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Anu Laakkonen[1,2], Katri Rusanen[1], Teppo Hujala[1], Mika Gabrielsson[3,4] and Jouni Pykäläinen[1]

Implications of the sustainability transition on the industry value creation logic – case of Finnish pulp and paper industry

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Highlights

- Global change drivers are inducing a sustainability transition to a circular bioeconomy.
- Established industries need to reconfigure their value creation logic.
- A document analysis investigated pulp and paper industry's communicated value creation logic.
- An interdisciplinary approach helps to understand a changing business environment.
- Recognition of a socio-economic-technological-environmental system is needed.

Abstract

Global economic, social and environmental change drivers have tremendous effects on the dynamic and nested business environment calling for a sustainability transition to a circular bioeconomy. The transition will pressurise established industries to alter their value creation logic to consider sustainability holistically. The study follows a case study research strategy and investigates how an established Finnish pulp and paper industry reconfigures its communicated value creation logic. The findings of a qualitative document analysis suggest that the pulp and paper industry has started to explore new sustainable path-breaking innovations and create a common development agenda, which has resulted in incremental adaptations in the value creation logic. However, the industry's narrative of already being sustainable has hampered the reconfiguration and stabilisation of the adapted value creation logic. From a theoretical perspective, adopting an interdisciplinary and systemic perspective is necessary to understand the changing business environment. From a managerial perspective, cross-sectoral collaboration and including perspectives of different actors can help in creating a holistically sustainable value creation logic.

Keywords business transformation; circular bioeconomy; forest industry; sustainable business
Addresses [1]School of Forest Sciences, Faculty of Science, Forestry and Technology, University of Eastern Finland, P.O. Box 111, FI-80101 Joensuu, Finland; [2]Department of Forest Sciences, Faculty of Agriculture and Forestry, University of Helsinki, P.O. Box 27, 00014 University of Helsinki, Finland; [3]Department of Marketing, Hanken School of Economics, P.O. Box 479, FI-00101, Helsinki, Finland;[4]UEF Business School, Faculty of Social Sciences and Business Studies, University of Eastern Finland, P.O. Box 1627, FI-70211 Kuopio, Finland
E-mail anu.laakkonen@uef.fi
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1 Introduction

Highly topical global environmental challenges such as climate change and biodiversity loss, coupled with digitalisation, overconsumption and rising eco-awareness of societies, are having tremendous effects on the global socio-economic-environmental system. All these phenomena can be viewed as change drivers, which are direct or indirect factors triggering a change in a human or natural system (Nelson et al. 2006). Responding to these change drivers calls for a systemic change, also known as sustainability transitions, requiring "*fundamental changes in socio-technical systems such as energy, food or transportation that aim to address grand challenges in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (Markard et al. 2020).

One sustainability transition is the transition towards a circular bioeconomy where bio-based resources are utilised in circular manner. However, the transition to circular bioeconomy does not self-evidently solve the sustainability challenges and the related change drivers. Therefore, this study adopts a rather new and radical definition and perspective for circular bioeconomy and sustainability. The traditional perspective on circular bioeconomy and sustainability, follows either the so-called efficiency or consistency strategies on sustainability. The efficiency strategy aims at utilising the lowest possible amount of resources for producing products or services and the consistency strategy aims at consistent resource flows following ideas of circularity and substitution of environmentally harmful resources with more environmentally friendly ones (Grunwald 2020). In both of these strategies the purpose of business activities is to balance the economic, environmental and social dimensions of sustainability, also known as the weak sustainability (Giddings et al. 2002). The social and environmental problems are seen to be solved with economic growth and technological developments (Morandín-Ahuerma et al. 2019).

To solve the current global environmental and social challenges the traditional perspectives on circular bioeconomy and sustainability might not be enough. Therefore, in this study, a sufficiency perspective on sustainability is adopted where the satisfaction of needs is achieved by consuming and producing less and the business strategies and activities are based on post-material values of solidarity, community and functional ecosystems (Grunwald 2020). In addition, a holistic perspective to sustainability is taken where sustainability is seen nested; the economy and society are derived from the natural environment, while all are simultaneously interconnected to each other (Folke et al. 2016; Dasgupta 2021). This means that human operations such as business are done within the planetary boundaries (Rockström et al. 2009) which follows the ideas of strong sustainability (Ayres et al. 2001; Giddings et al. 2002)

In this study, circular bioeconomy is an economic model focusing on the sustainable wellbeing of societies and nature (Palahí et al. 2020) while using renewable non-fossil raw materials and products in a sustainable, resource-efficient and circular way (Hetemäki et al. 2017). According to this definition, the circular bioeconomy focuses on wellbeing of societies and nature where a restorative and regenerative perspective (Landrum 2018; Ellen MacArthur Foundation 2023) on business strategies is taken and the purpose of business activities is to repair damages caused to environment or societies and to enhance their qualitative wellbeing. However, the substitution of fossil-based resources with sustainably sourced and reused bio-based resources as well as focusing on utilisation of the resources over ownership are also important aspects within the circular bioeconomy (D'Amato et al. 2020). Also, the concept of circular forest-based bioeconomy has emerged which refers to using and reusing forest-based resources according to the principles of circular bioeconomy. Forest-based bioeconomy has widened the notion of the traditional forest sector including pulp, paper and sawn wood companies, to consider companies outside these. Yet, the established pulp and paper industry is an important part of the circular forest-based bioeconomy especially in the regions with large forest reserves, such as the Nordic countries.

Transition to circular bioeconomy inherently challenges established industries, such as the pulp and paper industry, to transform to meet the needs of the changing business environment. This business transformation means that industries need to reconfigure their traditional value creation logics. In this study, value creation logic is defined as the actor's or industry's established and common ways of co-creating social, environmental and economic value by performing value-creating activities that integrate tangible and intangible resources (Prahalad and Bettis 1986; Håkansson and Snehota 1995; Möller and Rajala 2007; Vargo and Lusch 2011; Dyllick and Muff 2016). However, it is important to acknowledge that there might be differences with operational value creation logic, that is, the actual value-creating activities, and the communicated value creation logic, that is, the strategic narratives of companies and industries. The transformation of an industry and its value creation logic can be investigated with a business environment formation process framework introduced by Möller, Nenonen and Storbacka (2020). The framework provides means to understand the dynamic business environment and what kind of conditioning forces and transformation processes constrict and enable business transformations (Möller et al. 2020).

So far, research on the bioeconomy has highlighted its economic benefits (Korhonen et al. 2018c; Ramcilovic-Suominen and Pülzl 2018), but the resulting intensified use of natural resources and land space, together with the effects on social aspects have been increasingly questioned (Pfau et al. 2014; Karvonen et al. 2017; Gawel et al. 2019). Similarly, the use of forests and forest-based resources is controversial. On the one hand, the circular forest-based bioeconomy holds many opportunities since there are many promising innovations and wood-based solutions (Hurmekoski et al. 2018), especially related to substituting fossil-based products. Furthermore, it offers possibilities for rural socio-economic development by offering e.g., employment opportunities (Lehtonen and Okkonen 2013). On the other hand, forests offer ecosystem services of which many are crucial e.g., for maintaining biodiversity and regulating the climate. Thus, increasing the levels of timber harvesting will most probably lead to massive losses in biodiversity and ecosystem services (Eyvindson et al. 2018). Therefore, as forest-based biomass is a limited and scarce resource its use should be prioritised for the highest-value and longest-lasting products (Leturcq 2020; Material Economics 2021). Likewise, the inclusion of the social dimension, such as local stakeholder points of view in bioeconomy-related political decision-making (Mustalahti 2018) and global investments (Lehtimäki et al. 2011), is crucial because merely creating employment and economic growth will not lead to holistically sustainable business practices (Landrum 2018; Hadley Kershaw et al. 2021). Addressing all the above-mentioned sustainability-related phenomena requires adopting an interdisciplinary approach where theoretical foundations and concepts from different research traditions are combined. Thus, in this study theories and concepts from network management (Håkansson and Snehota 1995; Möller and Svahn 2006; Möller and Rajala 2007; Möller et al. 2020), strategic management (Prahalad and Bettis 1986; Hart 1995; Vargo and Lusch 2011; Evans et al. 2017; McDougall et al. 2019) and transition studies (Markard et al. 2012; Köhler et al. 2019) are intertwined in an interdisciplinary conceptual framework.

In business studies, there is an increasing amount of strategic management research related to the sustainable and innovative value creation (Klewitz and Hansen 2014; Bocken 2015; Ritala et al. 2018; Boruchowitch and Fritz 2022) within small and medium-sized enterprises (SMEs) and multi-national enterprises (MNEs). In addition, sustainable innovations and value co-creation have been widely studied within manufacturing and service industries (Patala et al. 2016; Inigo et al. 2020). The importance of networks and strategic relationships (Oskam et al. 2018; Loureiro et al. 2020; Calzolari et al. 2021) in doing business have been studied in network management studies. However, studies taking a natural resources perspective in sustainable value creation is researched less even though understanding special features of natural resources provides important future avenues in studying sustainable business. In addition, when studying sustainability of networks,

environmental and/or economic dimensions of sustainability are mainly considered (Gliedt et al. 2018; Keränen et al. 2021), and thus often the social dimension within the development of networks is missing. In the studies focusing on transitions, the concepts and narratives related to the transitions towards sustainability, circular economy and bioeconomy (McCormick and Kautto 2013; Lindahl et al. 2017; Leipold and Petit-Boix 2018; Gawel et al. 2019; Näyhä 2019; Wreford et al. 2019; D'Amato 2021; D'Amato and Korhonen 2021; Kardung and Drabik 2021) are broadly studied. Similarly, there are studies on macro-level policies that support sustainability-oriented economic transitions in general (Meyer 2017; Patterson et al. 2017; Stegmann et al. 2020), related to bioeconomy (Ramcilovic-Suominen et al. 2022) and within the forest industry and its networks (Korhonen et al. 2018a; Scordato et al. 2018; Korhonen et al. 2021). However, the business and value creation perspectives are missing. There are vast amounts of empirical micro-level company studies focusing on business model development in the forest industry, when transitioning to the circular (bio)economy (Näyhä 2020, 2021) as well as from other industries (Levänen et al. 2018; Diaz Lopez et al. 2019; Cavicchi et al. 2022), but studies focusing on the industry's meso-level value creation logic are largely absent. The knowledge regarding such industry-specific interactions is crucial for advancing sustainability transitions since they require joint efforts and collaboration between actors. Hence, more research is needed on the reconfiguration of a value creation logic of a natural-resource-based industry with powerful MNEs and their contributions to holistic sustainability. Especially, a meso- and industry-level approach to analysing sustainable value co-creation is needed because co-creating holistically sustainable value from forest ecosystems requires a systemic and inter-organisational perspective.

This interdisciplinary study aims to close the identified research gaps by gaining a holistic understanding of the reconfiguration of an industry's communicated value creation logic by investigating a practical and theoretically interesting phenomenon: the transformation of a mature and established industry towards a more sustainable value creation logic and how the macro-, meso- and micro-level drivers of change from the business environment influence it. Understanding the role of the business environment in the development of an industry's value creation logic and how the industry's sustainability contributions are communicated provide an interesting research context. The scientific novelty of this study is to advance interdisciplinary research by connecting theoretical concepts from business studies and transition studies into the same conceptual framework and apply them to the context of the pulp and paper industry. The objective of this study is to investigate the transformation of the pulp and paper industry towards a sustainable circular bioeconomy through the business environment formation process framework. The objective is met by responding to the research question: How has the Finnish pulp and paper industry reconfigured its communicated value creation logic towards holistic sustainability?

The rest of the paper is organised as follows: first, the conceptual framework and the research design are introduced. Next, the findings of the document analysis are presented. The findings of the study are discussed with implications to future research. Conclusions are drawn in the last chapter.

2 Conceptual framework

2.1 Reconfiguring value creation logic in the changing nested business environment

The core purpose of the economic actors is to create value by performing resource integrating activities (Håkansson and Snehota 1995; Möller and Rajala 2007; Vargo and Lusch 2011). In business studies, and moreover in network management studies, actors operate in a business environment which is a dynamic, complex and emergent structure of embedded relationships that bond actors,

tie resources and link activities together (Håkansson and Snehota 1995, 2017). The actors in the business environment have continuous interactions between each other resulting in changes in their relationships (Vargo and Lusch 2011; Håkansson and Snehota 2017; Möller et al. 2020) and in the value-creating activities. To understand the role of inter-organisational interactions in the complex and dynamic business environment, Möller et al. (2020) suggest that the environment is viewed as layered and nested. Within the nested business environment actors and activities are performed at different layers and they have causal power and influence over each other. This makes the social, economic, political and technological aspects intertwined. The nested interrelated layers consist of the actor layer at the micro-level, the focal business ecosystem and business field layers at the meso-level and the socio-economic-technological (SET) system layer at the macro-level (Möller et al. 2020).

Especially, responding to the change drivers requires a systemic and holistic understanding of the nested business environment where one actor alone cannot create value and provide solutions. Thus, reconfigurations of the traditional perspective on a company-specific value creation logic are required. Actors need to create a common understanding and vision, i.e., an agenda, for co-creating value in the business environment (Möller 2010; Möller et al. 2020). This common agenda can manifest an industry-specific value creation logic. An industry, which can also be called a business field, represents clusters of interrelated networks sharing common structures, technologies and industry-specific institutions (Möller et al. 2020), thus industry is a constellation of actors sharing similar ways for creating value. Especially, in established and mature industries there exists an institutionalised consensus between the network actors guiding how value is created and activities are performed (Van Bockhaven and Matthyssens 2017; Möller et al. 2020), hence representing an industry-specific value creation logic as a representation of the common agenda. However, it is good to acknowledge that the operational value creation logic may differ from the communicated value creation logic.

2.2 The business environment formation process framework

The nested business environment is constantly under pressure to change due to change drivers originating from the different nested layers, and thus Möller et al. (2020) introduced a business environment formation process framework with three phases of exploration, mobilisation and stabilisation (Möller et al. 2020). As the business environment is transforming, so are the actors and industries operating in the environment also pressurised to change. The phases can describe either a formation of something new, e.g., an industry, or a transformation of something old depending on the scale of the occurring adaptations and changes. Each phase is influenced and conditioned by change drivers originating from macro-, meso- and micro-levels. Similarly, innovation, coalition formation and institutionalising and influencing micro-processes influence each phase (ibid.) Thus, the framework can assist in understanding the dynamic and nested business environment and what kind of conditioning forces and transformation processes constrict and enable the transformation of a company or an industry. However, it can be argued that the business environment's formation or transformation is not a process per se, but it should be considered as a cycle where the phases follow each other perpetually and are partially overlapping. Therefore, we propose to rename the framework as a business environment transformation cycle and illustrate it in a cyclical form (Fig. 1).

The business environment formation process framework operated as a conceptual framework guiding the study. The theoretical foundations of this interdisciplinary study are guided by three research traditions of network management, strategic management and transition studies. In the following sub-chapters, the theoretical underpinnings and concepts of each research tradition are

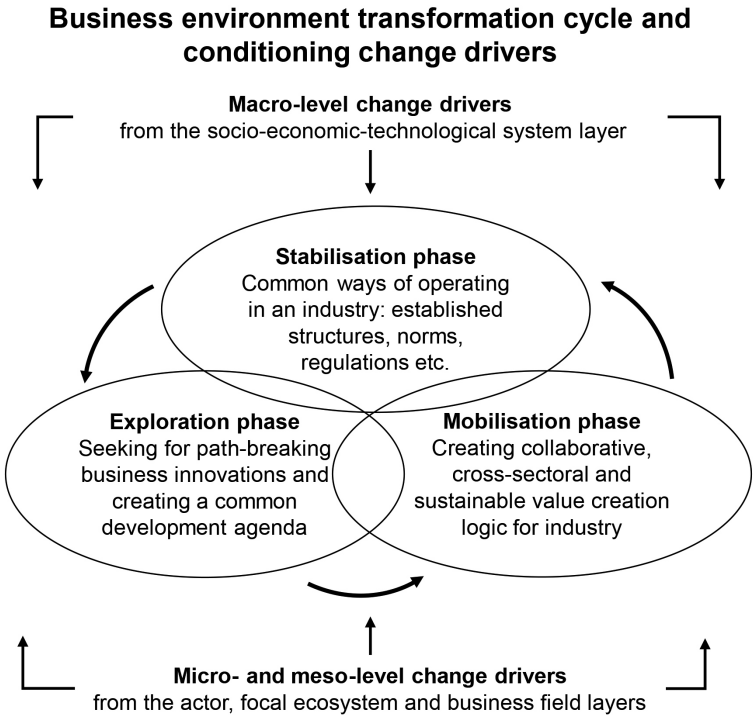

Fig. 1. The interdisciplinary conceptual framework guiding this study (modified from Möller et al. 2020). The business environment is constantly influenced and conditioned by macro-, meso- and micro-level change drivers. These pressurise the business environment to transform pressurising the actors operating within the business environment to change also, and thus the transformation cycle starts from the stabilisation phase as established industries will start exploring for new innovations and mobilising for creating a new value creation logic.

discussed and connected with the (trans)formation phase to assist in interpreting and analysing the changing business environment and industries. To understand and interpret the micro-level change drivers, approaches from strategic management studies are followed. In addition, approaches from network management studies are applied to understand the meso- and micro-level change drivers. Similarly, theories and key concepts from transition studies, are applied to gain a more systemic and macro-level understanding of the changing business environment and industry's transformation.

2.2.1 Exploration phase

During the exploration phase path-breaking systemic business innovations are sought in response to the changes occurring in the business environment (Möller et al. 2020). Innovation is a dynamic and systemic collaborative process beyond company borders where resources are integrated for co-creating new useful knowledge (Vargo et al. 2015). To undergo a sustainability transition, innovations should be sustainable, meaning that they are "*(radically) new or (incrementally) improved products and services or entire systems, which, based on traceable comparative analysis, lead to environmental and (or) social benefits that surpass those of the prior products, services, or systems"* (Bocken et al. 2019). This means that the long-term influences of the innovation are balanced with the impacts it has on the economy, society and the environment (Hautamäki 2010). The institutional actors and operating environment are very closely connected to the ways companies and industries operate, especially related to creating new products and processes (Lamberg et al. 2017), and thus new actors with new roles and redefined resources are critical for value co-creation

(Koskela-Huotari et al. 2016). Industries and companies can strengthen their competitiveness and productivity by applying holistic sustainability principles as opportunities, together with developing novel ways of creating value (Nidumolu et al. 2009; Porter and Kramer 2011).

After exploring the innovation, the involved actors need to create a common development agenda, manifesting the value creation logic, for promoting the business innovations to potential partners (Möller et al. 2020). Creating the agenda involves identifying and aligning objectives, interests and values of the involved actors and industries (Van Bockhaven and Matthyssens 2017). Agenda creation can be done by using narratives as a mode of communication, as a narrative is a story of human actions and behaviour: a way to understand and position actors and their actions within a context (Czarniawska 2004). Narratives have power, and thus powerful actors and institutions might gain a strong position in communicating certain types of narratives (ibid.). Hence, the created development agenda towards sustainability should be commonly understood and agreed upon by all societal actors for mainstreaming the systemic sustainability transition (Luederitz et al. 2017) and integrating it into strategic frameworks (D'Amato and Korhonen 2021). A proactive actor with the right resources and capabilities can have strong influencing power in selecting the promoted business innovation, value-creating activities and development agenda (Möller 2010; Möller et al. 2020). It is important to notice that the actor in this context is not only a single company, but actors within an industry can operate as an entity with strong influencing power in creating and promoting the common development agenda, and thus the value creation logic.

2.2.2 Mobilisation phase

During the mobilisation phase, a collaborative, cross-sectoral and sustainable value creation logic for the industry is created (Möller et al. 2020). This requires choosing and motivating partners, agreeing on roles and responsibilities, and creating shared goals, governance and management principles (Möller et al. 2020). In addition, being able to access and control valuable tangible and intangible resources and to create a variety of resource constellations provides opportunities for value co-creation (Håkansson and Snehota 1995; Allee 2008; Vargo and Lusch 2011). Similarly, adopting a systemic view in the value creation logic is important because achieving holistic sustainability requires broad, cross-sectoral knowledge and understanding of technologies, resources, practices and societal values (Möller and Svahn 2009; Evans et al. 2017; Bondeli et al. 2018; McDougall et al. 2019; Möller et al. 2020). This is especially important when dealing with an industry that acts globally, utilises natural resources and has an important role in answering to the socio-economic and environmental challenges and developments within the global business environment (Hansen and Juslin 2018). The access to these resources and the ability to realise the potential of natural capital tied to natural ecosystems (Costanza et al. 1997; Matthies et al. 2016; Costanza et al. 2017; Andersen et al. 2018) is especially crucial, as forest ecosystems have a key role in sustainability transitions, not to mention their role in facilitating human wellbeing.

2.2.3 Stabilisation phase

During the stabilisation phase, the sustainability-related adaptations in the value creation logic are stabilised. This requires activities from several actors to secure and institutionalise the reconfigured value creation logic (Möller et al. 2020). It is especially important to overcome institutional misfits, that is, the different perceptions and expectations of stakeholders regarding certain behaviour or activities, within the industry's networks and between different actors (Matthyssens et al. 2013). Thus, influencing and communicating the industry-specific norms, regulations and standards to relevant decision-making actors and groups is essential to gain, expand and maintain credibility

and societal approval for the industry and its operations (Möller et al. 2020). This is important especially, when aiming at holistic sustainability (Folke et al. 2016). For an industry to reach true business sustainability in all of its activities (Dyllick and Muff 2016) it simultaneously has to be able to communicate it in its networks (Lacoste 2016). Reconfigurations in institutional structures and value co-creation rules need to be maintained; thus, solely creating new rules will not suffice (Koskela-Huotari et al. 2016). Instead, these need to be integrated with the old rules (ibid.), and only this way can societal approval for business activities be gained.

3 Research design

3.1 Research approach

The research design and methodology of this study follow a case study research strategy (Stake 1995; Easton 2010) accompanied with approaches from phenomenon-based research (Schwarz and Stensaker 2016) and strategic foresight (Heger and Rohrbeck 2012; Vecchiato 2012). In this study, a practical and intrinsically interesting phenomenon, i.e., a case, the reconfiguration of the Finnish pulp and paper industry's communicated value creation logic, is investigated. The theoretically and practically important case offers a real-life inspiring illustration of the conceptual framework (Siggelkow 2007) and an opportunity to gain an in-depth understanding of it (Easton 2010) while building new knowledge on the phenomenon in the context of transforming business environment (Schwarz and Stensaker 2016). The study seeks to create understandings of how general theoretical principles can be applied in a specific empirical context (Nenonen et al. 2017), thus creating theoretical and practical understandings of the transition to a circular bioeconomy and how it simultaneously enables and constrains developments in the industry's communicated value creation logic. The changing business environment holds major uncertainties, and thus adopting perspectives from strategic foresight can aid industries and companies in noticing change drivers originating from the changing environment (Vecchiato 2012). In addition, it can help actors in managing with the evolving opportunities and threats to sustain competitiveness (ibid.) by developing capabilities to explore, plan and develop new value-creating activities within industries (Heger and Rohrbeck 2012).

A research tradition of critical realism is followed as we see that reality is emergent, and relationships between different actors, be they social or natural, have the causal power to change reality and the way it is socially constructed (Easton 2010; Peters et al. 2013). Therefore, an abductive logic (Dubois and Gadde 2002) is followed as theory-based observations will be modified or rejected if needed due to conflicting empirical observations. Abductive logic is especially suitable for this study as it aims at discovering new issues by matching theory and reality (Dubois and Gadde 2002). Similarly, abduction allows for the conceptual framework to evolve along the empirical observations creating a dialogue and connections between empirical observations and conceptual investigations (Dubois and Gibbert 2010).

3.2 The Finnish pulp and paper industry

The Finnish pulp and paper industry and its three powerful companies can be considered an interesting context for investigating the reconfigurations and adaptations in value creation logic towards holistic sustainability. The companies, Stora Enso, UPM and Metsä Group, are self-proclaimed forerunners in the sustainable bioeconomy (Metsä Group 2022a; Stora Enso 2022; UPM 2022). They are the key national actors in Finland and within the global top 100 in the pulp and paper

market, where Stora Enso and UPM are among the top ten (Newton Consulting Partners 2022). These companies have a great role within the whole forest industry as pioneers of their global value networks, and hence they have the potential to contribute to the transformation of the industry effectively while having access to crucial resources and strong bargaining power, both nationally and globally.

3.3 Research process

This study is a result of a long-term continuous iterative document search, reading and reflection cycle (Easton 2010) covering the period from the globalisation of the Finnish forest industry and the introduction of the concept of sustainable development in the 1990s until today. A modified three-phase qualitative document analysis, containing elements from content and thematic analyses (Bowen 2009), was applied as a data analysis method. According to Bowen (2009) in a document analysis, documents are the research data, and their content is systematically evaluated, analysed and interpreted to gain an understanding and empirical knowledge on the studied topic. As the document search and selection for this study has been a long-term familiarisation on the researched topic, rather than a single specific study, a detailed time-bound research process cannot be described. The abductive, iterative and non-linear research process is illustrated in Fig. 2. The research process had four phases with back-and-forth interactions between the conceptual investigation and empirical observations. The first phase of the non-linear research process was identifying and theoretically framing the research case, i.e., the phenomenon, and the objective of the study.

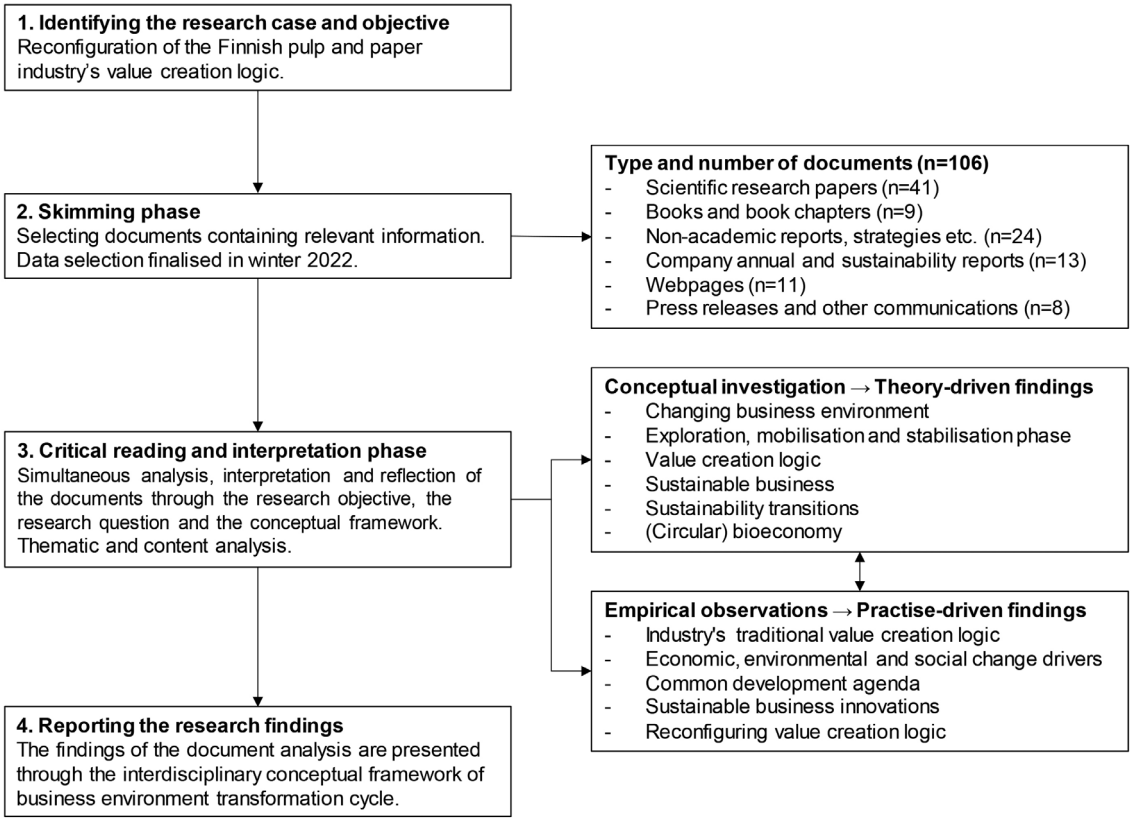

Fig. 2. The four phases of abductive, iterative and non-linear long-term research process (left part of the figure) and the following research activities conducted during each phase (right part of the figure). Note! Arrows represent the back-and-forth interactions between the conceptual investigation and empirical observations.

During the second, skimming phase (first phase in Bowen 2009) of the document analysis, documents containing relevant information were chosen (n = 106) (Fig. 2 and see Supplementary file S1 for more information on the selected documents). The document search was done by utilising internet-based search engines Google Scholar and Scopus, and search terms were different combinations of words forest industry, pulp and paper industry, (forest-based) bioeconomy, value creation (logic), sustainability transition, sustainable business and business transformation. In addition, snowball sampling was used. Documents not relating to these search terms were excluded. The selected documents were scientific research papers, non-academic reports, strategic reports and books as well as annual reports, webpages, press releases and other communications by the three Finnish companies and related actors. The data selection was finalised in winter 2022. As the purpose was not to investigate the business activities per se, documents as a research data, were perceived by the authors to provide a carefully considered strategic, consistent, and thus an objective perspective on the topic. When in contrast, interviews could have brought more subjective interviewee-related perspectives and distractions as well as false memories concerning past developments (Bowen 2009). However, it needs to be acknowledged that all company communications have an agenda, and they are written for certain occasions and audiences, thus their objectivity should be carefully considered. This is especially true in this study, as we are studying the communicated value creation logic.

The document selection had two objectives. The first objective was to make conceptual investigations on the phenomenon: to learn conceptual insights within the theoretical domain (Dubois and Gibbert 2010). The purpose of this objective was to gain scientific understanding of the sustainability-related developments within the business environment and the Finnish pulp and paper industry based on the concepts in the theoretical domain. The second objective was to make empirical observations on the phenomenon: to gain new knowledge through the empirical domain (Dubois and Gibbert 2010). The purpose of this objective was to gain a more practise-driven understanding of sustainability-related adaptations, especially related to the communicated value creation logic, from company, industry and policy perspectives.

During the third, critical reading and interpretation phase (the second and third phases in Bowen 2009) the chosen documents were read thoroughly while simultaneously abductively analysing, interpreting and reflecting the conceptual investigations and empirical observations through the research objective, research question and conceptual framework. Content analysis was used to identify relevant information from the selected documents and thematic analysis was used to identify relevant themes of the phenomenon under investigation. The focus of the analysis, interpretation and reflection was two-fold. First, relevant theoretical concepts, or themes, were identified, thus presenting the conceptual investigation and theory-driven findings. The theoretical themes, operating also as the coding structure, were changing business environment, exploration, mobilisation and stabilisation phase, value creation logic, sustainable business, sustainability transitions and (circular) bioeconomy. Second, empirical observations were done based on the identified theoretical themes and they were coded under the same coding structure as sub-codes. The empirical observations and practise-driven findings were the industry's traditional value creation logic, economic, environmental and social change drivers, common development agenda, sustainable business innovations and reconfiguring value creation logic. Therefore, both the investigated case, the reconfiguration of the Finnish pulp and paper industry's communicated value creation logic, as well as the constructed interdisciplinary theoretical framework directed the abductive research process and the interpretations made, following the approaches of phenomenon-based research (Schwarz and Stensaker 2016).

4 Results

The results section offers an analytically derived narrative of the results, and it is organised based on the interdisciplinary conceptual framework (Fig. 1) and the three phases of the business environment formation process framework (Möller et al. 2020). To ensure validity, reproducibility and transparency of the conducted analysis and interpretation, the narrative text includes citations to the documents from where the findings are derived. The section begins by describing the stabilised phase and current value creation logic of the established Finnish pulp and paper industry. Next, the change drivers originating from the changing business environment, and thus initiating the industry's transformation process are identified. After that each transformation phase and how they have influenced the industry's communicated value creation logic are elaborated starting from exploration, continuing to mobilisation and ending up with the stabilisation phase.

4.1 Value creation logic of stabilised and established pulp and paper industry

The traditional operational value creation logic of the pulp and paper industry is based on natural resources (Hansen and Juslin 2018) and the core business has focused on following the logics of economies of scale and integration where bulk products are manufactured by efficiently using raw materials in integrated mills (Diesen 2007). The industry can be characterised as capital-intensive (Rusko 2011) where the financial capital, machines and technologies and access to wood-based resources are the key to economic success. This value creation logic has proven to be successful regardless of the geographical location of the mills due to manufacturing bulk products with large volumes and similar quality requirements (Diesen 2007), globalisation of the markets (Hansen and Juslin 2018) and the consolidation of companies starting from the 1980s (Järvinen et al. 2012). In addition, the industry is locked-in to chosen technologies and strongly path-dependent (Lamberg et al. 2017; Luhas et al. 2019).

The dominant actors with the most power in the Finnish pulp and paper industry are three consolidated MNEs (the companies investigated in this study), the Finnish forest cluster, national and European governmental actors and stakeholders (Laakkonen et al. 2022). Sustainably managed certified wood and all its components as well as recycled fibres, water and chemicals are efficiently utilised as key tangible resources of the industry (CEPI 2014). In addition, competent labour and the competence system of the Finnish forest cluster are considered to be key intangible resources (Laakkonen et al. 2022).

Developments in the global business environment have always challenged the pulp and paper industry, and there is evidence that the Finnish pulp and paper industry has been able to adapt its operations and value creation logic according to these changes during its long history (Laakkonen et al. 2022). Regarding sustainable development, the companies adopted the idea quite soon in their strategic narrative, i.e., a development agenda and a communicated value creation logic, after it was introduced by the UN Rio Declaration in 1992. Metsäliitto Group and Kymmene both state that they follow the principles of sustainable development in their annual reports of 1992 (Kymmene 1993, p. 15; Metsäliitto-Yhtymä 1993, p. 54). Stora followed suite the next year (Stora 1994, p. 64) and Enso-Gutzeit in 1995 (Enso-Gutzeit 1996, p. 13, 69). Since then, sustainability, especially sustainable forest management and wood procurement, have been part of companies' communications. Similarly, the term "bio" has been mentioned in several contexts, e.g., bioenergy, biofuel, biodiesel and biorefineries, before the introduction of the term "bioeconomy" in 2009 by UPM and Metsä Group (Metsäliitto Group 2010, p. 8; UPM 2010, p. 143).

4.2 Identifying macro-, meso- and micro-level economic, environmental and social change drivers

The present millennium has brought a myriad of new challenges for the pulp and paper industry. Many of these are caused by interactions between humans and their natural or human surroundings, and thus they can be called anthropogenic change drivers (Nelson et al. 2006). Probably the most influential macro-level change drivers are those requiring a system-level change with interactions between multiple systems (Markard et al. 2020), thus leading to sustainability transitions (Markard et al. 2012; Köhler et al. 2019) such as a circular bioeconomy (Hetemäki et al. 2017; D'Amato et al. 2020). There are ongoing political discussions and policy responses related to the sustainability transition. For example, globally the United Nations (UN) has introduced the Agenda for Sustainable Development with 17 Sustainable Development Goals (SDG) (United Nations 2015) and the Food and Agriculture Organization of the UN (FAO) has introduced aspirational principles and criteria for a sustainable bioeconomy (FAO 2021). At the European level, the European Union (EU) has initiated several policies (EC 2015, 2019, 2021b) and strategies (EC 2018, 2021c, a) to respond to sustainability-related change drivers. For example, the EU's updated bioeconomy strategy (EC 2018) and the updated Finnish bioeconomy strategy (Finnish Government 2022) take a wider view than mere substitution and biotechnology to a more holistic and systemic view, where concepts such as industrial renewal, strengthening ecological boundaries, sustainability and circularity are emphasised. A similar shift has also occurred in the national-level (circular) bioeconomy strategies in Europe, the Americas, Asia and Africa (Dietz et al. 2018). Similarly, the pulp and paper industry's lobbying organisations, the Confederation of European Paper Industries (CEPI) and the Finnish Forest Industries Federation (FFIF), have a powerful role in influencing and drafting all these strategies affecting their business. In addition, non-governmental organisations (NGOs) and citizens are taking part in the discussions by especially challenging the political and business decision-makers (Anon 2018; Greenpeace 2019; Anon 2021). All these identified policy initiatives and societal pressure have a great effect on how forest resources are considered as a renewable alternative for fossil resources but also as a habitat for numerous species.

Within the forest industry related research there are publications that have identified and addressed the environmental and socio-economic changes and their effects on the industry. There are studies taking a global (Mery et al. 2010) or a regional perspective (Hetemäki 2014; Winkel 2017; Dockry et al. 2020). Furthermore, several publications discuss only certain possible change drivers affecting the forest industry. These include changing products, markets and demands (Cai et al. 2013; Hetemäki et al. 2014; Hurmekoski et al. 2018; Jonsson et al. 2021), the potential of non-wood forest products (Martinez de Arano et al. 2021), digitalisation and platforms (Watanabe et al. 2017), urbanisation, tertiarization and globalisation (Farcy et al. 2019), social innovations (Ludvig et al. 2021) and changing forest ownership (Viitala and Leppänen 2014; Weiss et al. 2019). In addition, a business perspective on transition to circular forest-based bioeconomy in Finland has been widely studied (Luhas et al. 2019; D'Amato et al. 2020; Näyhä 2020; Korhonen et al. 2021; Toivanen 2021). Overall, there is an increasing amount of scientific knowledge on forest industry's impact on environment, society and economy that the industry is incrementally acknowledging in their strategies. Hence, the identified change drivers are affecting the communicated value creation logic of the pulp and paper industry both directly and indirectly.

4.3 Exploring for path-breaking sustainable business innovations and a common development agenda

Due to the change drivers, the pulp and paper industry has started to explore for new sustainable business innovations. The companies have increased collaboration in bioeconomy-related research, development and innovation (RDI) activities by involving larger companies or SMEs operating in the same, similar or different industries, as well as public actors (Metsä Group 2022a; Stora Enso 2022; UPM 2022). However, the three main companies are not collaborating with each other. Many of the innovations within the industry aim at fostering cross-sectoral collaborations to provide fibre-based solutions through several initiatives, e.g., related to packaging and textiles and other biomaterials (ExpandFibre 2020b; 4evergreen Alliance 2021).

The traditional view of innovations in the pulp and paper industry has focused on large-scale industrial and technological innovations in processes and products. Thus, the innovations have related to energy and resource efficiency in manufacturing processes while increasing volumes (Pesonen 2006; Oksanen et al. 2010). In their communicated value creation logic, the industry has started to emphasise the sustainability of their products, as companies already use renewable materials and are substituting non-renewable ones which can be recycled and are biodegradable (CEPI 2014). Moreover, the industry has started to underline how its product and material innovations are path-breaking as they solve grand global challenges and create a pathway to a more sustainable future (Business Finland 2020; CLIC Innovation 2020; CEPI 2021c; The Finnish Forest Industries Federation 2022). However, the traditional view on innovations could be reconfigured (Rametsteiner and Weiss 2006; Secco et al. 2019) and a more systemic view, where both companies and the environment they operate in are considered (Weiss et al. 2020). Similarly, sustainability aspects could be considered more holistically in innovations by acknowledging the nested nature of environmental, social and economic dimensions and planetary boundaries (Boons and Lüdeke-Freund 2013; Folke et al. 2016).

The Finnish pulp and paper companies have integrated the idea of being forerunners in the sustainable (circular) forest-based bioeconomy seamlessly into their communicated value creation logic. In 2009, UPM introduced its Biofore strategy where as a "Biofore" company they have a vision stating: "as the frontrunner of the new forest industry, UPM leads the integration of bio and forest industries into a new, sustainable and innovation-driven future" (UPM 2010, p. 8). In 2014, UPM mentioned the term circular economy related to a new product that is made from pulping waste (UPM 2015, p. 50). In 2014 Metsä Group stated that "(t)oday's forest industry is a leader in promoting the bioeconomy and offering renewable alternatives for fossil-based products" and introduced the circular economy as a rising sustainability topic (Metsä Group 2015, p. 6). In 2015 Stora Enso introduced the term bioeconomy by stating that its "business model aligns well with the concept of a bioeconomy, offering sustainable alternatives to fossil-based materials" (Stora Enso 2016, p. 59).

The lobbying organisations CEPI and the FFIF together with the CLIC Innovation cluster (formerly Metsäklusteri Oy) play an important and powerful role in promoting new sustainable business opportunities. They also actively communicate and influence both political decision-makers and society on the developments, and thus taking part in creating a common development agenda. The FFIF extensively publishes reports and communication material related to the industry's important role in mitigating climate change and creating economic and social benefits for Finnish society (The Finnish Forest Industries Federation 2020b). They prepared a responsibility statement for the forest industry in 2012 after which an update in 2018 includes not only environmental but also social and economic aspects of responsibility while enhancing the achievement of SDGs (The Finnish Forest Industries Federation 2020a). Similarly, CEPI is contributing to the EU-level policies and strategies

on behalf of the industry by publishing responses on aspects, such as the new forest and biodiversity strategies (CEPI 2021a, b). CLIC Innovation cluster aims at providing an environment which is favourable for open innovation in Finland and the EU for the pulp and paper industry to develop collaboration in bioeconomy, circular economy and energy systems between companies and academia (CLIC Innovation 2022). The three companies are shareholders in CLIC Innovation. Thus, in the political context, the industry has somewhat succeeded in grounding the political imaginary of the forest-based bioeconomy contributing to climate change, rural development and high-value creation (Kellokumpu 2021), and thus contributes to sustainability. However, creating and communicating a political agenda does not guarantee that business activities follow that agenda.

4.4 Mobilising for adapting the value creation logic

According to the companies' annual reports for 2021, the most significant adaptations in the communicated value creation logic occur in the key activities. Especially collaborative RDI activities have gained importance along with the traditional key activity of manufacturing semi-finished B2B bulk products (Metsä Group 2022a; Stora Enso 2022; UPM 2022). The strategy to operationalise the collaborative RDI activities differs between the companies, but the creation of collaborative coalitions between different actors is central in all strategies. Stora Enso emphasises cooperation and open innovation across the value chain, and it has strategic partnerships with various universities and companies to develop, e.g., bio-based carbon fibre, sustainable paper bottles and containers, digitalised solutions for the low-carbon construction industry and man-made cellulosic fibre technology for producing textiles (TreeToTextile 2021; Stora Enso 2022). Often Stora Enso's role in these partnerships is to supply the raw material for the new products or processes. UPM has two different cooperation strategies. It operates as a hub with a central role in a network with products and processes closer to its traditional businesses, e.g., in the Leuna biorefinery (UPM Biochemicals 2021). However, when considering operations outside traditional businesses, such as biomedicals, the role of cross-sectoral collaboration is seen as key to successful innovations (UPM 2019).

Metsä Group has a different strategy than the two other case companies and it has established a separate innovation and venture capital company called Metsä Spring. It develops and strategically invests in "the field of wood-based circular bioeconomy", and thus strengthens Metsä Group's role in its business ecosystem (Metsä Spring 2018a). In addition, in 2014 Metsä Group introduced the concept of a bioproduct mill, which is an industrial ecosystem around a modern pulp mill which efficiently manufactures pulp, other bio-products and energy resources without using fossil-based fuels (Metsä Group 2015, p. 49). The definition of the industrial ecosystem has recently been expanded to also include research institutions and cross-sectoral stakeholders (ExpandFibre 2020a; Metsä Group 2021; University of Helsinki 2021). The innovation company Metsä Spring operates via strategic partnerships, such as wood-based 3D packages produced in cooperation with the Finnish company Valmet (Metsä Spring 2018c), or joint ventures, such as the Kuura textile fibre with the Japanese Itochu corporation (Metsä Spring 2018b). Thus, it seems that a culture of cross-sectoral collaboration is starting to emerge within the forest-based bioeconomy, especially with more radical and complex innovations (Korhonen et al. 2018c; Lovrić et al. 2020; Guerrero and Hansen 2021), which is a new mindset within the industry.

Similarities between the companies' adapted value-creating activities can be identified from the companies' annual reports for 2021. They all have widened their product catalogue and started to manufacture new, sustainable, bio-based products with novel processes. This shift in manufacturing logic has been enabled by manufacturing large amounts of traditional products (pulp and paper). For example, Stora Enso states that paper is a cash generator and market pulp is a foundation (Stora Enso 2022, p. 14). Many of the introduced new products and processes are related to

utilising pre- and post-manufacturing side-streams, such as sawdust or lignin, from the current processes. This helps the value creation logic move towards a circular economy where material loops are closed, and thus the value embedded in a resource is utilised many times (Geissdoerfer et al. 2017; Korhonen et al. 2018b; D'Amato and Korhonen 2021). In addition, the traditional paper-based industry has adapted to changing demands and it is transforming into a packaging industry where communication and writing papers are partly being substituted with different paperboard grades and packaging solutions. For example, UPM mentions that the packaging value chain offers attractive growth possibilities for them (UPM 2022, p. 25).

According to the companies' annual reports of 2021, all sustainability dimensions are considered in the industry's adapted communicated value creation logic. The companies emphasise the creation of economic value by utilising renewable wood from sustainably managed forests and they offer renewable, sustainable, high-quality solutions to many end-uses. Therefore, as in the bioeconomy in general, natural resources are seen as the key resource for value creation. However, the forest resources and the ecosystem services they provide are seen on one hand more valuable and on the other more vulnerable to changes (Costanza et al. 1997; Winkel 2017; EC 2021c). Hence, this accelerating debate regarding the sufficiency of natural resources, climate change and biodiversity loss will increasingly affect the industry and the three companies' value creation. Each company uses the UN SDGs to conceptualise sustainability aspects which mainly relate to creating economic growth and more sustainable products and processes, tackling climate change and managing forests sustainably. UPM states that it creates value for society through responsibility and sustainable solutions, and sustainability is considered in product development and design so that their contribution to sustainable development is followed (UPM 2022, p. 31). In Metsä Group economic aspects are highlighted by stating that they are actively looking for opportunities to grow profitably and sustainably and to create value for all their stakeholders (Metsä Group 2022b, p. 6). Similarly, Stora Enso relates value creation to economic aspects while stating that sustainable growth is central to all activities and value is gained from circularity (Stora Enso 2022, p. 5). The creation of environmental value relates to mitigating climate change and maintaining biodiversity, and social value relates especially to leadership, work safety and community development. Even though the companies state that they support all the SDGs they are still mainly focusing on those that are related to economic and environmental dimensions of sustainability and the social dimension receives less attention. However, during the past few years, the case companies have increased initiatives concerning biodiversity protection and societal wellbeing through separate sustainability programmes (Metsä Group 2022a, p. 17; Stora Enso 2022, p. 22; UPM 2022, p. 31). For example, Stora Enso and UPM are having initiatives to support local communities in Latin America (Stora Enso 2022, p. 153; UPM 2022, p. 67).

4.5 Seeking to stabilise the adaptations in the value creation logic

Based on our findings, the pulp and paper industry has not necessarily gone through a transformation, but rather it has adapted or renewed its traditional communicated value creation logic. The actors have sought the coexistence of stability and incremental changes within their networks and value-creating activities, but the changes have not been radical and system-wide (Möller and Svahn 2006). This perspective on changing the value creation logic, maintaining competitiveness through incremental developments, has been present in future-oriented strategic communication in the industry for several years already (Prime Minister's Office 2008). However, the forest industry's sustainability agenda and its important role in the sustainability transition are being actively communicated at the industry level (CLIC Innovation 2020; Toivanen 2021). The forest industry states that it is already sustainable (The Finnish Forest Industries Federation 2020b), while willing

to improve "even where we are already best in class" (CEPI 2021c, p. 4). Hence, it appears to be trying to stabilise or safeguard the incrementally adapted value creation logic. This can be noticed in the CEOs' reviews in the case companies' Annual reports for 2021 where all CEOs highlight three dimensions of sustainability, the eco-friendliness of their innovative solutions and forests' role in future growth.

> *"The ecological, social and economic perspectives of sustainability must be realised in everything we do. ... We want to be part of the solution in combating climate change and the loss of biodiversity. At the same time, we must be able to fulfil our task as a promoter of society's economic wellbeing." Ilkka Hämälä, President and CEO of Metsä Group (Metsä Group 2022a, p. 4)*

> *"We offer our customers and consumers sustainable choices: renewable and recyclable materials and low-emission energy. ... Performance, innovation and responsibility continue to be the cornerstones we build on. ... We source our raw materials from sustainably managed forests and we foster biodiversity." Jussi Pesonen, President and CEO of UPM (UPM 2022, p. 7)*

> *"We take a regenerative stance within climate, circularity, and biodiversity. This means putting greater emphasis on rebuilding and making a positive climate contribution within the planetary boundaries, rather than just minimising impact. ... The renewable future grows in the forest." Annica Bresky, President and CEO of Stora Enso (Stora Enso 2022, p. 5)*

It seems that the pulp and paper industry has not been able to convince society about its sustainability, as the environmental and social sustainability of the industry has been contested in science (Karvonen et al. 2017; Mustalahti 2018; D'Amato et al. 2019; Jarre et al. 2020; Temmes and Peck 2020), by NGOs (Anon 2018) as well as in public discussions. For example, the "path-breaking" aspect of sustainable innovations can be questioned, because pulp mills have been transformed into biorefineries responding to the needs of the bioeconomy (CLIC Innovation 2020; Toivanen 2021) by "making vast range of innovative products" (CEPI 2014, p. 2) and producing "more of everything" where forests are considered material banks (Kröger and Raitio 2017). Simultaneously, it seems that the promise of path-breakingness has not yet been delivered as most of the biorefineries today are mainly manufacturing traditional products, and thus are not fully responding to the ideas of the sustainable circular bioeconomy (Temmes and Peck 2020). In addition, regarding the fulfilment of social sustainability, there have been conflicts between the local people and pulp and paper companies concerning e.g., land property and human rights, especially in the Global South (Myllylä and Takala 2011; Gonzalez-Porras et al. 2021), and the sustainable innovations have lacked the social dimension in terms of the roles of different stakeholders (Secco et al. 2019; Weiss et al. 2021).

Furthermore, the institutional misfits related to the differing perceptions of the bioeconomy and its sustainability between various actors, such as political decision-makers, industry-specific experts and the general public, in Europe (Ranacher et al. 2020), not to mention at the global level, might hinder the stabilisation. Actors within the pulp and paper industry has to accept that their understandings, perceptions and knowledge on forest-related issues are different from the nonexpert public; thus, industry-specific communication are designed so that everyone is properly informed and able to participate in the public debate and cocreation of the future (Matagne and Fastrez 2019).

5 Discussion

5.1 Synthesis of empirical findings and discussion of results

Fig. 3 represents the main empirical findings of the document analysis through the business environment transformation cycle framework. The figure illustrates how the established pulp and paper industry has adapted its communicated value creation logic towards sustainability showing the stabilised value creation logic, the identified conditioning macro-, meso- and micro-level change drivers and the sustainability adaptations that have occurred within the pulp and paper industry's communicated value creation logic.

The findings indicate that the Finnish pulp and paper industry has started to reconfigure its value creation logic by exploring for path-breaking systemic and sustainable business innovations in collaboration with other actors. This finding is in line with the applied conceptual framework where after stabilisation phase comes exploration phase where new innovations are sought for (Möller et al. 2020). The identified sustainability-related innovations are increasingly developed with cross-sectoral actors and knowledge, supporting previous studies acknowledging the importance of cross-sectoral cooperation between business and non-business actors in sustainability innovations within the circular forest-based bioeconomy (Weiss et al. 2020; Guerrero and Hansen 2021) and other industries (Todeschini et al. 2020; Fontoura and Coelho 2022). However, this finding contradicts with a previous review stating that cross-sectoral collaboration is difficult for the pulp and paper industry (Guerrero and Hansen 2018). Furthermore, despite the increased collaboration, the three companies are not collaborating with each other, which might hamper the creation of a truly common development agenda for the industry.

The industry's sustainable innovations are mainly technological and product-oriented, where the substitution of fossil-based materials is emphasised. Hence, it follows the traditional sustainability strategies of efficiency and consistency. In addition, the industry seems to be focusing on the fit-and-conform pathway, which refers to establishing niche innovations to adjust within the mainstream industry instead of allowing them to transform it, introduced in transition studies (Smith and Raven 2012). However, relying solely on substituting impacts will not suffice, as one main goal of sustainability is to minimise overall emissions, for example, as it has been noted related to climate change mitigation (Hurmekoski et al. 2022). In addition, it appears the traditional conception of the pulp and paper industry is changing as paper operations are shifting towards packaging solutions. The industry has recognised and interpreted change drivers in the business environment and integrated that knowledge into their value creation logic, which is an excellent example of a successful strategic foresight (Vecchiato 2012; Fergnani 2022). Nevertheless, the findings suggest that the Finnish pulp and paper industry has not gone through a concrete transformation. Despite the communicated value creation logic has been adapted: the adaptations have been only incremental. According to network management studies, business transformation requires changes in value creation logic to be radical and system-wide (Möller and Svahn 2006). Nevertheless, the abovementioned developments confront previous studies stating that the pulp and paper industry, as well as the whole forest industry, is path-dependent and locked-in to chosen technologies (Lamberg et al. 2017; Luhas et al. 2019), because the industry has indicated readiness to reconfigure its value creation logic.

The industry follows a communicated value creation logic and vision of being a forerunner in a sustainable circular forest-based bioeconomy created together with industrial coalitions such as the FFIF and CEPI. This common development agenda is actively communicated, e.g., through many corporate responsibility initiatives related to increasing environmental and social sustainability. Thus, it seems that the actors within the industry have made sense of the needed

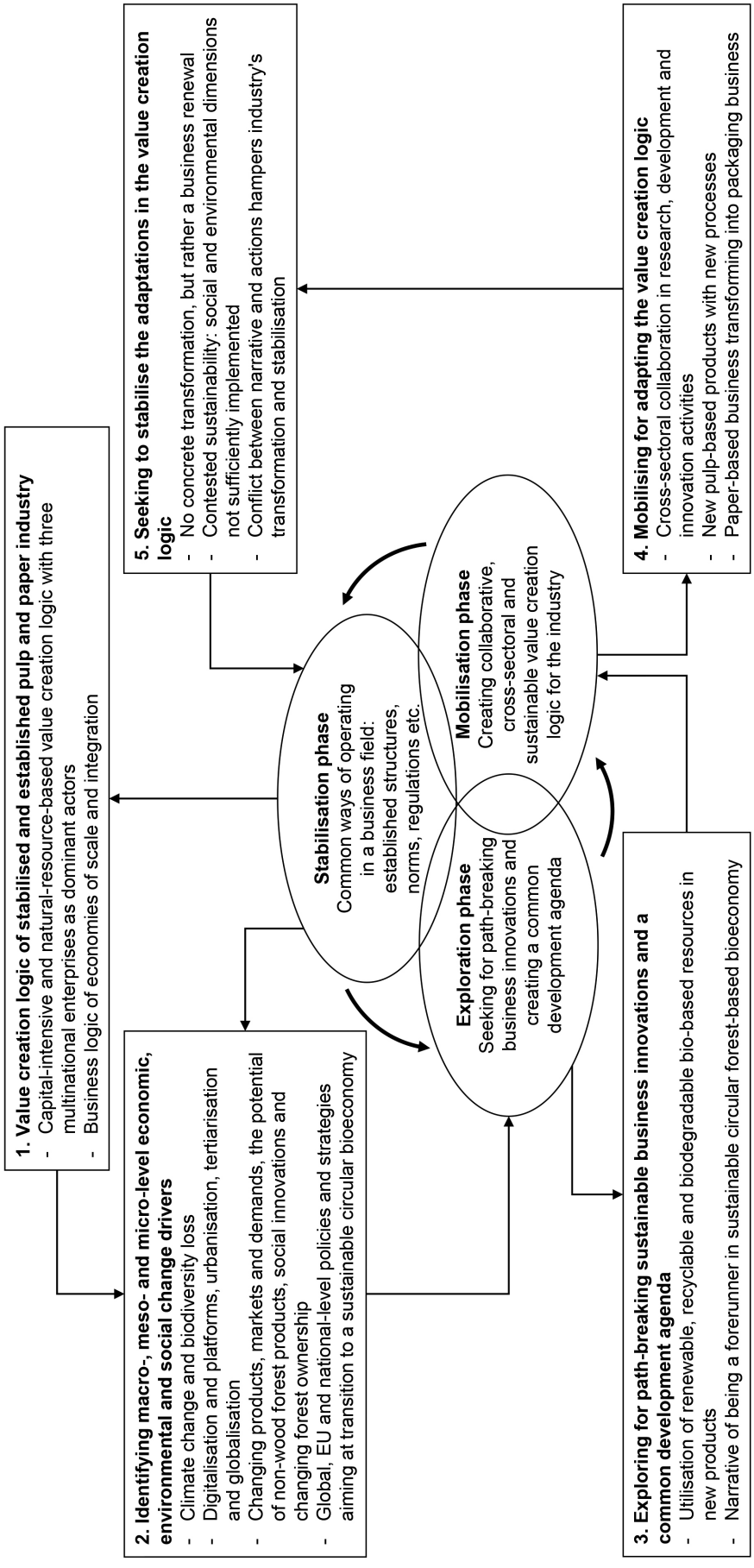

Fig. 3. Synthesis of the main empirical findings represented through the business environment transformation cycle framework. Note! Start reading the figure from the oval in the middle titled "Stabilisation phase" and continue up to the rectangle titled "1. Value creation logic of stabilised and established pulp and paper industry". After this the figure is read anticlockwise following the arrows. Arrows represent the direction of the transformation phases and the occurring adaptations in the industry's value creation logic due to identified conditioning change drivers originating from macro-, meso- and micro-levels.

sustainability-related innovations, and they possess the right capabilities to affect the transforming industry and its value creation logic and networks (Möller and Svahn 2009; Van Bockhaven and Matthyssens 2017). This finding implies that the industry is starting to see value creation more holistically where sustainable value is co-created among different stakeholders including also natural ecosystems and society (Matthies et al. 2016; Evans et al. 2017; Tate and Bals 2018). Similarly, the finding challenges the previous findings contesting the industry's environmental and social sustainability (Lehtimäki et al. 2011; Myllylä and Takala 2011; Eyvindson et al. 2018; Temmes and Peck 2020; Gonzalez-Porras et al. 2021). However, it remains to be seen whether these sustainability initiatives will remain as initiatives or turn into actions in the future. Despite all the communicative effort and influencing on policies and regulations, while highlighting its importance to the Finnish economy, as stated also by (Kröger and Raitio 2017), the industry has not been able to convince all stakeholders of its holistic sustainability.

5.2 Theoretical implications

The identified change drivers will affect and condition all four layers within the nested and dynamic business environment, from micro-level daily activities at the actor layer to meso-level innovations and governance at the focal ecosystem and business field layers, and to macro-level global institutional arrangements, strategies and initiatives at the SET-system layer. Hence, we propose that to gain a comprehensive and systemic understanding of the changing and transforming business environment, an interdisciplinary approach could be adopted in research. When investigating holistic sustainability of industries and companies operating in the circular bioeconomy, the conceptual frameworks would benefit from considering perspectives from macro-level transition studies, meso-level network management studies and micro-level strategic management studies. First, transition studies are needed to understand the political decision-making, governance and strategy development affecting value creation logic. This has been recognised by several authors in transition studies, e.g., Meyer (2017), Patterson et al. (2017), Markard et al. (2020) and Rosenbloom et al. (2020). Second, network management studies are needed to understand how network structure and relationships and interactions between actors affect value creating-activities both within an industry and in companies. Third, strategic management studies are needed to understand how the social capabilities of individual actors, suggested by Tate and Bals (2018) and sustainable technologies, suggested by Hart (1995) and Hart and Dowell (2011), contribute to co-creating economic, social and environmental value, and creating locally and globally competitive advantage. To top it all, this has to be implemented so that the management and utilisation of forest-based resources are done based on sufficiency strategy to mitigate the consequences for the environment and society. As it has been suggested by researchers from ecology and forestry (Eyvindson et al. 2018; Pukkala 2021). Therefore, the perspective on value creation should shift towards creating value and benefits for the common good: society, the planet and the economy. This makes it particularly essential to redefine the conceptualisation of the SET-system layer to include also environmental aspects, because the economy and society are embedded in nature, and all systems are highly intertwined. Thus, it is defined as a socio-economic-technological-environmental (SETE)-system layer.

5.3 Managerial and political implications

This study brings insightful knowledge about an industry-level transformation and especially what it takes to succeed or fail in a business transformation. Hence, we propose that managers within various industries should consider the following aspects. First, collaborating with other actors within and outside one's own industry in RDI activities as well as involving and consider-

ing a broader range of stakeholders in business activities can help companies in supporting the construction of a holistically sustainable value creation logic that produces sustainable and radical innovations in sustainable supply chains and networks. This has been suggested before by a few business and political researchers (Lacoste 2016; Mustalahti 2018; Tate and Bals 2018). Second, including different stakeholders in creating a common development agenda can assist companies to increase their sustainability awareness, and thus avoid conflicts, gain better societal acceptance and increase long-term resilience. Third, industries operating with natural resources are in a central role in sustainability transitions; hence, the natural ecosystems and valuable resources they offer are considered as capital and means for co-creating value for the common good, as it has been suggested by ecological economists (Costanza et al. 1997, 2017). This can also create several new business opportunities for companies and industries. Finally, practising strategic foresight within various industries can help in developing new sustainable solutions that meet the needs of future society. Similarly, seeing strategic foresight as a dynamic capability, as suggested by Fergnani (2022), can help companies and industries to actively interpret changes in the business environment, to outline and evaluate possible futures based on these changes and, most importantly, to utilise the information from these futures for creating a competitive advantage.

From a political perspective, based on the findings of this study, industries cannot determine their sustainability alone. There is a need for coherent policies, legitimacy and societal acceptance, which, when applied together, can enable a truly common development agenda on all societal levels. As D'Amato (2021) states, to pursue sustainability, actors at different levels need to be involved in co-creating policies that affect social-ecological-technical systems and recognise the context they operate in. Moreover, the conflicting goals related to global, regional and national policies and interlinked activities, such as climate and biodiversity protection, sustainable use of natural resources and their impact on fulfilling human needs, need to be resolved comprehensively.

5.4. The scientific quality of the study

The scientific quality and validity of the study were ensured by conducting triangulations of theory in which theories from different research traditions were utilised in explaining and interpreting the case, and investigators in which authors discussed and cross-checked the interpretations and reflections derived from the data (Stake 1995). As the study aimed to develop an understanding of the sustainability phenomenon by investigating specific documents and the three companies from the pulp and paper industry, the applied research design fitted the purpose well. The case study research strategy (Easton 2010; Stake 1995) accompanied with approaches from phenomenon-based research (Schwarz and Stensaker 2016) was suitable, as the conceptual framework provided theoretical framing for the phenomenon and the research objective. The abductive logic (Dubois and Gadde 2002) was suitable, because the data selection and analysis were a demanding iterative process, where many conceptual observations were modified and rejected due to conflicting empirical observations. However, to further validate the findings for the business transformation cycle, more research is needed, especially from other industries and with more companies. Findings provided by the analysis of secondary data could be extended by conducting, e.g., interviews with actors from several industries. This could provide more depth and generalisability of the findings.

5.5 Conclusions

By following the three phases of the business environment formation process framework by Möller et al. (2020), we conclude that the occurred incremental adaptations in the Finnish pulp and paper industry's communicated value creation logic are not responding to the required transition to a

holistically sustainable circular bioeconomy. The focus of sustainability-related communication and value creation logic within the industry is still on the business case, where economic shorter-term goals supersede the holistic longer-term sustainability objectives. Environmental and social dimensions of sustainability are considered secondary in value-creating activities. Thus, value creation logic follows the efficiency and consistency strategies. In the holistically sustainable circular forest-based bioeconomy applying the sufficiency strategy, the limited and scarce wood-based biomass is utilised in the longest-lasting and highest-value products. Simultaneously the role of forest ecosystems in mitigating climate change and halting biodiversity loss is acknowledged. Therefore, recognising the environment within the socio-economic-technological system is crucial in investigating business transformation. Here taking an interdisciplinary approach can help in understanding changes in the business environment.

It seems that the Finnish pulp and paper industry has not been able to create a truly common development agenda, and sustainability remains as a strategic narrative, and thus only a communicated value creation logic, to disseminate sustainability actions. For the industry to reach holistic sustainability, the environmental and social dimensions should be the main foundations for business activities and creation of financial value for the company. To become reality, these value-creating activities must be profitable for the companies. Business activities alone are not adequate for the sustainability transition but instead there must be political and societal support and regulation. Therefore, aligning the common development agenda and value-creating activities with the holistic sustainability is crucial for the pulp and paper industry to really transition towards circular bioeconomy and reconfigure its both communicated and operational value creation logic. Only by doing this, the industry can strengthen its competitive advantage and future resilience.

This study provides some interesting avenues for future studies. First, it would be important to investigate the actual sustainable business activities and operational value creation logic of the Finnish pulp and paper industry by collecting primary data from different business and non-business actors within the industry. Second, the business transformation cycle framework could be examined in several other industries, such as other natural-resource-based industries, both renewable and non-renewable ones, ICT and textile industries or other. Third, the foresight perspective could be connected to the transformation cycle theory as an element, which considers potential changes within the business environment of a specific industry. All in all, sustainability should not be seen as restricting business practices, but rather as providing business opportunities, and thus offering many interesting avenues for future studies.

Supplementary files

S1.pdf; Type, number and full references for the analysed documents, available at https://doi.org/10.14214/sf.23024.

Declaration of openness of research materials, data, and code

The used secondary research data are mainly available on the Internet, and the data sources have been cited accordingly.

Authors' contributions

Anu Laakkonen: Conceptualization, Methodology, Investigation, Formal analysis, Visualization, Writing - original draft; Writing - review & editing, Project administration, Funding acquisition.
Katri Rusanen: Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft; Writing - review & editing.
Teppo Hujala: Writing - original draft; Writing - review & editing, Funding acquisition.
Mika Gabrielsson: Writing - original draft; Writing - review & editing, Funding acquisition.
Jouni Pykäläinen: Conceptualization, Writing - original draft; Writing - review & editing, Funding acquisitio.

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