I asked the other participants if they would like to add their inputs, but they agreed to move on to the next layer.

Now on the third layer, I started by asking: what way of thinking, empathy or cultural understanding is needed to support the transformed metaphor?

As the question was perhaps still too broad, I reframed the question and asked: if you need to mention five things in terms of ways of thinking, empathy, or cultural understanding, what would these be within the organisation?

The CEO let others give their contributions first, saying, '*now, you go first'*. One of the participants answered:

Participant 4: *what we would need is being flexible in terms of adaptability while keeping close to the core business whole also being flexible and adapting to local environments. So for that, you need a heavy code of conduct, need a pretty extensive or well defined code of conduct. Something that you can go back to read.*

The CEO added:

CEO: *I would like to add some keywords, transparent, honest, simple, healthy, and natural.*

When asking another participant for her input, she said the previous comments from the CEO and his other colleague were good enough. To have a more rich discussion still in the third layer, I reframed once more the original question, and I asked:

Facilitator: *what type of worldviews will definitely not need to be in the DSME by 2030?*

As this was the third time, I used the word 'worldview' in the question, one of the participants asked what I meant by worldview. When I explained what I mean by worldview using an example:

Facilitator: *my worldview can be very ethnocentric, right? So it's not a global worldview. So I'm not very international because I'm very ethnocentric and focused on my national culture alone, my family values. So I'm much closed in terms of my worldview but for example, if you have a global worldview then you know you are cosmopolitan, you embrace different cultures, and you are more open to new flavours and to different cultures.*

The participant replied that he understood the concept but did not understand why he needed to again define a worldview for the organisation if the previous session had already defined a scenario of tribalism for the preferred future. He mentioned:

Participant 4: *in tribalism, the way I get it from the last session is that each country or region is actually a bit more ethnocentric, a bit more focused on themselves. But then we, as a global company that wishes to have activities in different parts of the world, then you need to find a way to fit in, in all of those tribes.*

The CEO answered back how the proposed metaphor fit this purpose:

CEO: *what I see in front of us is that we have a friendly alien magician who can wear a million masks so you got a face for every tribe but the souls and the mind and the technology, although it is adapted to each region and tribe. will have the same DNA, the same structure. Same ethic and norms, same drive for a positive impact. So the friendly alien magician can have million masks. Does this helps?*

The participants agreed once more with the CEO. The same participant with the questioning, when I asked him if the CEO's answer was clear, replied:

Participant 4: *'yeah, that is how I saw it'.*

Having clarified this, and before moving up to the second layer, I insisted on my earlier question on what type of worldviews they would like to avoid. I directed this question to the quietest participants during this session. She then replied:

Participant 1: *so, for me, ethnocentric or cosmopolitan are good worldviews. But then it came to my mind that there are also other types of worldviews: it's human centred and it is nature centred, and on the one hand again we wear different masks and I think we want both because we want to foster a regenerative future nature in our future activities. So for us it's very really important, therefore the nest image that we use at the beginning of each presentation so coming back to nature, but then at the same time we want to foster people's talent, people's power, people's brain. So we also take human centred vision s maybe these two explained like that could be combined.*

Facilitator: *So the DSME is both human centred and nature centred. One do not go above the other, you make decisions based on the positive impact of both.*

Participant 1: *yes, to use some of the teachings of our CEO as well; we have identified what we need: we need a solution to regenerate nature that we found using the tools of circular economy. Then we have identified what we want, where do we want to get, and then we have also identified the people who can do it and the technology that are existing already, so we're enabling this. Then we just go out and do it. So these are the first four of the six or seven steps that I always tried to apply my thinking from our CEO when I'm thinking about the DSME and I think we all heard about these steps.*

As this was a positive addition to the CEO's shared metaphor and worldview, I asked again what is what the DSME does not want as a worldview. The CEO answered:

CEO: *we do not want greed, we do not want to be self-centred and egoist. We do not want to be politically or religiously influenced. We want to remain impartial, that once you work with us you are living like in Switzerland.*

Having completed this third layer with a well-developed worldview, we moved up to the systems layer, which, as said before, has to do with the social aspect, systems and processes that the DSME needs to reach the envisioned worldview. In this layer, I emphasised the need to be now more specific. For example, specify the systems or processes needed to encourage the transformed worldview.

As a starting point, the team added an input mentioned in the previous layer that should have been placed in this layer, 'a well-defined code of conduct'. It was also mentioned as an additional system: 'a digital tool tailored made and transferable'. The CEO elaborated more on this and mentioned:

CEO: *when we are in a tribal world then it also needs to be transferable. So as form and shape should follow the function the digital tool should serve in specific tribes or regions.*

I asked, related to systems, what type of organisation the DSME wants in terms of the structure. I mentioned:

Facilitator: *so, let's use the inputs from the CLA – part 1 on the cultural differences between the US, Serbia and the Netherlands. If you keep having these differences, then the DSME future in 2030 would probably be not very different than today. So what type of system you need to have in place for this not to happen or that it does not create as much trouble as today?*

One of the participant added:

Participant 1: *I was also thinking something that we don't want is having a hierarchy. So what we actually want is an ecosystem of partners with allocated roles and responsibilities and hopefully this is replicable.*

The CEO then added concerning the cultural differences between countries the following:

CEO: *I think currently we have three tribes, by that time (2030), we will have hundreds of tribes and therefore we need a connecting system to them all. But they have to be able to function in their own ecosystem with our own ecosystem of stakeholders. And that ecosystem as such is built upon forms follows function. That's what I'm trying to convey. But the whole thing of one company, that doesn't work in the world of 2030. So one tribe will need an open communication system, the other tribe will need a hierarchical system, another tribe will be more explorative, intuitive and will have a more intuitive process of integrating and advancing and innovating. We should celebrate that these tribes are there because that gives a tremendous pluriformity and brings way more magic that trying to have one 'sausage' being made at the same time, in the same manner over and over again.*

Since this input from the CEO sounded to me not just crucial for the DSME vision by 2030 but also seemed radical, I expressed what I understood from him and said:

Facilitator: *what I get from your answer is that rather than get frustrated by the cultural differences, it's something that you actually incentivise and that the DSME enriches from.*

The CEO confirmed this and said:

CEO: *'yes, we should celebrate diversity and abundance'*

After these inputs, I asked the other participants if they had something to add, but as they did not, I asked the participants to make pause and reflect if they thought something relevant was still missing. Finally, the CEO, as a reflection, added an insightful point to the session, as he said:

CEO: *what is concerning me during this call, is that I hear myself giving answers on how I see 2030 look like, but I am actually giving the same answers and statements as what I was starting in 2021. So my concern is that nine years from now, I would have not learned anything.*

I considered this a critical question from the CEO because he was comparing the DSME vision he was trying to convey with what we were building as a vision for 2030. I answered that:

Facilitator: *yes, that's definitely something that we need to consider. If we are visioning 2030 and all the elements that we consider the DSME will have in 2030 but right now we are maybe focusing in the very immediate future. I think, still the feedback or the discussion is much focused. I think, when we discussed about the celebration of diversity and abundance is something that will take everybody time to reach. So that's definitely not something that will happen in months. So that's something that the DSME needs to develop. Then when you describe that right now, there are three tribes, but that in 2030, you will have hundred. That's also something that will take time to develop.*

The CEO answered:

CEO: *ok, thank you for the reassurance.*

To close the session, we moved up to the upper layer, the litany. The final questions I asked the participants were: by 2030, how the desired vision could for the DSME be stated in a future newspaper headline? (i) What is the new thing everybody is talking about? (ii) And what are the things that you see over and over again in 2030 or statements that are constantly repeated? (iii). Before letting them answer these questions, I went back to the selected litany during the CLA – part 1 as an example of what is currently seen repeatedly in the DSME present.

The first participant answered:

Participant 4: *but I might differ, if you ask what would be on the news and what we would say internally at the DSME? Because the litany of the DSME in the US is different than the DSME litany in Netherlands and in Serbia. That's an internal thing. But if the questions would be about what the media would say, I guess in 2030, they would talk a lot about how much CO_2 is stored in our panels worldwide. I think that's something that would appear online.*

The CEO agreed and added:

CEO: *the headline would be, the DSME is receiving the Nobel Prize for being the most diverse, multi-faceted, applicable, diamond shape, uncapturable, amorphous organisation there's ever been.*

I commented, based on the CEO's litany:

Facilitator: *it surprised me today, because you mentioned the Nobel Prize in your litany, since the literature Nobel price was announced today, and a novelist born in Tanzania, residing in England (Abdulrazak Gurnah) won, for his "uncompromising and compassionate penetration of the effects of colonialism and the fate of the refugee in the gulf between cultures and continents (The Guardian, 2021, p.1). So that surprised me, because usually the Nobel Prize for literature is about an extraordinary piece of literature being written, but this year was different, it had something to do with a social cause.*

The CEO replied back:

CEO: *yeah, but everything now is much more about giving, providing us with meaning and sense. So I've been totally aligned with that. That's awesome.*

I returned to the previous participant's response about an interesting idea of having an internal and an external litany. In this direction, and since the CEO already provided an external litany, I asked the team what would be an internal litany you would constantly hear from your colleagues in 2030. To this question, the CEO answered back:

CEO: *I don't know. I think you should always walk the talk and I am also absolutely 100% convinced that a lot of stakeholders from us know that we got this internal struggle. It is the same like when you need a friend, you know if he's in trouble, or if he stressed or if he's happy, friends sense that. So an organisation needs representatives of an organization that their sub consciousness and instinct is not shut down simply because of business. People know we have struggles, customers know, staff knows, the government knows. They only choose not to ask you face to face, but they know must of the time.*

As again, this CEO's participation was quite deep and somehow touched upon other issues that the DSME was facing at that moment in time, I wanted to make sure that I understood right the CEO's message, so I said:

Facilitator: *so let me see if I understood your point. So what you mean is that the colleagues that we work with should have the instinct and the subconscious and also the*

external partners to understand our day to day struggles, but that doesn't affect the let's say the momentum or the energy of the organisation to accomplish their goals?

The CEO confirmed that was not his point, so he added:

CEO: *please let me clarify. You have asked if there will be different internal litany. I don't believe that. Okay, because of all the things I just said. People sense. People will feel this, people are aware. I don't think this is something you can or should hide, especially when you take the words earlier on: transparent, simple, honest, natural, healthy. It's not healthy to work in an organisation where there's constant frustration about how things are moving and are being managed. It's not natural that people are going to do other stuff than what they're good at. It's not simple to have big time zone differences and micromanagement combined with each other. So I think the external litany should always also be the internal litany. Otherwise, you're fooling yourself. When there is a brand promise, as a synonym of external litany you need also the micro and macro skills to live up to that brand promise. So when the bran promise is pluriformity and diversity it cannot be all white man in the board, it cannot be just one fibre alloy.*

With this CEO remark, his message was clear. As a recommendation for future implementations of the CFA, it is always good to make sure the insights from participants are well understood within the session, by the facilitator to capture the essence of the insights collected, but also by all the other participants to express if they agree or not, to complement, reinforce, or challenge each other ideas.

As no other comment came after the CEO's last input, we closed the session after an hour. I thanked the participants for their insights and told them that starting from the next session we would be immersed in the strategic part of the CFA. The team reacted very positively to this session, especially the CEO as he said before the end:

CEO: *I really, really love doing this. It makes me so sad that I have missed some of the sessions because of time constraints.*

The DSME CEO is not alone in this situation. According to a recent publication in the Harvard Business Review (2022), 97% of 10,000 surveyed senior leaders said that being strategic was the most critical behaviour for their organisation, yet 96% of senior leaders surveyed in another study said they lacked the time for strategic thinking. If strategy is so important, why don't SME leaders make time for it?

5.2.6 Probing

1) Hambrick and Fredrickson's strategic diamond (session 1). In preparation for this activity, I included the inputs from the final DSME preferred future circular business canvas and ideas bank encompassed in the Scenarios Mural board.

As this is the first activity of the six pillars and the first fully immersed in strategy, it is essential to emphasise this to the participants. The theoretical or conceptual work ended in the previous stage, and the implementation work started.

The strategy diamond session thus was crucial to building the DSME strategy towards 2030 by completing the five elements that, according to this tool, make up a strategy: arenas, vehicles, differentiators, staging, and economic logic.

Arenas are the geographical areas, the product categories, the market segments the organisation will focus on, and the supply chain activities it will take on (e.g. manufacturing, selling, distributing, etc.). Vehicles have to do with the organisation's presence and credibility in the desired arenas (e.g. internal development, joint ventures, licencing, etc.). Differentiators focus on how the organisation is or wants to win in the marketplace (e.g. quality, price, brand image, customisation, etc.). Staging is about the speed and sequence of the milestones to go after (e.g. speed of expansion, the interval between events, or sequence of initiatives), and finally, the economic logic is how the profits will be generated and sustained.

For the first twenty minutes of an hour session, the participants dedicated the time to dragging and dropping those elements they valued from the ideas bank and the circular business canvas as inputs of the five named categories. A visual division on the Mural was drawn to make this differentiation.

The participants did not struggle to capture their thinking and share and complete this section within the arenas category. My main role was to make sure, when the answers were too broad, to ask participants to elaborate more on their answers. For example, because CO_2 mitigation was included as a core technology, I asked:

Facilitator: *how would you do your CO_2 mitigation?*

Moreover, the most experienced participants in this area answered:

Participant 3: *in theory the DSME is a carbon capture technology so that's how. Also I can in certain projects you can compensate the waste of materials or materials that would get burned otherwise.*

Facilitator: *and CO_2 credits? This was also included in the value creation category*.

Participant 1: *so it's the CO_2 savings from applying our solution to a specific case, and not only CO_2 but also other air pollutants. It's also the carbon that is stored in the fibres, which is why Carbon capture was also included.*

The completed section on Arenas is included below in Table 10:

Arena	**Present**	**Future**
Which product category?	-Panels -Manufacturing facilities	-3D applications -Fully circular panels -Complete interior furniture sector
Which channels?	-Local governments -Business to business -Local agents	-Licensing -Local sourcing, manufacturing and distribution
Which market segments	-No exporting to other countries or very limited	-Market segments of licensees -Same markets that right now but widely
Which geographical areas?	-Europe	-Regions that our licensees are at -Europe, Japan, UK, Americas
Which core technologies?	-Semi-automated production	-CO_2 mitigation -Carbon capture technology -Green energy -3D printing technology
Which value creation strategies?	-Clean technology	-Access to the model (technology) -CO_2 savings

Table 10. DSME's current and future Arenas.

We moved on to the second area of the strategic diamond, 'the vehicles', the how the DSME will get to the preferred future. As the questions in this area are framed in a way

that the answers could be just yes or no answers (e.g. through joint ventures?) I asked the participants to develop their answers and try to be as specific as possible. I mentioned some examples available in the literature on the strategic diamond technique, for example, IKEA's case (B2U, 2020).

There was a specific question from the participants related to two of the categories. The question was, what is the difference between licencing and franchising? The participants themselves tried to help each other by answering from their knowledge what they believed were the main differences. After three opinions from the participants, the DSME CEO interfered and said:

CEO: *you are all wrong. Franchising is a commercial formula backed up with activities, protocols, and procedures. Like a handbook on how to. A franchise is also something that you buy yourself into, but you stay as an independent entrepreneur and you run your own business, but you've got the power of the brand and the franchisor behind you. Licensing means that you buy yourself access to technology or access to the use of a trademark. While franchise is much more commercial oriented, licensing is access. This is a big difference because when you license the DSME technology, then you can build your own brand, your own company, your own logos, your own sales force. In a franchise that's not possible.*

This explanation by the CEO was needed to specify that one of the DSME vehicles to reach a preferred future was through a licencing model and not through a franchise. After this CEO intervention, a rich discussion started.

The participants were confused about connecting the answers in this area with the mission and value proposition drafted in the circular business canvas completed during the scenarios session. This was challenging because, in the circular canvas, one of the answers to the DSME mission was that they would give away panels for free while the revenues would come from the positive impact created. The feasibility of this was doubtless, even though most participants were trying to explain how a technology that produces panels would still be profitable by giving panels for free. However, the most sceptical participants challenged this assumption. Because this discussion took over the session for at least ten minutes, we decided to put it on hold and come over to the next session with an internal answer from the DSME on how the vehicles and the DSME mission could be associated.

We still completed this area by filling it with the corresponding answers of vehicles (internal development, licensing model, joint ventures, and strategic alliances with local

governments, green field start-ups, and material innovation centres) and before we moved on to the next diamond area I emphasised on something that I felt was relevant.

I mentioned that the purpose of this session was to build the DSME strategy and that at this point of the approach, we could still collect ideas and, in the end, do a possibility check, where we challenge all of the insights and ask what is possible.

Because at this point of the CFA, we were still in a stage thinking about the future and the result (e.g. to depend more on the DSME licencing model), but since the DSME still works in the present, the participants brought up ideas that were taking place. I highlighted that they needed to differentiate what actions were taking place then and what could be the result so that they could build a bridge, and as an organisation, the participants could ask themselves how they got there. For example, when does the DSME stop producing panels, and only the licensees do? Based on this, I decided to adapt the Mural board by dividing present and future and leave for later in the session for participants to decide what fit or not into the future strategy. The participants appreciated this idea, and we moved on to the next area.

The next area was 'differentiations' or how the DSME plans to win. In this area, we discussed how the DSME plans to differentiate from their competitors; if it will be based on price, the brand, speed to the market, reliability, or a new business model. An important question I asked that steered a rich discussion was:

Facilitator: *if you license, and this go back to the differentiation between franchise and licensing model, the end panel that it's produced by the DSME licensees, would it have the branding of the DSME? Or will it just have that is was produced by the DSME technology? So the question is, will it be the DSME panels or will it be all different brands of the local suppliers? I asked this because I wanted to understand, and I think it was important also for the participants, how important will be the DSME brand in the preferred future.*

A couple of the participants answered:

Participant 6: *as I envision the DSME in 2030 the power of the brand is bigger than right now. The items would have to show that are DSME products. In terms of price I don't see that our panels should be a cheap material or even a competitive material against cardboard and HDF or MDF. I think that we should differentiate in price (higher) as well because the DSME produces a material with the abundance of waste rather than with*

additives or toxic binders like it is the case with traditional materials. I think the customer is willing to pay a higher price.

Participant 2: *Also we assume that by that time people want to pay more, they want to see the difference. Because sustainability is very high in everybody vision. So I think that's why we can say we are more expensive, because people are willing to pay for that.*

Participant 6: *I also think that we haven't been able to communicate clearly the value differentiation. Everybody is willing to pay a higher price for a jacket made by Patagonia. We don't question Patagonia and ask why this jacket is more expensive than a Gap jacket? But Patagonia communicates that they use 100% natural materials and are 100% recycling material and we end up buying a jacket for a higher price and we get something of a very high quality in return. So I think that in the end that's why is very important the price strategy, because we can communicate clearly to the customer what we are.*

After this discussion, the participants were notably not as proactive as in previous meetings. In order to avoid unintended silence, I kindly said: "*you guys are extremely quiet today*". This comment steered interesting insights from the participants for this type of strategic session.

One of the participants replied back:

Participant 2: *maybe it's a different focus today. Personally I find it a bit harder to see if we are aligned. So it's a bit different to brainstorm about this.*

I replied back:

Facilitator: *I think is harder (to brain storm) because now we move to the strategy part. So we changed from gathering data to now what does it really mean for you.*

Participant 1: *it's also because we're coming at the end (of the approach) and everything is getting together. What we have built is a lot, but also again, we need to make strategic decisions. So this goes here, and that goes there. It's yeah, it's a bit hard even to, for example, voice my thoughts.*

As I agreed with these two insights from the participants, I replied that:

Facilitator: *this might be something that also cannot be done in one session and I will think about some exercises (for the next session) on how can we enrich that thinking, so*

it becomes easier and clearer. Because it is hard to come from the abstract now more into really the specific and how it would look like (the DSME strategy).

After finalising the differentiations area, we discussed the area in the middle of the diamond, the economic logic, and how profits will be generated. The discussion within this section was straightforward compared to the other four. The team was able to define five venues in which the DSME would generate profits, and these were the selling of panels (1), research and development projects (R&D) (2), carbon credits (3), feasibility studies (4), and the royalties obtained by the square meters sold through the licensed manufacturing facilities (5).

We continued the session by moving to the next area, 'staging', and tried to answer the question of what will be the DSME speed or sequence of moves. To facilitate filling in this section, I made three-time divisions; from 2021 to 2024, from 2025 to 2029, and 2030. By 2030 we agreed that the milestones would be an established (1) material innovation centre, (2) a licensing model, and (3) and knowledge cloud. While also continuing the current transactional model. We included the inputs from the scenarios and CLA sessions, namely:

The DSME in 2030 is an organisation that is part of a regional ecosystem with like-minded organisations that exchange local learning through online platforms. The DSME leverage from these partnerships in what each part produces. The DSME produces materials (panels and items) with cellulose fibres. Carbon credits is a significant source of revenue (each year more). The DSME has fabricators at a close reach and has satellite collaborators and consultants. The DSME generates new business models for the local communities and tackle local problems (abundance of local waste)

For the years 2021 to 2029, we agreed that in the coming activity, 'Backcasting', we would address the needed actions and milestones in more detail. With this being said, we came to the end of the first two sessions as the scheduled time ended. We were going to continue completing this staging area of the strategic diamond the week after this session. I thank the group for 'sticking and hanging in' although the session was a bit hard part of the CFA process.

As a reflection, I consider that there were rich conversations during the session. It was hard for the participants to get into using the strategic diamond smoothly, but it is probably because most people have not been taught to think strategically. It is, therefore,

the role of the researcher how to ‘hack’ this strategic diamond tool so that it is easier for people to complete it.

2) Hambrick and Fredrickson’s strategic diamond (session 2). After learning from the previous session, and as an example of a feedback loop for the improvement of the CFA implementation, I made some arrangements to simplify the strategic diamond Mural board. However, to finalise the strategic diamond activity, we still needed to complete the ‘staging’ area or what will be the DSME speed or sequence of moves. For this purpose, I divided the DSME descriptive image of the future (included verbatim from the previous activity) and segmented it into five sections: material innovation centre, licensing model, transaction model, carbon credits, and abundance of local waste.

In table format, I divided the five sections while adding three columns to write down what was accomplished in 2021, what needed to happen from 2021 to 2030, and what the DSME needed to become by 2030. Based on this segmentation, the participants were able to have a more smooth discussion and to fill in the exercise easier than compared in the previous session (as shown in Table 11 below):

Section	Description	What now (2020)	What in 2030	What do we need to do to become this by 2030
Material Innovation Centre	-Satellite connections between innovation labs within the DSME and outside universities, businesses, designers, and governments.	-One satellite exist right now doing activities and experimenting with new materials.	-Three satellites (Netherlands, Singapore, Tunisia and Italy exist). -Cross-pollination for others can build on these innovations and then advance.	-Local satellite in The Netherlands needs to become a foundation -A code of conduct for suppliers functioning. -Guidelines handbook for building new satellites
Licensing model	The DSME license the DSME model to third parties.	-Dutch manufacturing facility is open. -Building a business plan to raise CAPEX for opening a 2nd manufacturing facility in the Netherlands.	-The DSME has a special division focused on partnering with third parties to license the DSME model. -There will be a small team developing the DSME ecosystem in each location, as it takes a few years to develop the local market.	-To open manufacturing facilities in the UK, Germany, India, and Japan.

			-The DSME uses blockchain technology to keep track of the innovations, R&D development, locations of the ecosystems, etc.	
Transaction model	The traditional or current way of working	Dutch manufacturing facility with a production of 3.5 million square meters per year.	20 million square meters of capacity per year.	-Proof of concept of other agricultural raw materials. -Develop local and regional ecosystems -Increase the rate of innovation to increase the percentage of fibre in the panel. -Broaden the number of our fabricators and the internal team focused on applications. -Internal development capable of educating others on the DSME technology and the business case.
Carbon credits	DSME panels capable of capturing carbon.	-The DSME has the potential to claim that its panels capture carbon. -ISO, including bio-based credentials.	-The DSME is fully accredited as a carbon capture material. -The DSME has the baseline information from the clients to get the needed certifications.	-The Material Innovation Centre leads this effort and endorses carbon credits and other credentials.

		Economic constraints to capitalise on this (limited budget).	-Carbon credits create a significant source of revenue for the DSME.	-The manufacturing facilities get cradle to cradle accreditations.
Abundance of local waste	The DSME partners with the entities' sources of waste.	-Partnership with agricultural raw material suppliers, old corrugated cardboard and paper.	-The DSME has grown the base of row material suppliers (rice, paddy straw, spent grains, label liner, coffee grounds, textiles, etc.). -Airports have become a significant raw material source for making DSME panels. -Sewage from treated water is used as raw material for the DSME panels.	-Establish a commercial relationship with established raw material suppliers and local authorities.

Table 11. DSME Staging table

After finalising this last section of the diamond, I acknowledged the participants for their diligent work during this additional 60 minutes. I mentioned that although the gathered information was still too broad, we could be more specific and agree on tangible steps in the subsequent sessions, particularly during the Backcasting activity. As a reflection, the insights from these last two sessions filling in the strategic diamond allowed us to have a clearer picture of the DSME that we could work on during the Backcasting in a more detailed way, assigning steps to each area within the DSME so that they would easily build a detailed pathway on how to get to the preferred future. This activity was the end of the landing and probing CFA phase.

5.2.7 Transforming

1) Backcasting. We started the CFA last phase with this method. I can say without a doubt that within the CFA implementation, this FS method was the most powerful in terms of tactics, as it effectively clarified the actions the DSME should start to implement from 2021 continuously to 2030 to reach the preferred future.

In preparation for this session, I used a Mural board to draw a horizontal calendar-like chart from 2021 to 2030. Each year had two six-month divisions, from January to June and from July to December. Then, vertically I added from top to bottom the core seven areas within the DSME; manufacturing, finances, sales, business development, marketing and communications, material innovation centre, and others (where any other activity that did not fall into the previous six was placed, for example, HR or R&D activities).

In addition, we used several insights from the previous activities, mainly from Scenarios, Strategic diamond, and one of the first activities in the approach, the State of play questionnaire. These insights were previously included in the Mural board. Moreover, in this session, I wanted participants to exercise the developed futures literacy from the first CFA session until now and put it together in the Backcasting Mural board. Finally, we were ready to answer the question: if we want to reach our preferred future by 2030, what do we need to get done by 2029, and what do we need to get done by 2028, all the way to the present?

For the first five minutes, I started the session by explaining the reason for using this method and how it works. I explained that while traditional planning frequently makes organisations do things that were not even planned, Backcasting tries to do the opposite. Backcasting begins by defining your desired outcome, and from there, work backwards to identify the necessary steps to connect the future to the present. These steps were

divided into three categories, and each category was represented with a symbol: activities (square), milestones (pentagon), and learning use cases (circle). To clarify the difference between these three categories, I defined activities as actions that someone within the company performs, while milestones were the most important events that an area of business completed. Learning use cases were the most relevant insights obtained by a project (executed successfully or not, as well as managing failure and learning from it).

Right after these brief explanations, the team started filling out the Backcasting method. As a recommendation and to get the team started, I suggested filling the Mural with those more significant milestones that the DSME had already defined. The first milestone was 'to become a €150 million company in revenues'. This milestone was included in the 2030 finance row. After this was captured, I tried to give ideas based on my recollection of insights from the previous sessions, with the intention of the participants coming up with their inputs. Based on this, the second captured milestone was 'to have eight manufacturing facilities operating and creating a positive impact'. As soon as the more significant milestones were written in the corresponding business area and year, I asked:

Facilitator: *in order to become a €150 million company in revenues by 2030, how many panels need to be sold and when. Additionally, if 10 million panels need to be sold by the beginning of 2030, how many panels need to be produced and when?*

These questions helped the participants connect milestones and activities within the different business areas and start moving backwards easier since the panels needed to be sold first to have this revenue. For the panels to be sold, they needed to be produced and to be rational on the number of panels to be produced, a certain number of manufacturing facilities needed to exist, and several projects executed with a specific size of companies. Based on the participants' work form, a rich list of activities, milestones and learning use cases was achieved. The completed Backcasting is included in Figure 41 below. The link for full access to this Mural is available in the appendix.

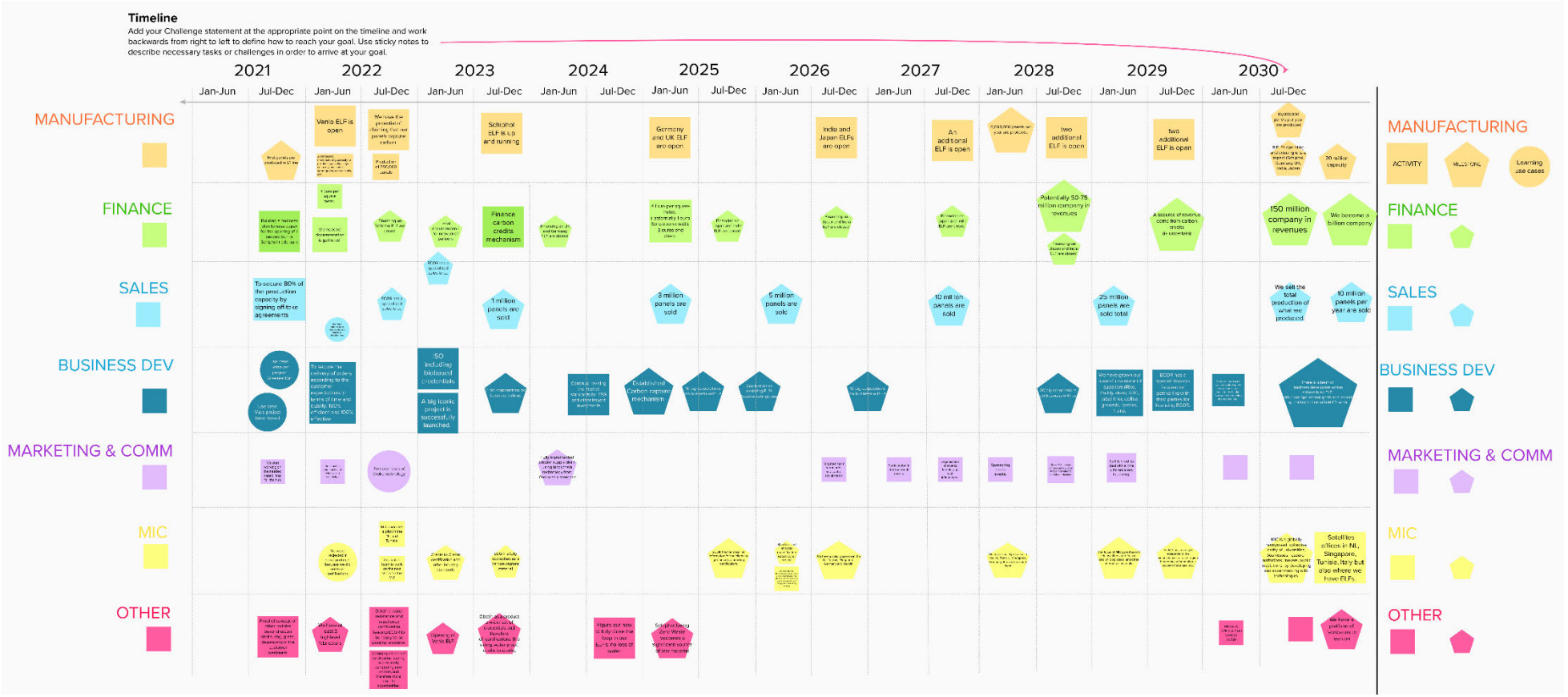

Figure 41. Completed DSME Backcasting.

The most challenging business area to complete was marketing & communications. This area did not have an allocated budget in 2021. I tried to tell the participants not to neglect this business area by asking questions focused on marketing. This drove an interesting conversation that served as a suggestion for this and any further application of this method. The dialogue was:

Facilitator: *what does need to happen at the marketing level?*

Participant 3: *I do not know what the timeline on the current projects is.*

Participant 6: *what if we include in this semester (July-December 2021) that this area will work on mapping the needed capabilities to create a hub.*

Facilitator: *although we are going back to today.*

Participant 3: *It's difficult thing to push through.*

Facilitator; *but don't think how difficult it is today. Think about 2025, what happened so the marketing and communications area is towards what the DSME wants to become by 2030.*

Participant 3: *well, first we need a budget*

Facilitator: *but you have the budget, by 2030 you will be a €150 million company in revenues.*

Participant 3: *alright.*

Facilitator: *what you would do with that amount of money?*

Participant 3: *I will hire a copyrighter, redesign the website, and be active in social media, doing some targeted advertising.*

For me, and I also believe for the participants, this was one of the most relevant moments that evidenced the usefulness of this FS method. Let us compare participant 3's answer at the beginning of this dialogue (clueless about where to start) with how he ended the conversation (with a number of suggestions). It can be observed that the moment he

was asked to be convinced that the DSME was a €150 million company in revenue, he imagined that some of this revenue could be used for marketing and communications, and he started proactively suggesting what activities should be implemented by 2025 in this area. This is also evidence of the importance of being prepared to ask hard questions as a facilitator and not be satisfied with the first answers or with no answers. Usually, richer insights are generated by insisting that the participants share their insights.

Lastly, it is essential to say that the outcome of the Backcasting method when an organisation completes it should be a clear pathway to reach the preferred future. This was accomplished in the case of this DSME implementation. As a result, the DSME has a detailed pathway with milestones, activities, and use cases to reach a preferred future by 2030. Notwithstanding, it is also crucial to methodically revisit this tool each year as valuation support and for updating purposes.

The overall feedback from the participants about the session was positive and valuable to the CFA. As one of the participants puts it:

Participant 2: *it is nice to do this as a team, because we all contribute a little bit, and, yeah, it's fun.*

Furthermore, another participant mentioned:

Participant 6: *[Backcasting] it's more challenging than I thought. As contribution to the approach I would suggest to first do and individual exercise, so like doing our own personal Backcasting for a particular goal that we want. As a good warm-up exercise.*

As we were approaching the end of the session, I dedicated the last minutes to sharing with the team that we were almost coming to the end of the approach with just another three sessions to go. I showed the timeline of all the completed activities as a motivation to stay focused in the last stages of the approach. This closed the session, and a week after we met for the next session.

2) Transformed Futures landscape. This is a familiar method for the DSME participants as we learnt to use it in the mapping phase. In the Mural board of this activity, we copied the outcomes from the first Futures landscape as we decided which insight should stay based on the defined preferred future. Specifically, this session focused on sharpening the previously defined DSME vision, goals, identity, and values, using all the learnings, insights, and milestones we developed throughout the CFA implementation.

In the first part of the session, the discussion led the team to modify a critical element of the vision, from being ‘a global up-scalable model that is locally relevant’ to an ‘up-scalable model that is regionally relevant’. The reason behind this contraction from a global to just an up-scalable model was that the DSME was not envisioning having a global presence but focusing on Europe, with some exceptions of presence in countries outside Europe such as India, Singapore and Mexico. This is also why we changed the DSME vision from local to regional. This was the only adjustment to the vision.

We moved up to the section of the DSME mission and goals. Here we added a handful of new goals, such as: being a €150 million company in revenues, opening seven manufacturing facilities, having a vast network of fabricators, having a defined budget for marketing and communications, having the technology in place to validate the DSME material integrity, have a validated life cycle assessment and total cost of ownership and an international platform to execute projects more accessible. Lastly, it was added as a goal to re-evaluate the DSME business model by 2026 (to ensure the DSME was on track to reach the preferred future by 2030).

We moved down on the Mural board to the next section on individual and organisational values, the lenses through which the DSME and its members see the world. During the first futures landscape session, several values and strengths were written. This time the participants focused on the essential values and defined the identity values of the DSME by 2030, based on the metaphor defined during the CLA futures session of ‘being a friend alien magician’. In line with this preferred future metaphor, the participants believed the DSME values should be: excitement, integrity, creativity, endurance, fun-loving, courage, order, and friendly relationships.

Lastly, we analysed the current DSME strategy and contrasted how they were currently reaching their goals and how they see themselves reaching their preferred future by 2030. For example, who their competitors and customers would be. To help the participants with this task, I added the completed futures Butterfly diagram and the preferred CE canvas from the Scenarios session. We used the previous Futures landscape information, and I asked the group what they would keep, what they would add and what they would not—for example, a particular key supplier or key customer.

Based on this, new key suppliers of raw material were added, such as a consortium of horticultural farmers (based on a promising project the DSME had in India) where the DSME would buy the remnants of crops (paddy straw) and airports (based on a promising project in The Netherlands) where the DSME would use the processed waste from one airport to produce DSME panels. We also assessed if there would be new key products

and services. The only addition in this field was the carbon credits. As key customers, they added an established flooring company, which they negotiated for a crucial off-take contract and additional airports.

Lastly, a list of organisations and brands from different regions was added as key competitors based on the market intelligence analysis made during the CFA exploration phase.

After the CFA implementation ended, reflecting on the positive impact of this session within the DSME, it is relevant to report a course of events while the participants were in a team meeting the following days (not related to CFA sessions).

The designated chair of the meeting wanted to keep the meeting within the agreed time, 60 minutes, so when the meeting was in the last quarter, and a participant was discussing an important topic, the chair asked to develop more around the topic at another time outside from the meeting since there were just 15 more minutes left to discuss other topics. When this happened, the participant argued that he had let the other participants speak during the first part of the meeting without any restriction while listening attentively. Therefore, he insisted it was his turn to develop his discussion topic within this meeting. This created some tension in the group meeting even though the meeting ended at the stipulated time.

Following this event, the team showed exceptional unity in taking charge of how the meetings should take place from the next meeting onwards. DSME members shared some communication and emails after the aforementioned agitated discussion. To my gratification, the mission and identity values agreed upon during the CFA approach implementation were mentioned in the correspondence as guiding principles, as shown in the following sequence of emails and WhatsApp conversations. The email reads:

Hi everyone, based on the moments we all lived today during the meeting I would like to propose for all of our meetings, an atmosphere of: 1) Punctuality: to arrive on time to the meetings. Otherwise we are more tempted to hurrying each other up to finish on time. 2) Let's give each other the precious value of being heard of. Do not decide for the team if what the other is saying should be postponed, shortened or managed in another meeting. Most of the times I find that judgement to be bias. I want to believe that if my colleague speaks what he or she has to say has a value. Equal value that if another colleague speaks. Regardless of the hierarchy of the organisation, which we seek to be inspired by a holacracy type of structure. 3) Let's make the meetings a productive but also enjoyable time to meet. After the workshop sessions finalised last weekend, we defined the type of

culture we wanted for DSME, and I think it's worth sharing for those that could not make it for the sessions. We are a creative, exciting, integral, enduring and fun-loving globally recognised organisation and brand - for the positive impact we create - and for our commitment to produce quality products", and our identity values:

Excitement, Integrity, Creativity, Endurance, Fun-loving, Friend-relationship, Order, Courage. I would be happy to have a dialogue / facilitate a virtual reunion with all of you to talk these points through if you also feel it is needed to.
(E-mail correspondence from one participant of the CFA approach to the group, including researcher, 2021).

In response to this participant email, another member of the team wrote by e-mail:

Thank you for sharing today's thoughts with the team, this shows how much of a team player you are and motivated to keep us on track. But most of all our weekly Wednesday sessions did gave us that beautiful message: we are a creative, exciting, integral, enduring and fun-loving globally recognised organisation and brand - for the positive impact we create - and for our commitment to produce quality products, and our identity values: Excitement, Integrity, Creativity, Endurance, Fun-loving, Friend-relationship, Order, Courage. Have a lovely evening,
(E-mail response to email above, from one participant of the CFA approach to the others, including researcher, 2021).

The participant that sent the first email also received the following two responses via WhatsApp:

I am very touched by your email. I support to have a virtual reunion or meeting to discuss this with the team, so again thank you (1st WhatsApp response, 2021).

Thank you for your email to the team and for addressing all the points that we all felt today, opening up a safe space for dialogue. I re-read your email again because it's so fantastic, the way to provide remarks and feedback to the management as well, thank you for writing it. I think you really communicated integrity and courage above all (2nd WhatsApp response, 2021).

3) Balance scorecard. This technique developed by Kaplan and Norton (1992) aims to provide organisations with a 'scorecard' that contributes to having a concise summary of

critical success factors of a business and to facilitate the alignment of business operations from four different angles (financial, customer, internal, and learning and growth) with the overall strategy (Okumus, 2003). The balance scorecard has five principles: translate the strategy to operational terms (1), align the organisation to the strategy (2), make the strategy everyone's job (3), make the strategy a continual process (4), and mobilise change through leadership (5).

This activity was previous to the last session of the CFA. For this activity, I created a Mural board to gather all the relevant information from the previous CFA sessions (especially the last two, Backcasting and Transformative Futures Landscape). The balance scorecard session focused on translating all insights into a strategy. For a successful CFA implementation, I wanted to ensure that the DSME goals, their strategy, and the way to measure the completed activities were linked to the organisation's vision of a preferred future.

The first question I asked the participants was, 'is the current vision complete or are there any elements that need to be added?' Following this, I read the vision they have created (as the values and financial goals were integrated). Next to the vision, I also included the metaphor of the friendly alien magician. I reminded the DSME team that additions to the vision could be made, having in mind that they were already in 2030 and fixing their minds as if they had created what they had been developing during the CFA. I also emphasised being as descriptive as possible. After some additions from the participants, the final DSME-created vision for 2030 reads:

We are a creative, exciting, integral, enduring, and fun-loving globally recognised organisation and brand operating locally, which through our technology converts abundant cellulose fibres into panels, setting the specs for circularity having a positive carbon impact in the triple bottom line. We are part of a larger disruptive ecosystem with like-minded organisations that exchange knowledge through digital platforms. We are a billion company organisation that generates €150 million in revenues by 2030.

After the vision was defined, we moved on to the second activity for the session. The task was to translate the vision into goals. These goals must be actionable, inspirational, and time-bound in the short, medium, and long term. To segment these goals in DSME areas, I put a table on the Mural board with four columns: financial (how do we look to shareholders), business (what must we excel at), innovation and learnings (what do we need to improve at), and customer perspective (how do customers see us). These four columns had three-time divisions: 2022, 2026, and 2030. Next to these columns, I added

six rows per DSME area: finance, sales, business development, marketing, innovation and manufacturing. The task asked the participants to fill in this table with tangible goals. To get started, I gave some examples. For example, in the financial area, the defined goal for the financial perspective by 2022 was to sell each square meter of a panel at €4.00, by 2026 to be a €50 million company in revenue, and by 2030, three times this, a €150 million company in revenue. Table 12 includes the completed task of this activity.

Particularly important for the participants was to develop ideas around the innovation and learning goals because, on all of the goals and milestones set from 2021 to 2030, the DSME needed to make sure that the team has the internal capabilities and knowledge to reach the preferred future. This is the reason the participants included that creating and implementing a training platform for onboarding new DSME employees was crucial, as well as having a multidisciplinary team (external and internal) that contributes to the DSME to breach their capabilities gaps and having a specialised staff to focus on strategising the areas within the DSME that need to be developed.

Once we completed the table, we moved on to the third and last activity, which focused on defining how will the DSME measure and keep track of the set goals. Some organisations call these Key Performance Indicators (KPIs) or Objectives and Key Results (OKRs). As with the previous section, the template we used was divided by the DSME areas, and in each area, we discussed which metrics should be established and which tools the DSME use to measure each.

A discussion on performance indicators in a session was not intended to be conclusive or incorporate these indicators within the DSME right away. However, it was intended to open up a conversation on the need to establish indicators in the DSME, as at that moment, there was no metric in place but just progress reports. So, although the table the participants built in this short time has room for improvement, it was a great starting point, and the participants shared the value of having one in the organisation.

In this session, the value-added for me as a facilitator was to drive participants to come up with performance indicators that could measure the objectives and that these were following a SMART model (specific, measurable, achievable, relevant, and time-bound). Moreover, I would insist that these indicators were also directly connected, leading to the constructed DSME image of the future by 2030 (since it is easier to lose focus on this while an organisation is building a metric performance system). In this sense, KPIs such as having a circularity index and measuring the percentage of revenue coming from carbon mitigation were included.

Additionally, whenever the participants proposed an indicator to be included, I would ask openly if everybody understood this metric and agreed. By asking these questions, I wanted to ensure that the metrics were well thought out and refined as much as possible. A positive attribute of all these indicators is that the participants used their experience in past projects as use cases to incorporate indicators that would help them improve the execution of projects or operations. The complete results are included in Table 13. By finalising this table, we ended this session.

AREA	FINANCIAL PERSPECTIVE GOALS			BUSINESS PERSPECTIVE GOALS			INNOVATION AND LEARNING PERSPECTIVE GOALS			CUSTOMER PERSPECTIVE GOALS		
	How do we look to shareholders?			What must we excel at?			What do we need to improve at?			How do customers see us?		
	2022	2026	2030	2022	2026	2030	2022	2026	2030	2022	2026	2030
FINANCE	4 Eur per square meter	50 million company in revenue	A billion company/ 150 million in revenue	financing on Dutch factory is closed. Landing revenue generating BD projects.	Closing financial of the Germany and UK factories. Finance next with margins from previous factories							
SALES				Secure 80% of the production capacity by signing off-take agreements	3 million panels are sold	10 million panels are sold per year				ECOR has a code of conduct for fabricators and partners		
BUSINESS DEVELOPMENT				A big iconic project is successfully launched	10 multinational organisations do business with us.	There is a team of business developers where there are ELFs.	Create and implement a sharing / training platform for development (on boarding)	Multidisciplinary team (external or internal) that develops our capability gaps. Multidisciplinary team (external or internal) that develops our capability gaps.		Obtain a water resistance and repellence certification.		
MARKETING & COMMUNICATION									Staff is hired to deal with al the different areas to develop	A budget is allocated so DSME positive impact is communicated as a campaign	Fully implemented circular supply chain using blockchain technology from use case	
MATERIAL INNOVATION CENTER					Standardised impacts quantification across facilities and projects.	Satellite offices in NL, Singapore, Tunisia, Italy and where factories are based				Cradle to cradle certification and other industry standards	DSME is fully accredited as a carbon capture material.	MIC is globally recognised as a collective entity with Universities, business, makers, public institutions by developing and experimenting with technologies.
MANUFACTURING				Production of 250,000 panels	NL, UK, and Germany factories are open	20 million panels capacity / 8 sites operating	We have at least three high level fabricators. Customised panels capacity.	Coating line	We have a platform of fabricators to lean on	We have a local team that engages with current and new customers to spread impact on a local level	We have a local team building on the vision 2030.	

Table 12. DSME perspective goals.

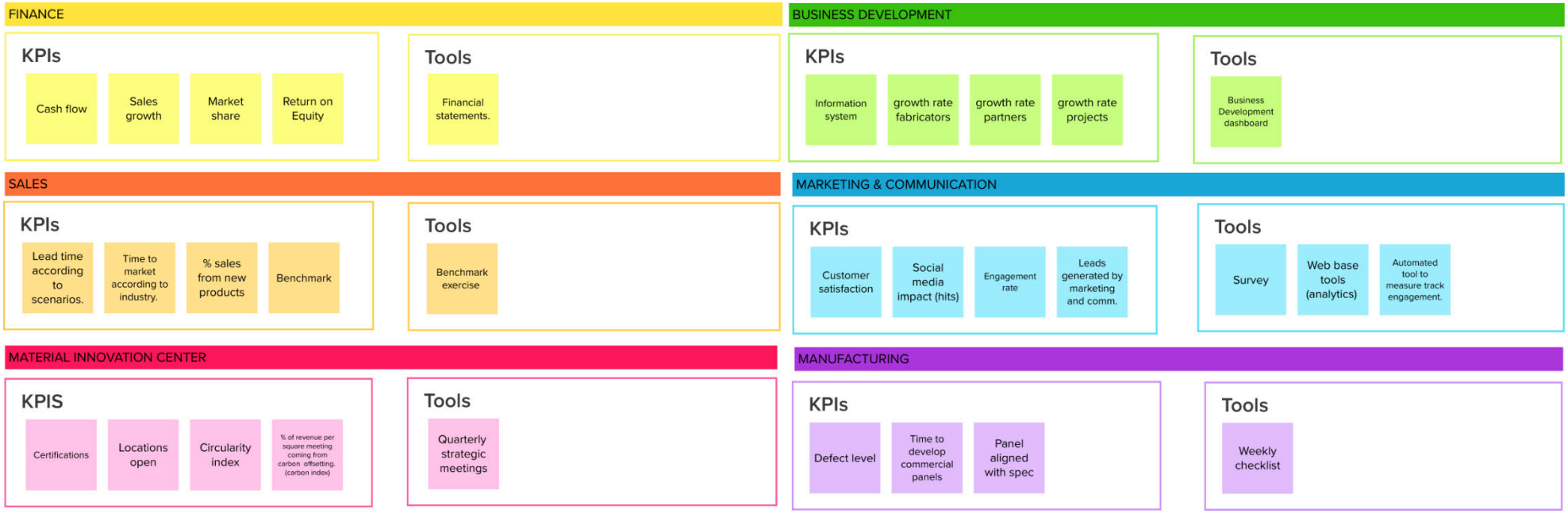

Table 13. DSME KPIs and tools to measure.

4) Post-mortem. A post-mortem analysis is a typical process in the design field. Inspired by this, the session was divided into two parts. The first part and starting point was a brief recapitulation of the CFA. Then, I reminded the participants of the theme of the approach, exploring space and discovering together a preferred future for the DSME to come back to planet earth (present) to apply those learnings and reach the preferred future by 2030. Based on this, I placed a rocket ship image on the Mural board with different sections to fill in. I called this 'the rocket of single sentences'.

Next, I asked them to place five statements about; (1) the preferred future by 2030 (not exclusively for the DSME but in general), (2) the vision (or what is the purpose of the DSME), (3) the mission (or how do the DSME serves the purpose and what are their goals), (4) the strategy (or how will they reach those goals), and (5) the culture they want to create in the organisation.

The participants were asked to discuss each section and complete these five statements based on this structure. The usefulness of this rocket ship was twofold. On the one hand, it serves as a closing CFA exercise for the DSME participants, and on the other hand, the rocket ship of one sentence could be a symbol that could be used as a tangible reminder and inspiration for the DSME to place somewhere in their premises, to have as a 'guiding light' (for example I suggested it could be placed in the main meeting room of the DSME headquarters).

During 45 minutes, the participants were able to build these five statements. The completed rocket ship with these statements can be seen in Figure 42 (on page 234. The link for full access to this Mural is available in the appendix). The most relevant questions and discussions within this activity (by category) were the following:

Concerning the preferred future:

Facilitator: *today we are finalising the whole [CFA] process. We went through scenarios, through images of the future, then we went to the more strategic part, and all these are coming together today. As we know also, part of the whole process is that anything can happen, a lot of things are possible, some things are more probable, but nothing happens the way we think, exactly like the scenarios, but some of those elements that we got from the scenarios will happen, and we would like them to happen like that. [For example] we want this localised yet global mindset. So let's try to bring all that into what is the preferred future that we want. Where the DSME plays a role.*

Participant 3: *right, so we want something like that billion company aspect where we assist and create local ecosystems by enabling a wide variety of circular material exchange and a broad spectrum of environments by means of licensing the technology.*

Facilitator: *that is part of the vision and a bit of the mission too. What we want in this area [the preferred future] is the environment in which the DSME is in the future. So it's 2030 and we know that the DSME is already the way we preferred, so what is the environment like? So what are the conditions by 2030 in which the DSME that we envision by 2030 thrives.*

Participant 2*: a future where global warming is addressed in how governments and countries regulate […]*

Participant 1: *if I can add to that, I think we need to add a sense of urgency. Seeing how much they talk during the COP26 and nothing was achieved. Maybe the climate crisis put technologies such as ours in the spotlight, so for us is not anymore a question. We don't have to put so much work into going towards the clients, but all of the clients are flocking to us, and to other technologies of course, not just to ours.*

Participant 6: yeah, I really like that, and I also think this is becoming a reality on some very localised places. I think this is very concrete.

Participant 4: I think it's been well said, but it would be the technology that enables or allows us those changes, instead of always waiting for regulations from whoever. But instead of waiting for that actually technologies take a step further, goes beyond expectations.

Participant 1: *I really like that, it's almost like our expertise and know how, and the business case could be included in policies, and could drive.*

Participant 4: yeah, *it's a bit like bottom-up way of seeing it, instead of top-down, it fits the DSME.*

Facilitator: *so what about 'climate crisis puts technologies such as DSME in the spotlight and helps to enable a positive change.*

All participants: *Sounds great. Yep. I like it. Excellent!*

Concerning the vision statement:

Facilitator: *then let's move to the second tier. The vision statement, what is the purpose of the DSME as an organisation? I already put some ideas from the big vision that we built in the previous sessions*

Participant 1*: I think the most commonly recognised vision is 'the DSME everywhere'. If that is a vision, no, that's a mission.*

Facilitator: *I think that's more like a slogan, that's a tagline. Why don't we start by building the vision inspired by the preferred future? So if there is that future with a climate crisis, then what is the purpose of the DSME?*

Participant 1: *could it be positive impacts? Which for me always encompass the three pillars, economic, social, and environmental.*

Facilitator: *Ok, and where? Should we say in the world? Where the DSME is present? Where there is abundance or local waste?*

Participant 3: *if we want to align to the preferred future I think [the vision] is where the DSME is present.*

Participant 4: *there's also something called creating shared value, which basically means you make a business case or business model using a problem, may be social, environmental, and you turn that into a business opportunity. So you make money but you also have a positive impact either social or environmental or both at the same time. So again, linking back to the triple bottom line, so in the end, in that sentence, it could also be talking about creating shared value.*

Facilitator: *excellent, I like the idea 'create a shared value where the DSME is present'. Ok, my only concern is that now it's too broad.*

Participant 4*: yes, when I read the sentence it is a bit vague somehow. Creating shared value and keeping what you deleted and maybe something with a positive impact.*

Facilitator: ok. Creating shared value and a positive impact where the DSME is present. I mean, you [participants] already defined that you will be in eight specific locations, so

we can include in the regions where the DSME is present, because maybe it will be more or less than eight [locations] but you are creating value in those regions.

Participant 1: *I would also like to add the means of feasible, not only financially but a viable future proof business case. Because that's how we prove that t is actually working [the DSME business]. The reasons I am saying this is because we always had this vision of multiple facilities, closing deals, being very good at finally closing agreements. So in my vision, the part where we are feasible and viable, I think it should be included.*

Facilitator: *I am happy with this vision if you are happy*

All: yes, yes [they are happy]

Concerning the mission statement:

Facilitator: *so how do you serve the purpose, what are the goals?*

Participant 3: *should these be concrete actions like opening facilities, finding ways [for the material] to [be] fireproof and waterproof?*

Facilitator: *no, that will go in the strategic statement. This would be why we do serve the purpose by creating an environment of, or by engaging […]*

Participant 3: *we could write down there our acronym [co-creation, collaboration, co-responsibility]. It's still broader than concrete actions but it does show our intention and the manner in which we want to achieve our goals. I mean it does not have to be exactly that but that's the spirit in which we would write this right.*

[…]

Facilitator: *ok, we could write down 'enable co-creation, collaboration, co-responsibility by being part of a larger disruptive ecosystem with like-minded organisations that exchange knowledge through digital platforms.*

All: *we like that, very nice.*

Concerning the strategic statement:

Facilitator: *if the answer to how do you reach your goals is though the technology, then that could be the strategic statement. So what if we use part of the elements from the previous sessions and write down [as a strategic statement] 'through the DSME technology to convert local and abundant cellulose fibres into panels, setting the specs for circularity, having a carbon positive impact in the triple bottom line'? Yeah? Are you guys happy with this [strategic statement] one?*

Participant 1: *sure, yes, yes, and as we advance with the exercise we can always go back and change something.*

Facilitator: *ok, exactly, that's the idea, that you actually review and update this every six months, or every year.*

Concerning the culture statement:

Facilitator: *what culture do you want to create within the company? And here, again, going back to the how you framed the metaphor of the DSME and who do you want to be, that it is part of the culture. In the CLA [method] a lot of what you want as a culture came out, you wanted to be adaptable with your culture, but also respectful to each other. Since you are global already by 2030 you need to know how to work the culture in everyone's favour. So let me open the CLA Mural board [where we wrote down some ideas about organisational culture. 'We are a creative, exciting, integral, enduring and fun-loving globally recognised organisation and brand'.*

Facilitator: *but maybe you need to be more specific on why do you are a globally recognised organisation and brand?*

Participant 6: *yes, for the positive impact we create.*

Participant 4: *well, I hope also for the quality of our products. Of course sustainability is good but if you produce stuff you want it to be of quality that it last.*

Facilitator: *ok, [what about] committed to produce quality products?*

Participant 3: *yes, but we say we are creative and fun-loving, if you start to focus just on the quality of the product you get things like SAB [car manufacturer] which became boring after a while though very reliable cars. [Based on this] shouldn't we focus on the entire product instead of just the quality?*

Participant 1: *could we mention also performance? Then it is a free interpretation, is it performance in terms of specs?*

Participant 4: *but I have a question, because now we say we are creative. Is it we as the team that works at the DSME? Or is it the DSME? Because I feel that in the first part of the sentence we are talking about the team and the second is more about the DSME. I think we should rephrase it a bit.*

Facilitator: yes, I think you have a point. Ok, I just rephrased a bit with what you just said.

These dialogues illustrate the commitment of the participants to create a thorough rocket of one sentences and the rich discussion from them to build the organisation they want to be part of from the present to 2030. It also illustrates the positive atmosphere it creates when organisations include their employees in this crucial activity that forms the organisation's identity. SMEs have the optimal size to be as inclusive as possible when these activities are implemented, something that a big corporation will struggle to do or find impossible.

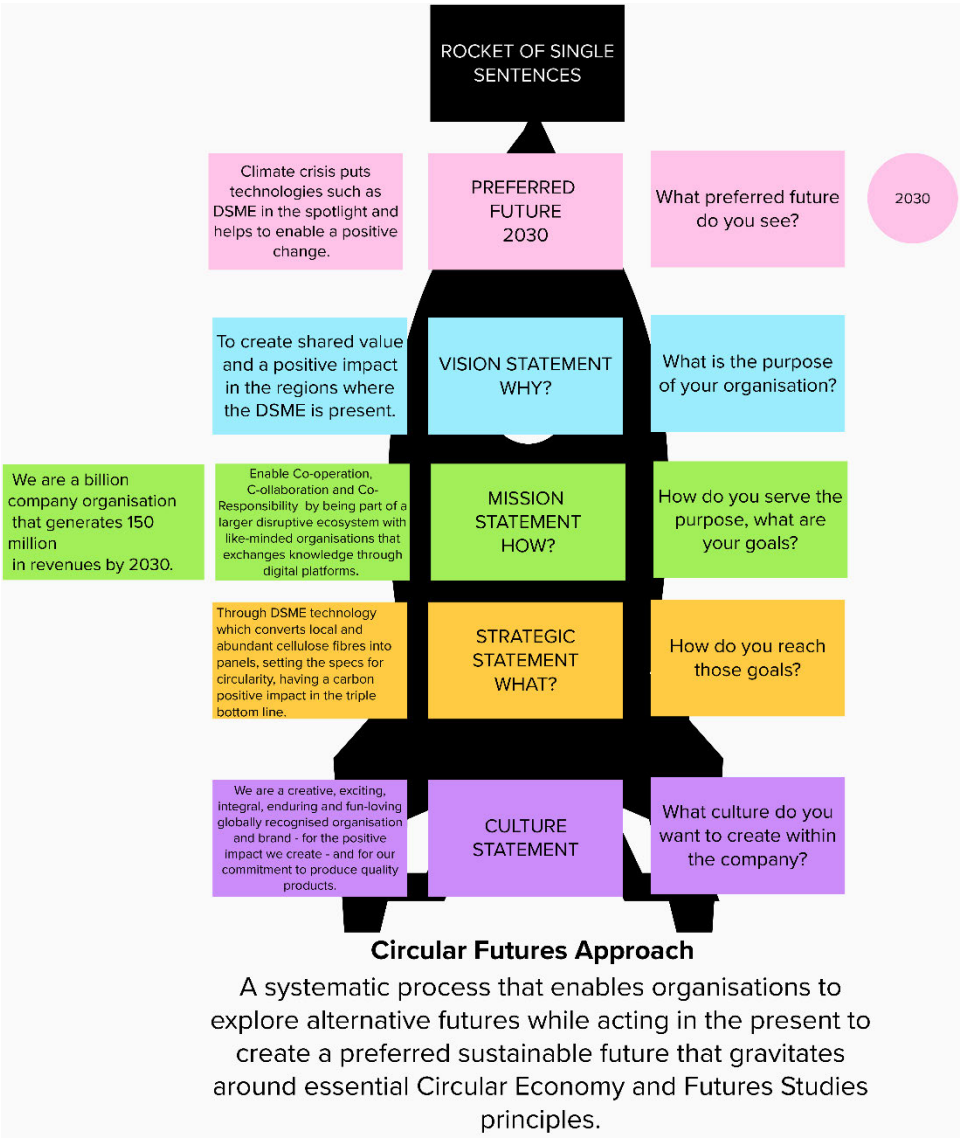

Figure 42. DSME rocket of one sentences.

After completing the rocket, we moved to the second and last part of the session (and the whole CFA). In this session, I asked the participants, based on their experience, what would they keep, fix, or try out as part of the CFA if the approach were to be implemented again. Based on this, during this last CFA session, the seven phases of the CFA were included and assessed based on these three categories; what worked well, what would you fix or improve, and what would you add. Before we started going over this section, I expressed gratitude to the participants, summarised the hours and sessions we dedicated to the CFA (42 hours in 28 sessions), and briefly mentioned how many tools and methods we use in each of the seven stages. I also ask them to be as critical as possible in their feedback so that I could learn from them and capture those insights to improve the CFA, reminding them that this was the first time the CFA was implemented as a pilot.

Finally, I also asked them to share how they felt about the process and how they think it would work for the interest of the DSME. Figure 43 (page 241) shows the template I used on the Mural board to capture this learning. The main inputs from the participants in the verbatim form are the following:

Facilitator: *in the first phase [surveying] we introduced you to the CFA and we did the Polak game and the State of Play questionnaire.*

Participant 1: *I would like to start with the State of Play. It is definitely something to keep. Absolutely. I like the fact that it was open questions but at the same time very structured if that makes sense. So I would not fix or try.*

Participant 3*: I like how it was organised [in a session] because it shows you how people view the company and the current state. It also show certain aspects that you may not be aware of and that was nice.*

Facilitator: *what about something to try in there?*

Participant 1: *physical discussions I think. Having everyone in a room. Physical meeting where we could have a discussion. Something else, since we are on the topic, it would be also nice to see, after we evaluate all of this activities if we could cluster a set of activities in which we can say we need one boot camp. Next time that this approach is implemented. That we need one or two days in a nice cottage somewhere and this activities we can do face to face, and the rest we can do it online.*

Participant 4: I would like that idea.

Participant 2*: yes, it is nice.*

Facilitator: *what do you guys think about the length of the approach? Did you find necessary to have too many sessions for the results that we got, you think it could have been more compact?*

Participant 3: *I do feel that sometimes we start repeating the same statements but I am not sure if it was often enough to be a problem, because sometimes you need to highlight the most important parts and keep repeating those and it is good when everybody remembers so everyone is on the same page.*

Facilitator: *I think that is an interesting insight because it is like this sweet spot between not repeating too much but also knowing that not everyone was in the rom all the time, and then again I keep repeating the future image for example because it is easy to get lost in between, so from my end what I started asking myself is how to create a recap, a very visual recap at the beginning of each session of what is important to highlight and then the what is next, without repeating too much. The improvement then would be to be more precise in what the recap needs to include.*

Participant 4*: to continue on this, maybe also some sessions, let's say two session could have been merged in one session of two hours. It may be more productive in a way that having two sessions a bit similar. This could have helped also to potentially let more people to join. So structurally this could be an idea from my side.*

Facilitator: *yes that is an interesting point, not every organisation would be as global as you are or going to have the same challenges. In some organisations having something [sessions] shorter that would be better than having longer ones. So that has been something I have been thinking about, having some sessions and then a bigger session like sort of a retreat [team building] exercise and then maybe we can continue. That is going to depend a lot on how is the organisation, where are they based, how many employees are going to participate, and those type of things. But it is good that you mentioned that having longer sessions could have been good, although we also know that having longer sessions online can be exhausting, especially during almost two years of [having a] pandemic.*

Facilitator: *another question I would like to ask to know your opinion, is on the combination of Futures Studies methods and Circular Economy [material]. So for*

example the Butterfly diagram that we did, the present Butterfly diagram and the future Butterfly diagram. How was that for you as a combination? Because one of the things that would be new for the Circular Economy discipline is the inclusion of these Futures Studies methods.

Participant 2: *well, I found it very interesting, buy also it gets you thinking where the company wants to go, what the goal is, and how we can implement that, and it is quite nice to think about that. I think personally it was quite difficult, because I think every session we were reminded to just think in that way, in the future, and not in the present. So I think it is really good that we had this because it does put that in your mind. To think about it, or how it could be, or how we want it to be. So personally that was one of my highlights as a thread of all the sessions.*

Facilitator: *and do you think this was like a 'muscle' that you have developed? And that you could use for other activities?*

Participant 2: *maybe a little bit, I think it will be encouraging to see if we can have maybe once or twice with the team something like a workshop to think about or do the Butterfly execution sessions so everybody can think that way because it is something that we should keep in mind at the moment, on where we want to take the company.*

Facilitator: *thank you! Very interesting. This is something I have been thinking. How to lock in these learning and how do we keep improving. Also on how do I stay in touch with the company after the implementation?*

Facilitator: *if we move on to the next phase, on mapping, the second column […]*

Participant 2: *it was interesting too, because in a way you do think back on what happened. I think it also makes you realise on what was achieved and what we achieved. So I would definitely say keep that.*

Facilitator: *and then I think the most challenging pillar was the third one for everyone, from the 28 sessions we dedicated 4 to scanning. Do you remember? […].*

Participant 3: *I did not see the added benefit of adding articles into Factr, because we were already keeping track of competitors and new developments. So looking for random articles it did not seem relevant to me for the future of the DSME.*

Facilitator: *and what about the horizon scanning, scanning for week signals? Less about the competitors, was it hard? Did you see the difference?*

Participant 1: *a practical remark for me is that it was not immediately clear to the group that we could search outside of the platform [Factr]. I would say even the first couple of weeks was the sense of everyone that we could not find enough articles but then it came up and you clarified that we could also look on google and then we really start to see the usefulness of this, at least I started to feel like this is something I would love to have the time to do every week.*

Facilitator: *reflecting on scanning I also have been thinking that some of these scanning I could have done myself and share it with you in the sessions […] but again as a new activity we found that finding these weak signals is hard, they are not so evident for people to detect. So it is one of those things that you need to practice, so to the previous point in a way it would be great that once a week you do a little bit of scanning and the more you do it the deeper into the signals you would get because scanning is very important. Maybe also [helps] having a specialised team scanning but then you all continue doing scanning so you get better at it.*

Facilitator: *one of the things that I am very interested of is to know what you think is the weakest point of the approach. If you connect all the things of the approach together, something that makes you think, ok this is something that the approach misses [falls short], or maybe an element [that was there] that was very week.*

Participant 4: *we talk a lot about the future but I think we did not talk a lot about the problems, the struggles of the company or of the team, how the company has been built, and I think tackling those issues and their problems could actually help understand how to improve it for the future. Sounds idealistic but I think is important to do it. So I think this we did not talk much about that.*

Facilitator: *I don't remember if you were in the session of the CLA present, where we touch upon the cultural differences between the USA, Serbia, and The Netherlands.*

Participant 4: *Oh, no! That's the only one I miss I think.*

Facilitator: *yes, we selected from 6 challenges the DSME had and that one was picked, but still, I agree with you, it was not addressed as necessarily [the structural problems], just in one session, so maybe more can be developed [to address this.*

Participant 1: *Isn't it also a fine borderline on how much a company would like to share about its internal problems with external mediators? I don't think it happened with these sessions […] I don't think there is a way to know how much […]*

Facilitator: *I think I know what you mean. Maybe if in another organisation we cannot talk about this [internal challenges] at least at the beginning maybe it is more about doing surveys where people can [easily] express themselves anonymously and we can start seeing what are the challenges [after analysing the answers] and based on that the next sessions are designed. Also [it is good for] the approach [and the facilitator] to have some time to reflect. Maybe to divide the approach in two or in three parts and after each three or four sessions we recap and we refocus on things that need to be addressed. I will leave this Mural open for you so you can come back and add things, and be anonymous. I think it is important for you and me to know what work or not, what was your favourite part […] because based on what you said [Participant 4] that you were not in the CLA, nothing should be discussed in just one session, it needs to be always connecting back to the previous sessions and this is something I need to look at. Not something that is just touched upon in one meeting or in one workshop or exercise. [Lastly] I would like just to ask when you fill in this individually to put a number, from 10 being yes, and 1 being no, if you would recommend this experience [of participating in the CFA implementation] to other colleague or to a friend that would experience this in their own organisation.*

Participant 3: *I definitely would. I may need to apply some of these things very soon. I got asked to do a project which some of the activities in here would be very useful for. I will then definitely go with yes.*

Facilitator: *I want to thank you all for being part of this journey and it is of course nice to hear that it will be useful for you. Thank you for your time because I know that this is not part of your daily activities and you dedicated 90 minutes of your time every week in this, so thank you so much for joining and being so active and participating.*

Participant 2: *You are more than welcome Participant 6 and it was very nice to work with all of you and as I said this should continue I think within the organisation to do something with this, so I hope this can be established.*

Participant 3: *Yes, you should definitely revisit it this later on. It is a premise that the future changes so if you lock in actions right now and if you start working on those blindly for the next fifteen years you may end up in an entirely different place that you wanted to be or should be, or could be.*

Participant 6: *something very useful that I found, and it happened in the Monday meetings when we discussed about fabricators it our backcasting we established that we need [to work with] by 2025 at least 10 fabricators so that really helps you to focus. Ok, bring that to the present, we need to develop fabricators, otherwise we will not reach that goal in 2025, and the same with all the other milestones that we defined.*

Facilitator: *I will leave the Murals open for you so you can access them and print them in you want or put them in your office so you visualise see what you wanted to do, that actively you remember where you want to by 2030. As a wrap up I will create a file with every session, every file, and pdf with the point that you use it and take advantage of it.*

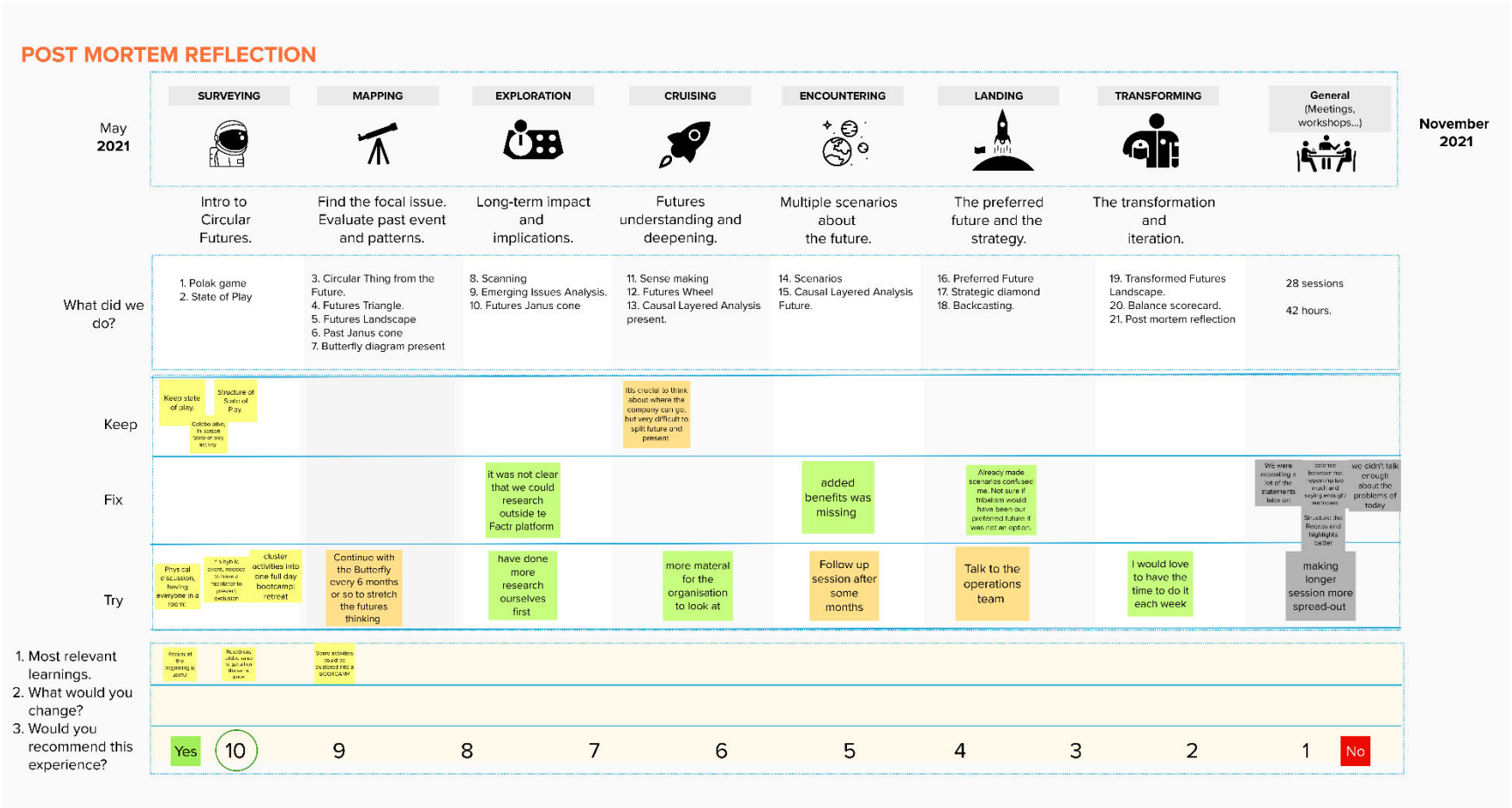

Figure 43. DSME post-mortem.

Chapter 6: Findings and discussion

6.1 Introduction

The following sections present the main outcomes of the data analysis. Initially, my analysis sought to validate the CFA objectives, using the criteria of feasibility, and usability, according to the definitions and criteria suggested by Platts (1993). Then, the approach's utility was verified by analysing the results and how they support the organisation, thereby identifying its added value, as recommended by Bourne et al. (2014). Finally, concerning feasibility and usability, the approach was evaluated by holding discussions and making observations during its application in the Dutch SME. In addition, I asked participants to share their CFA understanding, from obtaining information to the presentation of the results, to give their opinions on the time required to implement the approach and feedback on my role as a facilitator.

The DSME participants were generally pleased with the CFA structure and the time required for its implementation, as shown at the end of Chapter 5. Indeed, the observations and feedback from the participants and CEO demonstrated the approach's value and usability.

In addition, the results of the CFA implementation were also sent as a form of validation to several CE & FS specialists. The specialists considered that the results obtained using the approach were satisfactory. This reinforced the validity of the CFA as an alternative approach to assist SMEs in defining and providing a road map to their preferred future. The feedback from one FS specialist highlighted the novelty of mixing different approaches and methods and the coherence of the space exploration metaphor. An insightful recommendation on how to build on my CFA became one of the turning points of the approach: distinguishing which activities and methods would be classified as core or non-core. In section 6.2, I will illustrate how this was executed within the approach and how this can be further developed in future research.

One of the CE specialists that provided feedback highlighted the importance of my research results since they suggested to the CE that the integration of the FS methods is key. Moreover, it was also emphasised that the social implications of my study would be particularly interesting, namely, understanding the social impacts of the CFA.

Thus, based on the approach implementation results and the feedback obtained, it can be confirmed that the CFA proposed here led the DSME to satisfactory results, fulfilling

my research expectations. Nevertheless, further work is necessary to test collaborative work in a physical setting and compare outcomes. My main observations that came up from the CFA implementation and data analysis are the following:

- The group enthusiastically participated in the CFA implementation, and positive feedback was generally received at the end of each section. There were 29 positive comments about the approach, while just one non-positive comment from the DSME CEO was provided before its implementation, namely, whether the timing was right.
- It was difficult for the participants to start working on a preferred future. This may be explained by the fact they were new to the topic and because of the paradigm the DSME was working under, based on short-term goals. These elements confused participants between what they were asked to do and what the CFA approach empowered them to envision and act. This also emerged from the data analysis, where some contradictions were identified. One example regards the future utilisation of the panels: if panels would be given for free at some point or if the DSME should have a foundation or not. This contradiction existed because it was never discussed before. Therefore, it was never envisioned, and the business model to make this possible was not implemented, making it unattainable to consider giving panels for free, not even in a plausible future. Moreover, while the DSME participants were asked to focus on the future by the characteristics of the CFA itself, there were several times when the participants were clueless about the future or just had some clue. For example, participants did not know the timeline and milestones to accomplish in an important project parallel to the CFA implementation.
- A fully online implementation seemed to work well for all participants; however, repetitive technical issues harmed the continuity of ideas and sometimes consumed significant time out of the sessions. In concrete, there were 35 interruptions, leaves or technical difficulties during the online implementation. This is equivalent to almost two interruptions per session.
- The CFA allowed participants to question current assumptions about themselves and the organisation and enabled them to discuss and elucidate their socio-cultural concerns and strategic priorities, as observed mainly throughout the CLA, Point of impact and Strategic diamond sessions).
- The participants made good use of the approach and proposed improvements also. In addition, the approach helped develop futures literacy in the participants. There was uniform participation from all the attendees considering their attendance and interventions in general. Moreover, they created valuable insights and tangible actions to

implement from 2021 to 2030. As Dian (2009) argues, those who think in terms of 5-20 years understand the impact of trends, take a systemic thinking approach and facilitate the development of the best possible futures.

6.2 CFA's potential impact on current CE and FS research

Regarding my research contributions, I have added the foresight perspective to the current CE debate and proposed an approach that could play a relevant role in the CE research field. With the developed CFA and its implementation, I initiated a promising bridging process between two rapidly evolving and complementing research fields (CE and FS), where the CFA could serve as a possible conceptual linkage between both disciplines. Both disciplines, CE and FS, challenge old paradigms. On the one hand, CE defies the unsustainability of the current linear economic model. On the other hand, FS inquiries about social norms, social systems, and the existence of biases and assumptions that influence organisations' data collection and decision-making. As we cannot fully overcome those biases and assumptions, it is critical to be aware of and include diverse perspectives and lenses, multicultural backgrounds, and disciplines. As shown in the structure and methods described in the previous section, the CFA has the following unique characteristics compared to the other existing approaches:

1) The CFA approach is interdisciplinary as it combines CE principles and FS methods to a new level of integration to contribute to a positive and new CE research output. Moreover, the approach includes a balanced set of activities from both disciples (e.g. Butterfly diagram from CE and Futures triangle from FS). I have also synthesised, where possible, the elements of both disciplines in specific methods or activities. An example is the 'Circular thing from the future' game, where I have adapted the original FS game to revolve around CE principles. Participants design an object by including certain boundaries to their design aligned to CE business models and design strategies. A slightly different example with the same purpose in mind was to adapt the Butterfly diagram by dividing the exercise into two different stages: analysing the organisation in the present state in phase two and the futures state in phase three. I have also done this in other two activities, CLA and Futures landscape.

2) This approach was inspired by other frameworks (as analysed in Section 4). However, these reviewed frameworks present limitations: they lack guidelines on the order of the activities and the starting and ending points. Moreover, based on the extensive literature review, there is little to no explanation of their effective implementation. In other words, the authors of these frameworks have not thoroughly explained the structure

of their frameworks to those interested in learning how to implement them. Presumably, this has its reasoning in that an FS process should be relatively fluid, as Voros (2005) and Inayatullah (2008) suggested in their approaches recommendations. Nevertheless, a vague structure and explanation for their approaches' effective implementation can hinder researchers, practitioners, and SMEs from embracing the existing approaches and consequently not developing a futures literacy and reaching their preferred futures. Alternatively, perhaps there is a commercial reason for not publishing a thorough explanation of their approaches, as these authors usually charge organisations from £6500 to £8000 per day for implementing their frameworks (as an anonymous expert shared with me).

3) Hence, concerning my research aim and one of my objectives of providing a clear structure for the CFA implementation, I have fulfilled this, and I have designed the CFA flexible enough for SMEs to adopt the approach to particular needs by making it easy to cut down specific elements without harming the intended outcomes. This is particularly important since I have noted that it is hard to structure a holistic process, especially for practitioners that are new to the field or those where the concepts of FS and CE are new.

4) The other main contribution of the approach is that I draw a unifying orbit where the participants are to be exploring the future, the CE principles. Participants are enabled to scan the CE principles for their organisation and frame them around the desired pathway of transformation (the orbit). Additionally, this approach captures the momentum for tackling the existing global climate crisis. The CFA is designed to guide SMEs in navigating their end goal(s) and applying CE elements and tools under extreme environmental and social pressure and resource scarcity. I believe this offers a tangible vehicle to start taking action today toward a more sustainable future.

In summary, based on the implementation and the existing literature, in the business context of SMEs, we need to consider two factors that circular futures thinking will highly influence; speed in decision-making and emotion in information perception. Especially in the context of SMEs, the decision-making on all matters should not be centralised to a few or even one individual. The rollout strategy is a joint effort requiring high coordination that should not only be on the shoulders of one or a few business leaders. Instead, it immensely helps to have a mutual alignment on where the team stands and in which directions the team is going, with possible scenarios that do not divert from the shared vision and ambition. The CFA can overcome such uncertainty and ambiguity of the organisation undergoing a CE transformation, allocating each member to a role in the

organisation that will maximise their skills and benefit the organisation overall. The CFA aims to support organisations in those challenges, contributing explicitly to:

1) Identify drivers that could impact the organisation's future (make them aware of dangers and opportunities ahead).

2) This set of drivers could then be turned into future visions that, through the approach, the participants would consider coherent and justifiable.

3) Provide a structured approach that helps organisations identify the key actions and crucial steps to change trajectories, from the most probable to the most preferred circular future and create a path to move forward in this direction (proactively deciding their position in the value chain rather than being imposed on a given spot) (Spitz, 2020a).

4) Enhance the organisational decision-making processes by encouraging them to change and adjust).

Based on the above, indeed, the CFA approach provides organisations with methodological and strategic tools contributing to SMEs with an option that would stop the malpractice of being led or dragged by one strategy or disowned future. A potential outcome of my extensive research would be fostering its application within various SMEs and different fields. In addition, I expect that this deep-diving into the CE and FS would serve as a basis for other researchers to pursue future research, as explained in more detail in Chapter 7. From the perspective of the DSME, a potential outcome would be to assimilate and apply the insights gathered during its implementation. Based on my continuous engagement with and service to the CE community, I am convinced that SMEs are more likely to transition to circularity more effectively by implementing the CFA.

6.3 CFA improvements based on its implementation

It is important to note that I constantly oscillated between the data collected and the literature review to modify the CFA's outcomes. Ensuring research outcomes have relevance to practice provides a platform for scholars, practitioners and SMEs to engage with, adopt or modify their needs and requirements. As the CFA values reiteration and feedback loops to strengthen the framework the participants' insights provided key information for the CFA, and the processing of their views made it possible to establish recommendations to improve the CFA. Noteworthy, after implementing the developed approach, I dedicated a session to getting feedback from the participants. The participants' feedback was then analysed to conclude the potential and usefulness of the CFA. It is worth noting that the participants expressed no negative comments regarding the CFA's general form, content, or implementation. Instead, the appropriateness of the completion

time and the degree of detail of the requested information were the main items of the feedback discussion. The collected feedback from participants during the CFA implementation, and the CEO's interview, are examples of how a 'bottom-up' approach informed back my framework for adjustments and improvements. However, a 'top-down' approach also took place after the CFA implementation when I asked CE and FS specialists for their feedback for further refinement. In summary, in addition to my evaluation post-CFA implementation, the final version of the approach honours both groups' suggestions. The final version of the enhanced approach is presented in Section 6.3.2 in Table 16.

6.3.1 CFA a priori adjustments

Comparing the original conceptual CFA proposed in Weigend et al. (2021), as shown in Table 14 below, to the actual CFA implemented structure, as shown in Table 15, it can be observed that significant changes were executed *a priori* and during the CFA implementation.

Phase	Activities
Surveying	Masterclass The Polak game Suggested readings Six basic futures questions State of play
Mapping	The circular thing from the future Futures triangle Futures Landscape [current] Past Janus cone Butterfly diagram [present]
Exploring	Scanning Emerging issues analysis Futures Janus cone Butterfly diagram [future]
Cruising	Sense-making Futures wheel Sarkar game Causal Layered analysis [part 1]
Encountering	The space mission Causal layered analysis [part 2]
Probing	Strategic diamond Windtunneling Experiential Futures artefacts
Transforming	Reflection exercise Backcasting Transformed futures landscape

Table 14. CFA conceptual

The most significant changes were:

- Adding an alignment meeting with the management team. This is crucial to agree on the participating team, the go-live date and other administrative details that would help the CFA implementation run smoother.
- The suggested readings were eliminated because I thought the approach was already too demanding time and effort-wise for the participants.
- The six basic questions were also eliminated from the CFA implementation. As I previously interviewed the CEO by asking him to answer these questions, I realised this was a suitable activity, but having a group answer each question, I recognised, would not add value to the approach outcomes.
- The order of activities suffered changes based on the intended outputs of each activity. Based on this, it made more sense to have certain activities before others. For example, by having the Futures triangle activity before the Futures landscape [current], the participants could use information from the former to construct the DSME vision easier in the latter.
- The scanning activities were considerably extended compared to the original approach design. This was a premeditated decision just after the first scanning activity, as I realised the DSME team did not have training on business, market and competitive intelligence as I would have expected. In addition, the time needed to explain the supporting tools (e.g. Strategic Intelligence and Factr) also consumed the equivalent of one full session.
- Four activities were not implemented for the DSME: the Sarkar game, the Space mission, Windtunneling and Experiential Futures artefacts. The reason was the complexity of facilitating these activities in an online setting. As the CFA design started before the COVID-19 pandemic, I needed to be pragmatic in deciding which activities would add value to the approach rather than adding unnecessary complexity. I previously validated my decision by consulting with FS experts, and later, I confirmed their good advice based on the continuous literature review, which indicated what FS activities could be adapted or not to an online setting (e.g. Fergnani, 2022b).
- Lastly, based on an anonymous FS expert recommendation, I decided to substitute these activities with others and add key activities to strengthen the CFA's strategic elements. For example, the Space mission exercise was substituted by two Scenarios sessions, and Windtunneling was substituted by the Balance scorecard and the Rocket of one sentence activities. Furthermore, the Post-mortem session was also added instead of a Reflection exercise, as it would provide additional feedback from participants on the CFA implementation.

Phase	Activities
1. Surveying	Alignment meeting with Management team Masterclass The Polak game State of play The circular thing from the future
2. Mapping	Past Janus cone Butterfly diagram [present] Futures triangle Futures Landscape [current]
3. Exploring	Scanning (a. introduction, b. business, competitive and market intelligence, c. mad hatter). Emerging issues analysis Sense-making (Impact/Uncertainty matrix) Butterfly diagram [future] Futures Janus cone
4. Cruising	Futures wheel – Point of impact Causal Layered analysis [part 1]
5. Encountering	Scenarios [part 1] Scenarios [part 2] Causal layered analysis [part 2]
6. Probing	Strategic diamond [session 1] Strategic diamond [session 2]
7. Transforming	Backcasting Transformed Futures landscape Balance scorecard Rocket of one sentence Post-mortem

Table 15. Implemented CFA.

6.3.2 CFA a posteriori suggested adjustments

In addition to the changes *a priori*, implementing the CFA also allowed me to evaluate which activities could be considered core and non-core to the approach. Based on this, I highly recommend keeping the core activities for effective implementation and expected outcomes, as they are the backbone of the approach, while the non-core activities could be singled out. For visual purposes, in Table 16 below, just the recommended core activities are in bold text:

Phase	Activities
Surveying	**1st meeting with the Management team** **Masterclass** The Polak game **State of play** **The circular thing from the future**
Mapping	Past Janus cone Butterfly diagram [present] **Futures Landscape [current]**
Exploring	**Scanning (a. introduction, b. business, competitive and market intelligence, c. mad hatter).** **Emerging issues analysis** **Sense-making (Impact/Uncertainty matrix)** Butterfly diagram [future] Futures Janus cone
Cruising	**Futures wheel – Point of impact** **Causal Layered analysis [part 1]** Sarkar game
Encountering	**Scenarios [part 1]** **Scenarios [part 2]** **Causal layered analysis [part 2]**
Probing	**Strategic diamond [session 1]** **Strategic diamond [session 2]**
Transforming	**Backcasting** **Transformed futures landscape** **Balance scorecard** **Rocket of one sentence** Experiential Futures artefacts **Post-mortem**

Table 16. CFA proposed improvements.

Based on this recommendation, the CFA could be implemented from start to finish by running just 19 of 26 activities (73% of the implemented activities). As one of the anonymous FS experts suggested, the CFA could be simplified, and I agree, as I also sensed that too much went on during the implementation. In other words, some activities

generated the same outputs, so I suggest just keeping one of the two. For example, I suggest the Futures wheel as a core activity and the Butterfly diagram as a non-core. Since the metaphor of exploring space adds coherence and cohesion to the CFA, the non-core methods could be passed over, especially if the implementation occurs virtually (given attention spans from participants behind a computer screen) and if the intended SME has time constraints and a justified urgency for the CFA implementation.

6.4 Implications for practice

As the CFA has been validated through its implementation in an SME context, the empirical results generated from the CFA indicate that it can be considered an instrumental tool for strategic management in orienting SMEs to better align their decisions with their vision and mission by improving their strategic intelligence and proactive capacity towards their preferred future. Furthermore, making the CFA accessible to SMEs provides these organisations with a methodological tool to improve their performance by equipping decision-makers and their teams with a tool that helps them study their past, analyse their present, and scan their future. The CFA contributes specifically to (1) approach volatility, uncertainty, complexity and ambiguity systematically, (2) create ownership of the foresight topic, (3) learn to qualify weak signals and interpret the next-order impacts of change, connecting the shifting dots with action triggers, (4) informing decision-making, (5) induce organisational innovations, (6) inform decisions on future investment, and (7) the development of new business models or new products.

Implementing the CFA and showing the DSME participants the dynamics of their future perceptions contributed effectively to the targeted use of their professional knowledge, future orientation and future literacy. The CFA implementation phase aimed to provide the DSME with practical knowledge, a toolkit, and methodological support in problem detection, decision making and problem-solving. Forward-looking thinking and future orientation characterise the diversity of methods in the facilitated learning process.

Chapter 7: Conclusions

Increasing attention has been paid to CE as a new paradigm for a sustainable tomorrow. However, this concept still needs to be critically questioned since CE is still an evolving discipline from a scholarly perspective. My research contributes to this questioning by highlighting a systemic failure within this discipline, which considers the future unknowable, and proposes FS as a complementary discipline for CE to study and address the future thoroughly. My primary purpose has been to open the field in the CE discipline to elaborate and integrate FS methods for a better and more actionable methodology to support SMEs transitioning to CE. The FS community could, on their part, evaluate whether existing methods are entirely suitable for CE research or if new developments or refinements are required. I have explained where the synergy sits, provided the CFA, and recommended how and where to start.

This thesis has explored FS methods' analytical and practical potential for CE research. Grounded in a collaborative research project with a Dutch SME, it has been argued that FS methods, through their elements and combination with CE principles, can serve not only as means for the generation of prospective data but also enable organisations to create and pursue their preferable circular future systematically.

This CFA systematisation contributed during the approach implementation to selecting the preferred future amid a wide variety of realities and visions and then to a plan of effective action. Moreover, as an alternative to more standard methods of knowledge extraction, FS methods constitute one possible answer to the methodological imperative of recognising how the agency and subjectivity of people working in an SME unfold through research encounters (Andrä, 2022).

The development of a methodological tool to reach a preferred circular future has received no attention within the context of SMEs. Thus, the conceptual model and empirical research presented in this thesis have proposed a new circular futures paradigm for SMEs and a pathway to effectively implement the developed approach in practice.

A case study supported my findings, which substantially enhanced the results' reliability presented in this thesis. The empirical results demonstrated that the CFA could play a protagonist role in helping SMEs define a preferred (and circular) future and provide a clear pathway to advance toward that future. Moreover, this research has contributed to developing a more solid CE paradigm as one approach toward circular futures now exists.

7.1 Revisiting the aim, research questions and objectives

By studying the DSME experience in implementing the CFA, I have raised strategic implications crucial not only for this organisation to meet their preferred future but also for other SMEs to achieve their long-term ambitions.

Thus, the CFA contributed to answering the following three questions: (1) what needs to be found in the future, (2) how to find it (3) what methods (and sequence) should be used to study the future. Implementing the CFA approach provides organisations with a tool to perform better in the present and increase the likelihood of reaching their preferred future. Furthermore, positive results could become more robust and consistent as companies procure greater stability when implementing this approach. This CFA fills in the gap in the literature regarding this topic.

My findings, therefore, suggest that actions to envision, define, and be persistent in reaching the preferred future for SMEs in a transition to CE are possible and desirable and that this size of organisations have now a valuable and practical tool regardless of their characteristics, e.g. industry, processes, products, location, etc.

With this point of departure, I have demonstrated the gap between CE and FS disciplines for research objective one. To fulfil research objectives two, three and four, I have provided an initial understanding of where the synergy sits, recommendations for where to start and provided the CFA as the first existing alternative for the CE to study the future thoroughly and help organisations transition to circularity more effectively. Finally, for research objective five, the appropriateness, feasibility, validity and reliability of the proposed approach have been conceptually explained and empirically confirmed by the in-depth case study presented in this thesis.

In conclusion, the CFA approach's design, implementation and final results fulfil my research goals and confirm 1) the uniqueness of the framework and how its implementation improved it, 2) my study contributed to the CE and FS literature and research fields, 3) it offers practical contributions to the private and public sectors. Furthermore, I have demonstrated that an interdisciplinary approach with CE principles and FS methods implemented in SMEs is feasible and practical. Additionally, this research provides empirical evidence demonstrating that the CFA helps SMEs to recognise the interaction between their understanding of the world as it is now and their vision of what it might become (Mallan and Greenaway, 2011).

7.2 Contributions to existing knowledge

7.2.1 Academic contributions

From a scholarly perspective, CE is still an evolving field of study, and a new economic and development paradigm must be critically questioned and validated. I have examined its ability as a suitable paradigm in an SME context. I believe my research provides a substantial review of the related literature on CE and FS. In addressing this, my research has confirmed a lack of a CE's robust approach to studying and helping SMEs reach a preferred future. To bridge this gap, I have developed the Circular Futures Approach, a CE and foresight-guiding tool for SMEs already adopting CE or exploring CE adoption. An empirical study was undertaken to examine this framework in the context of a Dutch SME.

The epistemological and empirical approach proposed in this thesis is undoubtedly one of the many lenses to adopt and practice by the CE research community. We need more of them to study a very relevant phenomenon in the CE discipline and thus for researchers concerned with how CE can thrive. Such pluralism would allow us to answer the many questions regarding how and why a combination of CE principles and FS methods works in SMEs.

By designing this approach, I have provided a valuable tool for SMEs to envision ways that their organisations can adapt in the present to the external environment in transformative ways representing a CE pathway for SMEs to follow. I hope to contribute to a starting point for more CE tools focused on SMEs' future and stimulate further discussion in the CE research and practitioner communities to consider other important elements to integrate or improve within my approach. My research opens up a new and rich agenda of research on CE futures applied not exclusively to organisations, as our profession becomes normative and engaged with the wicked problems of society at large (Fergnani, 2020). For this reason, we, as CE scholars and practitioners, ought to develop this agenda.

Based on my findings, I encourage CE scholars to exercise a more pluralistic view when studying the future to guide SMEs to transition to CE successfully. As Sardar (2010, p. 182) argues: "any singular term for the exploration of the future will only perpetuate Eurocentrism. This is why plurality must be emphasised consciously and continuously".

In line with Nadkarni et al. (2018) call for radical theorising, I aimed to stretch the theoretical boundaries of the CE discipline by introducing a new frontier of research that, although current incipient, could shape the CE debate, namely using FS methods for a

more effective transition to CE. Lastly, I hope the CFA is analysed, implemented and tested by other scholars and professionals within CE and FS. Finally, I also hope the CFA will be enhanced, and other researchers will include new methods and activities.

7.2.2 Managerial contributions

The CFA can make significant contributions to management. The proposed framework provides SMEs with a new tool for SMEs interested in designing and assessing strategic decisions and their results in the CE context. Therefore, it considers various possible futures and the possible effects of implementing the defined actions.

By implementing the CFA, SMEs can better integrate the CE into every strategic decision within a jointly defined timeline. Furthermore, being a participatory process improves the effectiveness of such discussion, increasing the final consensus and anticipating adverse consequences. Thus, my research seeks to help SMEs be more comfortable navigating uncertainties and exercising dynamic organisational capabilities in the present that would enable them to do so in the future (Fergnani, 2022a).

One of the main characteristics of the approach is the group decision process. From a practical point of view, as mentioned in section 6.1, it was observed that the approach was well evaluated by the DSME participants, bearing in mind feasibility, usability, and utility features. I believe this positive CFA assessment is grounded on the methodological support that helps organisations analyse their strategies and make adjustments where and when necessary, having managerial perceptions of what must be done to reach their preferred future. For example, the outputs of various CFA activities could allow future investment decisions to be more targeted in search of the desired future.

For this reason, I believe the proposed approach represents an excellent opportunity for the industrial sectors as it can help improve organisational actions with a common vision, common strategy and shared objectives and targets.

As the approach can be adjusted according to each organisation present and based on the industry they are into, it facilitates SMEs selecting some of the methods and leaving others out to be executed, depending on the organisation's resources, readiness and the targeted period to reach their preferred future.

7.2.3 Policy contributions

Establishing a clear link between the CFA and its impacts on policies is challenging. However, SMEs are a case of particular interest to policymakers. As Havas and Weber (2018) argue, “in uncertain times, thinking in terms of multiple futures states is a necessary precondition for devising policies to cope with unexpected developments” (p.

212). For this reason, the CFA represent a valuable tool that policymakers could adopt and make available to SMEs. Moreover, the CFA implementation could contribute to SMEs turning long-term concerns into urgent policy priorities. For example, the CFA could become a tool SMEs use when applying for CE public funding. Moreover, the support this tool could provide to SMEs could contribute to the development of circular SMEs with the potential of a positive impact on the common good of a community or a nation, alongside other tools and coordinated actions. Finally, as the CFA integrates the CE principles with FS methods, this could also help policy-makers adopt better and more effective policies in the field of CE.

By focusing on this size of organisations, examining its current efforts, and offering an approach for a sound transition to CE, policymakers could improve their understanding of the SMEs to focus on policies better. Furthermore, as the CFA could help SMEs with risk management, this would give evidence-based resources to policymakers to mitigate risk.

The local or regional governments could help disseminate the CFA and let SMEs access it widely. In addition, the public sector could create incentives for companies implementing the CFA. Finally, amid our global climate crisis, a more radical approach could be considered to turn the CFA from a voluntary to a compulsory process. For example enforcing that, if SMEs do not implement the CFA or invest resources in it, they could get fined or lose their licence to operate.

7.3 Limitations

7.3.1 Bibliometric review limitations

It is essential to consider the limitations of this research imposed by the methods used. My bibliometric review and snowballing technique might have missed some literature that falls within the scope. Such limitations could be, on the one hand, due to my bibliometric review approach (selecting publications based on matching keywords). Such limitation is due to the query construction for my bibliometric review approach, as I selected publications based on the literal use of the concepts ‘circular economy’ and ‘futures studies’ by using these exact keywords without a wildcard (e.g. circular econom*), I may have missed publications containing terms semantically different but with the same meaning, e.g. circular economic, circular-economy (Türkeli et al., 2018).

On the other hand, the snowballing technique could have been affected by my subjective judgements on which publications are worth exploring based mainly on the

title and abstract of the manuscripts. Despite these limitations, this thesis has highlighted a substantial opportunity for a beneficial collaboration between these two fields of study that I feel would be highly worthwhile exploring. Further work must be done to establish what both fields could offer each other in more detail.

7.3.2 CFA implementation limitations

My findings are grounded in the experiences and subjective perceptions that each DSME participant communicated during the workshop sessions. Consequently, I used individual reflections for my data codification. Moreover, this included potential biases, referring to participants' memories (Hofmann and zu Knyphausen-Aufseß, 2021). I tried to tackle these potential biases through data triangulation, but this limitation must be recognised.

My research and proposed CFA are qualitative. Therefore, they are unspecific about the actual impacts of the proposed preferred scenario, activities and milestones, nor provide probabilities. Moreover, the relatively short timeframe of my research makes it impossible to estimate the longer-term impact of the CFA on the participating SME. As Havas and Weber (2018) argue about the impacts of foresight practices, its impacts may take time to arise, while some effects may be almost immediate.

However, the CFA provides a sound baseline for quantitatively modelling the suggested courses of action. In terms of this research limitation, I believe, based on the trade-off between the time spent and effort made by the SME participants and the added value the CFA implementation gave in return, that the CFA is worth implementing. Furthermore, the CFA can adapt quickly to the different SMEs' circumstances regardless of their maturity level. Lastly, it provides organisations with a clear pathway to envision and pursue a preferred (and circular) future.

The CFA implementation shows that it works well in the context of SMEs and can improve the organisation's preparedness to cope with the possible futures by providing a systematic approach to studying the future. Additionally, combining insights from CE and FS fields of research results in a clear, comprehensive and innovative approach for SMEs.

7.4 Further research suggestions and final comments

My research provides conceptual, practical and applicable guidelines and insights to inspire and prepare SMEs for a circular transition. Intending to stimulate discussion and further dialogue between these two fields, I invite researchers and practitioners from CE and FS to collaborate on addressing the role of FS and its integration within CE.

There are several opportunities for future research. I recommend a further systematic and comprehensive review of other methods and methodologies available within FS and how to integrate them into the CE. For example, new studies could be conducted to examine different aspects of my proposed approach. Future research could examine the list of suggested methods by removing or adding new elements according to the SME's new challenges. In addition, researchers could suggest a different taxonomy on the CFA for the core and non-core methods, depending on the different application fields and industrial areas. It is also recommended to systematically create and test other frameworks that consider alternative possible, plausible, probable and preferable futures with CE principles and FS methods.

Moreover, I believe both fields (CE and FS) explicitly require key contributions from the creative economy as I recognise the relevance of the cultural and creative sectors to produce innovative solutions for sustainable development in our contemporary reality and collective futures.

The CFA developed in this research could be empirically tested again and improved by using other SMEs as a case study. In an empirical approach, my study illustrates the variety of methods and stages representing the SMEs' journey to circularity. Furthermore, learning how companies in other cultures develop and incorporate CE and FS in their strategies would provide new insights. Therefore, a possible continuation of this research could be to interrelate the results of my thesis with intercultural disciplines, contrasting data based on surveys on employees' satisfaction and participation in the company strategy. Moreover, concerning the case study research method I used, it was impossible to examine the internal dynamics of the DSME in real-time. For this reason, future research should follow a case study combined with an ethnographic research design.

In addition, the CFA could also help shape the type of organisation where people wish to work in the future, where the journey from the current status of the company to the wished future at a certain point may be part of a longer study. Thus, researchers could apply time series analysis and collect and analyse data over an interval to assess the changes within the organisations.

Accordingly, my research could be complemented by further research using different FS methods and applying the CFA using different approaches, analysing data differently, and having other case studies. My argument about the potential of CFA for CE research is not limited to the exact FS methods I used. Preferences for particular methods may vary between researchers, and different FS methods may be appropriate for different research projects and contexts. For example, one possible exploration of how to improve the approach is by adding quantitative methods and tools that measure the organisation's present state and preferred future.

Therefore, this thesis seeks to extend an invitation to CE and FS practitioners and researchers to engage in further additions to my developed approach. This will be instrumental in triangulating findings and expanding our current limited knowledge of circular futures. My research aim was to study SMEs, but further research investigating the futures of industries or cities under a CE paradigm I believe will be highly fruitful.

Moreover, to stimulate discussion and further dialogue between these two disciplines, I invite researchers and practitioners from CE and FS to collaborate on addressing the role of FS and its integration within CE for a sustainable future. I am keen and open to fostering these topics collaboratively.

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Appendix

Open access link to all Mural boards:

https://app.mural.co/invitation/room/1655670322400?code=860dcb691ad142f9ab9a18a3470e4c90&sender=ucfb105c039c7b3bfbe781066

For open access to particular Mural boards to facilitate reading:

The Circular thing from the Future:
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655671175801/052438e00a8457e750b3a0eec44bdca5d0c1cada?sender=ucfb105c039c7b3bfbe781066

Futures Triangle:
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655671157304/e25c5ad3c460b20300b60d5310b96ffa2ffbd35a?sender=ucfb105c039c7b3bfbe781066

Futures Landscape:
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655670665660/b444622f6dda9588623657d40fab9be59b103fa7?sender=ucfb105c039c7b3bfbe781066

Integral Futures Framework:
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655671126516/94c14ea8d3a01d45cedf4e2879ff05caf1671659?sender=ucfb105c039c7b3bfbe781066

Sense Making, Mad Hatters and Emerging Issues Analysis (patterns created):
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655671076313/3085016723ef5640a0ca1a0204c2c6620f90ece4?sender=ucfb105c039c7b3bfbe781066

Impact Uncertainty Matrix, Past and Future Janus cone, and Butterfly diagram future:
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655671054045/6421fa5c8201490784cc5006d31aab9a2ce773b2?sender=ucfb105c039c7b3bfbe781066

Point of Impact Wheels:
https://app.mural.co/t/circulareconomyfuturesstudie6093/m/circulareconomyfuturesstudie6093/1655671913122/f1f23dfa819d73c347b8b319396bb421071f53df?sender=ucfb105c039c7b3bfbe781066

Causal Layered Analysis:
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Backcasting:
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Rocket of one sentences:
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