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Opening the black box of transition towards a sustainable business model

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ABSTRACT

Transition towards sustainable business models (SBMs) has become an imperative practice for businesses. To ensure this change is systematic, firms need to transform all BM components———value creation, delivery, and capture———in a consistent manner. However, extant research lacks an understanding of the integrative mechanisms of value logic transition when modelling a business through the lens of sustainability. This study explores mechanisms for such transition towards SBMs. We follow companies operating in three traditional industries in Finland: mining, paper production, and shipbuilding. To tackle transition towards SBMs, we focus on context, intervention points, mechanisms, and outcomes of this change. We derive an integrative model that depicts how value components are transformed as a whole, thereby contributing to the literature on sustainability transitions and dynamic views of BMs.

1. Introduction

Over the past decade research into sustainability transitions has burgeoned significantly, both in terms of its scope in covering various subjects and global regions, and in its depth through the development of theories and methodologies (Markard et al., 2012; Zolfagharian et al., 2019). While sustainability transitions are multi-dimensional systemic processes involving societal and technological shifts at macro levels (Geels and Raven, 2006; Markard et al., 2015; Rip and Kemp, 1998), the more micro-level business model (BM) approach has been recognised as a relevant and beneficial means to unveil sustainability transitions (Aagaard et al., 2021; Bolton and Hannon, 2016; Jiang et al., 2021). This is due to the boundary-spanning nature of BMs, which allows us to grasp the interconnectedness between firm-level operations and external context (Massa et al., 2017; Zott et al., 2011) and generate insights into not only a firm's economic performance but also its social and environmental impact (Snihur and Markman, 2023). From the BM perspective, sustainability transition implies the development of a SBM (Shakeel et al., 2020; Bocken and Geradts, 2020; Snihur and Bocken, 2022) with the primary focus on changes in its value processes (Lüdeke-Freund et al., 2024; Norris, 2024). Overall, BM thinking has served to pave the way for the development of SBM studies (Schaltegger et al., 2016).

SBMs have emerged as a pivotal means for firms to tackle systemic societal and environmental issues (Stubbs and Cocklin, 2008). Hence, transition towards SBMs has become an imperative practice for businesses (Bocken and Geradts, 2020) and, concomitantly,

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scholarly discourse on transition towards SBMs has gathered depth. Studies show that this change has an extensive impact on firms' value processes (Ritala et al., 2021; Yang and Evans, 2019). For instance, Bocken et al. (2014) develop SBM archetypes depending on the nature of transition in value processes; and Ciulli and Kolk (2019) specifically examine value creation and unpack how it shifts once incumbent firms change their existing BMs to participate in the sharing economy. These important contributions notwithstanding, this stream of research remains nascent. Studies especially emphasise the need for systematic approaches and pinpoint the need for firms to consider all of the value-related processes that coalesce around value creation, delivery, and capture; this is to ensure that the outcome of transition is holistic in terms of tackling environmental, social, and economic challenges (Massa et al., 2017; Pieroni et al., 2019; Shakeel et al., 2020). While the change of firm value logics is key to understanding how companies transition towards SBMs (Laasch, 2018; Teece, 2010), extant literature on SBMs remains fragmented and descriptive, focusing predominantly on separate innovation practices that are implemented to imbue BMs with greater sustainability, such as circularity, sharing practices, or a zero-waste approach (Bocken et al., 2014; Ritala et al., 2018; Öberg, 2023). Although these perspectives are relevant, they show *what* needs to be attained yet fall short in explaining *how* precisely this can be accomplished, especially when a given BM requires changes. Therefore, extant studies are not particularly effective in uncovering the integrative mechanisms of value logic transition when modelling a business through a sustainability lens (Lüdeke-Freund and Dembek, 2017; Massa et al., 2017). In terms of understanding the dynamics that enable transition towards an SBM, this emergent field remains a black box (Snihur and Bocken, 2022).

In this study, we address this research deficiency and seek to examine mechanisms[1] for transition towards SBMs within three industrial contexts: mining, paper production, and shipbuilding in Finland. Firms operating in these industries traditionally follow established ways of operating, none of which necessarily address current sustainability demands. Hence, in their efforts to respond to increasing environmental and social challenges, such firms proffer a suitable setting within which to explore transition towards SBMs. In our analysis, we employ the CIMO framework (Denyer et al., 2008) and focus on the **c**ontext, **i**ntervention points, **m**echanisms, and **o**utcomes of this change.

The main results and study implications are as follows. *First*, our work contributes to the literature on sustainability transition from the BM perspective (Bolton and Hannon, 2016; Bocken and Geradts, 2020; Snihur and Bocken, 2022); specifically, it employs mechanism-based theorizing (Pajunen, 2008; Hedström and Swedberg, 1998) and unpacks the "cogs and wheels" (Elster, 1989: 3) of the transition towards an SBM and *how* SBMs are actually brought about. This mechanism-based reasoning (Anderson et al., 2006) allows us to connect the intricate inputs, sub-processes and fine-grained details of changes within firms' BMs and the outcome of this changes, that is SBMs. This understanding is vital for ensuring a smooth transition without undermining a firm's overall performance. *Second*, we provide fresh perspectives on the dynamics informing these BMs during their transition to sustainability. This affords us a glimpse into the black box of firms' value-related activities, shedding light on the tensions inherent in this transition. In addition, from a practical perspective, this study demonstrates the necessary actions managers need to take in different value activities to integrate sustainability into the company's systems while maintaining profitability. As for the societal implications, this study shows that the transition towards SBMs is a collective effort that includes not only a company but also a wider range of stakeholders.

The remainder of this article is organised as follows. First, a theoretical discussion presents the conceptual underpinnings of our discussion of BMs, BM transitions, and SBMs, and we outline the methodology and three empirical settings for this study. Next, we present our findings and discuss these in light of prior research, which allows us to theorise on the transition towards SBMs in terms of its context, intervention points, mechanisms, and outcomes. We conclude with our theoretical contributions, relevant directions for future research, and the practical implications of our study.

2. Theoretical grounding

In theory-related discussions, debate over the nature of the business model (BM) phenomenon has a long history (Prescott and Filatotchev, 2021). Lambert and Davidson (2013) note that the concept's definition tends to vary depending on theoretical perspective and research purpose. For instance, a BM has been referred to, among others, as an architecture (Timmers, 1998), a narrative (Magretta, 2002), a description (Osterwalder and Pigneur, 2010), a blueprint (Demil and Lecocq, 2010), a system (Tikkanen et al., 2005), a model (Doganova and Eyquem-Renault, 2009), and a cognitive map (Chesbrough, 2010). This signals not only the breadth of the field, but also its fragmentation. However, management scholars and practitioners alike generally agree that value-related processes———*value creation*, *value delivery*, and *value capture*———form the backbone of the BM concept, wherein the key function of the BM concept is to explain how value is created, delivered, and captured (Bocken and Geradts, 2020; Landoni et al., 2020). Given the variety of perspectives to define value-related processes, in the following we specify how we approach them in the context of this study. Here, we understand *value creation* as a process of resource integration for stakeholders' benefit within a given context (Wieland et al., 2017; Vargo and Lusch, 2016). *Value delivery* refers to choosing a value proposition, providing that value proposition in a cost-effective way, and communicating the value proposition at hand (Payne et al., 2017; Biloshapka and Osiyevskyy, 2018). *Value capture*, or value appropriation, is frequently associated with various revenue models and targeted at ensuring sufficient profit (Biloshapka and Osiyevskyy, 2018).

[1] Our understanding of mechanisms comes from the definition for social mechanisms that are "bits of theory about entities at a different level (e.g., individuals) than the main entities being theorized about (e.g., groups), which serve to make the higher-level theory more supple, more accurate, or more general" (Stinchcombe, 1991: 367). Applying this to a business context, we follow Bechtel and Abrahamsen (2005: 423) who state that "A mechanism is a structure performing a function in virtue of its component parts, component operations, and their organisation. The orchestrated functioning of the mechanism is responsible for one or more phenomena".

The essence of BM transition lies in the shifts in how firms create, deliver, and capture value as they strive to translate this into profitable outcomes (Baden-Fuller and Morgan, 2010; Lantano et al., 2022). Under BM transition we understand the change of a current BM into a different BM[2]; and this change can vary in scope and degree of novelty (Foss and Saebi, 2017) depending on the industry lifecycle, for example (Vittori et al., 2022). Here, BM transition is a subtype of BM innovation (BMI). Other types include BM diversification, where the creation of an additional BM is implied; BM acquisition, wherein an additional BM is acquired and integrated; and start-ups that create a new BM (Geissdoerfer et al., 2018). In this regard, Codini et al. (2023: 1) talk about BM exaptation, "a discontinuous evolutionary process that allows utilizing and adapting existing resources in new application domains". Continuous BM transitions are the key to achieving a competitive advantage, generating new customer offerings and revenue streams (Massa et al., 2017; Zott et al., 2011), even if most BMI attempts fail in the market (Geissdoerfer et al., 2018; Landoni et al., 2020).

Due to mounting sustainability challenges and a heightened recognition among top-level executives that addressing these challenges can lead to profitability (Stubbs and Cocklin, 2008), there has been a notable shift in corporate focus towards integrating sustainability concerns into the BM change processes (Geissdoerfer et al., 2018). As influential global actors, businesses have a major responsibility in driving transition towards SBMs (Long et al., 2018). In their ability to influence stakeholder behaviour and engagement, organisations may act either as catalyst or barrier for achieving sustainability goals (Bocken and Geradts, 2020; Rauter et al., 2017). Numerous studies have illustrated organisations' growing tendency to integrate sustainability aspects into their operations (Klein et al., 2021). Here, the potential "to bridge the gap between radical and systemic sustainable innovation and firm strategies" (Boons and Lüdeke-Freund, 2013, p. 3) allows BMs to serve as a platform for integrating sustainability principles into the core of business design, operation, and strategy (Stubbs and Cocklin, 2008).

Incorporating a *sustainability aspect* into BM thinking implies "extending the *scope* of value creation to abroad set of stakeholders, while maintaining viable social and ecological systems across long time-frames" (Norris, 2024, p. 2, italics added). For instance, Unilever has long been a leader in integrating sustainability into its business model. The company launched the Sustainable Living Plan in 2010, aiming to decouple its growth from its environmental footprint while increasing its positive social impact. By focusing on sustainable sourcing, reducing greenhouse gas emissions, and improving health and well-being, Unilever has not only met sustainability goals but also driven profitability through increased consumer trust and brand loyalty (The Birth of Unilever's Sustainable Living Plan, 2010). Another example is IKEA that made significant strides in integrating sustainability into its business model. The company's People & Planet Positive strategy includes commitments to renewable energy, sustainable sourcing of materials, and circular economy principles. IKEA aims to become climate positive by 2030 by reducing more greenhouse gas emissions than its value chain emits. These efforts not only address environmental challenges but also attract environmentally conscious consumers, driving profitability (IKEA sustainability strategy).

Shakeel et al. (2020, p. 6) propose the following definition of a BM for sustainability: "A business model for sustainability helps describing, analysing, managing, and communicating (i) a company's sustainable value proposition to its customers, and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organisational boundaries." Overall, the most prevalent structure of an SBM definition includes value proposition, value creation and delivery, and value capture (Abdelkafi and Täuscher, 2016; Boons and Lüdeke-Freund, 2013; Evans et al., 2017). Notably, shifting the focus from customer benefit and shareholder value towards stakeholder benefit and stakeholder value has implications for the conceptualisation of value capture in SBMs. Here, value capture refers to sharing the benefits of a value creation process between the stakeholders and the company (Geissdoerfer et al., 2018, p. 404; Lüdeke-Freund et al., 2024). Crucial components of SBMs include economic, environmental, and social dimensions with a focus on meeting the needs of all stakeholders rather than solely prioritising shareholders' expectations (Stubbs and Cocklin, 2008), as well as the alignment of interests among various stakeholder groups (Evans et al., 2017). Along these lines, Lüdeke-Freund (2010) examines BMs that aim to generate exceptional customer value, encompassing both customer satisfaction and contributions to the sustainable development of the firm and society as a whole.

In 2014, Bocken et al. launched an initial attempt to develop a typology of SBM archetypes in order to integrate and synthesise previously disconnected strands of scholarly literature. Their objective was to establish a comprehensive framework that enhances our understanding of the specific BMs that are capable of fostering or achieving environmentally and socially sustainable outcomes even as they ensure economic sustainability. Based on this, Ritala et al. (2018) differentiate between nine generic SBM strategies or archetypes: (1) maximising material and energy efficiency; (2) closing resource loops; (3) introducing renewables and natural processes; (4) delivering functionality rather than ownership; (5) adopting a stewardship role; (6) encouraging sufficiency; (7) repurposing for society or the environment; (8) creating inclusive value; and (9) developing solutions to scale up sustainability. Since then, research into sustainable BM patterns has grown exponentially and supported the development of more sustainable organisations (Lüdeke-Freund et al., 2019), concomitantly sparking scholarly and political interest in BM innovation for sustainability (Lüdeke-Freund and Dembek, 2017). As a result, SBMs have become widely acknowledged as a way to resolve social, environmental, and economic challenges (Dentchev et al., 2016; Massa et al., 2017). Generally, transition towards an SBM implies integrating sustainability aspects into organisational value logic (Laasch, 2018). However, the significant processes and procedures necessary for developing and changing

[2] While BM literature uses the terms "transition" and "transformation" synonymously (see e.g., Khanagha et al. (2014), the distinction between these two terms is stricter in the broader literature on sustainability transition. To ensure the accuracy of terms, we follow Hölscher et al. (2018) and employ the word "transition", which is more consistent with our study because: 1) our main focus and unit of analysis is a BM (not large-scale societal change processes); 2) we examine the how of changes toward more sustainable BMs; 3) in terms of normativity, we look at outcomes of change from unsustainable to more sustainable BMs; 4) also, we examine interventions needed for this transition.

BMs in the direction of sustainability are complex and remain to be addressed properly in extant research (Snihur and Wiklund, 2019). Prior research does however acknowledge the existence of the design-implementation gap in SBM transition, illuminating how ideas and concepts are not acted upon———or fail, in the market if implemented———due to a lack of resources, technological complexity, or mind-set that eschews the will to invest the additional effort needed (Boons and Lüdeke-Freund, 2013; Geissdoerfer et al., 2018; Zott et al., 2011).

In summary, the extant literature on SBMs acknowledges that the shift of the logics of organisational value is crucial for transitioning a BM to include sustainability (Laasch, 2018). However, the literature chiefly accumulates knowledge on SBM definitions, archetypes, and typologies and neglects to delve into explanations of how value-related processes are modified so as to accommodate the needs of a broader range of stakeholders and integrate sustainability aspects into BMs.

3. Methodology

3.1. Rationale for research strategy

In light of the emerging nature of research on transition towards SBMs (Bidmon and Knab, 2018) and the exploratory nature of our research question, we adopt a qualitative, multiple-case study strategy (Edmondson and McManus, 2007; Siggelkow, 2007) to develop an in-depth understanding of the transition mechanisms from traditional BMs to SBMs. In business disciplines, a multiple-case study is justified by scholars as an appropriate research strategy for capturing the mechanisms of change within a specific context (Chetty, 1996; Willson and Miller, 2014). Due to our purposeful sampling approach (Gartner and Birley, 2002) and special attention to contextualisation of how transition towards SBMs occurs (George and Bock, 2011), we selected firms from three industries in Finland: mining, paper production, and shipbuilding. Our selection was motivated as follows. First, all three industries are considered to be environmentally detrimental by nature (e.g., ships require energy and release emissions; mining and paper production are associated with consuming natural resources, such as ore and water). Therefore, the selected firms were in dire need of a transition towards SBMs, which served as a second criterion. Third, all three industries have inveterate, even 'conservative' ways of running their operations, thus implying that the transition towards SBMs would impose substantial changes (Olvera, 2022; Ruth et al., 2000; Stott, 2018). Given our theoretical background, our case selection followed Baden-Fuller and Morgan (2010), Teece (2010), and Lantano et al. (2022) in how we understood BM transition and Shakeel et al. (2020) in how we defined SBMs. Below, we describe the respective research contexts of our three cases.

3.2. Study contexts

Mining in Finnish Lapland as an industrial activity that extracts useful materials from the earth (National Geographic Society, 2022) began in the 19th century. The excavation of valuable minerals and ores is often associated with an extensive ecological burden, including for instance the excessive usage of water that results in highly unsustainable operations. Mining carries significant environmental consequences that extend well beyond the boundaries of excavation sites. From habitat destruction to water pollution, mining activities can disrupt ecosystems, compromise biodiversity, and cause long-lasting ecological damage. Yet, contrary to common belief, mining companies do have the potential to become leading actors in achieving a few of the sustainable development goals (SDGs) by generating tax flows (SDG1 No Poverty, SDG 17 Partnerships for the Goals), employment (SDG 1 No Poverty), and economic growth (SDG 8 Decent Work and Economic Growth) not only in a specific region but also nation-wide. In the interest of ensuring sustainable mining, mining companies focus on the local acceptability of their operations, which is boosted by ensuring that the environmental impact of mines remains reasonable, that is, within the limits set by permit conditions, as well as by promoting effective dialogue with local communities. To attain sustainability in mining the Finnish government is currently reforming the Mining Act, thereby aiming to improve environmental protection and mines' operating conditions. It goes without saying that sustainable mining operations imply not only local acceptance but also changes in mines' production processes so as to minimise environmental impacts throughout their lifecycles, from exploration, extraction, and refining to reclamation (Hilson and Murck, 2000).

The *paper production* industry in Finland began to develop in the late 19th century as the demand for newsprint paper burgeoned. At its core lies the production of industrial machines used in the pulp and paper industry to create paper in large quantities and at high speed (TAPPI, 2023). Similarly to shipbuilding, paper production requires various metals, plastics, and other materials, which are often extracted through resource-intensive processes. The fabrication of paper consumes significant amounts of energy, often derived from fossil fuels, thus increasing carbon emissions and exacerbating climate change and air pollution. In addressing these problems, industry stakeholders adopt a holistic approach that incorporates the sourcing of sustainable materials, energy-efficient manufacturing processes, and responsible waste management. Innovations in materials, technologies, and production methods play a pivotal role in reducing the environmental impact of paper production (UPM, 2023). Generally, the paper industry tends to be traditional, driven largely by capital-intensive investments.

Shipbuilding in the coastal area of Finland's Ostrobothnia region dates back to the 16th century, and over the centuries ships and other floating vessels have been constructed at shipyards' specialised facilities. The focal product of the shipping industry is a ship, its final customer is a shipowner, and its suppliers provide components or services to the shipyard. The direct environmental impact of shipbuilding, which involves the construction, maintenance, and repairing of ships, constitutes a major challenge to the industry (OECD, 2010), and its initial stages demand vast quantities of raw materials, including metals, wood, and composites. The ship construction phase is characterised by energy-intensive processes that emit greenhouse gases, primarily carbon dioxide. Additionally, shipyards generate substantial amounts of waste, such as hazardous materials and non-recyclable materials. As the maritime industry

confronts the pressing need for environmental responsibility, shipbuilding is undergoing a move towards greater sustainability. To achieve this goal, shipbuilders and industry stakeholders have begun to implement a range of practices and strategies that prioritise ecological well-being while maintaining operational efficiency and safety, including the use of energy sources with a smaller environmental footprint, utilizing more sustainable solutions for power generation, the digitalization of a ship's operations, and the extensive use of recycled materials (OECD, 2010).

In all three of these cases of traditional industries, practices often predate the awareness of environmental impact and are today confronted with the challenge of recalibrating their operations to align with contemporary sustainability imperatives. It follows that questions emerge regarding the ability of these industries to adapt to and coexist with such sustainability imperatives, and how established practices can be reimagined here.

3.3. Data collection

For our primary data collection, we followed companies involved in Finnish mining, paper production, and shipbuilding between 2014 and 2022. Given that the changes are not immediate, a seven-year timespan offers an extensive account of the transition, enabling a deeper understanding of multifaceted interdependencies and facilitating the identification of transition mechanisms. We added further companies in the mining industry in 2020 as a substantial legislative change was initiated with the aim of fostering that industry's sustainable development (Ministry of Economic Affairs and Employment, 2023). The majority of data were collected through in-depth semi-structured interviews with key informants from companies and/or organisations in the value systems, including CEOs, senior executives, and middle managers (see Table 1) (Hesse-Biber and Leavy, 2006). In total, our study comprises 8 case interviews in mining, 15 interviews in paper production, and 11 interviews in shipbuilding, all of which were recorded and transcribed verbatim with informants' permission.

To ensure data triangulation, we further utilized secondary archival data, such as the websites, newsletters, and international documents of informants' companies and organisations, industry news, and public press releases (see Table 2). This information was used to prepare for interview meetings and verify findings generated from the interviews.

3.4. Data analysis

In all three contexts our unit of analysis is a company's BM; due to the boundary-spanning nature of BMs (Zott et al., 2011) and our attention to the given external environment, we also examined the interactions with other stakeholders that are important for transition to an SBM. Furthermore, during data collection and analysis we applied systematic combining and constantly moved back and forth between our empirical data and theory (Dubois and Gadde, 2002). The content analysis of the interview transcripts and secondary archival data was performed by using NVivo software (version 12) (Sinkovics et al., 2008).

In our coding we followed two stages.[3] *First*, to understand transition mechanisms in the BMs of the studied firms, we needed to decompose our understanding of their BMs (as main entities) into smaller components; understanding this hierarchical structure (part-whole) was essential for our mechanism-based theorizing (Pajunen, 2008). For this, we utilized theory-based *a priori* coding (Lichtman, 2013; Saldana, 2009). We derived three theme codes from the theoretical background of this research, namely value creation, value capture, and value delivery. Because all authors were involved in data analysis, we sought to ensure the consistency of our interpretations by developing a code 'dictionary', which contained the precise definitions of these three concepts as taken from the literature (Osterwalder and Pigneur, 2010). This initial coding was essential for recognising these focal concepts in the data and in order to navigate the empirical materials.

Second, due to the exploratory theory-building nature of our study, we also identified and categorised emergent theme codes that arose repetitively throughout the data, such as mechanisms of transition and the tensions therein. Notably, this inductive work prevailed throughout our analysis. These theme codes provide the basis for the new topics in our data analysis and guide our further inductive inference and concurrent theoretical conceptualisation of transition mechanisms and potential tensions, as well as paving the way towards recognising our study's contributions (Saldana, 2009). Here, we followed the Gioia method (Corley and Gioia, 2011; Gioia et al., 2013) and performed "initial data coding, maintaining the integrity of first-order (informant-centric) terms" (Gioia et al., 2013, p. 26). This part of analysis was largely data-driven, thereby allowing our empirical materials to 'speak'; in this way we moved from raw data to first-order concepts and second-order themes and generated more aggregate theoretical dimensions (see Fig. 1).

Next, to fully grasp the transition towards SBMs, we applied the so-called CIMO framework (Denyer et al., 2008, pp. 395–396), which "is constructed as follows: in this class of problematic **C**ontexts, use this **I**ntervention type to invoke these generative **M**echanism (s), to deliver these **O**utcome(s)". In this, **contexts** refer to the internal or external factors and the nature of human actors that influence change; **interventions** denote actions taken to address or influence the phenomenon; **mechanisms** are the underlying processes that interrelate entity elements and activities to produce some effect; and the **outcomes** are changes that occur due to interventions (Pawson and Tilley, 1997; Denyer et al., 2008). The benefit of this analytical approach lies in producing more solution-oriented and prescriptive study results, thereby increasing the relevance of research to practice. It is also congruent with the mechanism-based reasoning we employ in our study (Anderson et al., 2006; Pajunen, 2008; Hedström and Swedberg, 1998). Following this framework, we directed our attention to the internal and external contexts in which transition towards SBMs occurred; importantly, the

[3] A similar approach to data analysis can be found in Bohnsack, Ciulli & Kolk (2021) and Galkina, Atkova, Gabrielsson (2023).

Table 1
Overview of primary data collection.

Industry	Shipbuilding	Mining	Paper production
Informant's role, date, duration	Shipowner senior executive, October 29, 2020; 55 min. Shipowner senior executive, 15.12.2021; 54 min. Ship equipment supplier A, senior executive, May 28, 2014; 60 min. Ship equipment supplier A, senior executive, September 16, 2015; 50 min. Ship equipment supplier A, senior executive, October 30, 2020; 45 min. Ship equipment supplier B, senior executive, July 08, 2014; 80 min. Ship equipment supplier B, senior executive, February 10, 2015; 60 min. Ship equipment supplier B, senior executive, November 3, 2020; 40 min. Ship equipment supplier C, executive, March 17, 2014; 60 min. Ship equipment supplier C, executive, May 24, 2015; 56 min. Ship equipment supplier C, executive, 6.11.2020; 47 min.	CEO, December 21, 2020; 69 min. CEO, April 1, 2021; 64 min. Chief geologist, April 06, 2021; 59 min. Senior geologist, April 12, 2021; 62 min. Head of Science and Innovation, April 28, 2021; 65 min. Minister of Economic Affairs in Finland, June 04, 2021; 53 min. CEO, June 29, 2021; 60 min. CEO, January 24, 2022; 71 min.	Account manager (UK), October 31, 2016; 87 min; *December 6, 2018;*34 min. Account manager (Chile), November 15, 2016; 74 min; *December 5, 2018;*32 min. Account manager (USA), March 15, 2017; 92 min; *November 19, 2018;*31 min. Account manager (USA), March 16, 2017; 52 min; *November 30, 2018;*31 min. Account manager (Canada), March 21, 2017; 65 min; *December 11, 2018;*27 min. *Solutions Business Manager (Finland), March 29, 2018;*39 min. *Solutions Business Manager (Finland), April 23, 2018;*57 min. *Solutions Business Manager (Finland), April 27, 2018;*80 min. *Solutions Business Manager (Finland), May 03, 2018;*90 min. Customers Manager/Director (UK), November 01, 2016; 68 min. Customers Manager/Director (Chile), November 14, 2016; 53 min. Customers Manager/Director (USA), March 15, 2017; 58 min; *June 04, 2019,*27 min. Customers Manager/Director (USA), March 16, 2017; 57 min. Customers Manager/Director (Canada), March 21, 2017; 57 min; *May 27, 2019;*29 min. *Customers Manager/Director (China), May 08, 2019;*33 min. * *in italics:* carried out online

Table 2
Overview of secondary data collection.

Data item	Websites	Newsletters	Press releases	International documents	Industry news
Description of the data, type of information obtained, pages of text	Recent information on the company strategy regarding transition towards an SBM, 13 pages	Company representatives shared the latest developments in the field of sustainability, 21 page	Company representatives announced the recent achievements regarding transition towards an SBM, 17 pages	Understanding of the external legal environment that may impact transition towards an SBM, 49 pages	Information on the recent trends and key issues in mining, paper production and shipbuilding, 22 pages
Advantages	Instant access to a wide range of information that is updated on a regular basis.	Exclusive content, including insider information, early access to reports that are not available elsewhere.	Timely announcements and official statements directly from the source, ensuring that the information is credible and authoritative.	A platform for addressing global challenges such as transition towards SBMs.	Timely updates on the latest developments, trends, and changes within a specific sector.
Limitations	Website content often prioritizes brevity and accessibility, which can result in a lack of depth or comprehensive analysis.	Multiple newsletters lead to an overwhelming volume of emails, making it difficult to manage and prioritise the information.	Presenting information in a biased manner; lack of detailed information or context necessary for a full understanding of the issue.	Ambiguity and vague language; lack of enforcement mechanisms.	Biases; the quality and accuracy of industry news can vary widely between sources.

initial BMs which were to be changed were also regarded as a part of the context. Additionally, we identified the intervention points within existing BMs that triggered the transition. We investigated the nuanced mechanisms of this transition with the aim of clearly identifying how this unfolded in relation to value creation, value capture, and value delivery. Finally, given that mechanisms cannot be understood without the effects they produce (Pajunen, 2008; Hedström and Swedberg, 1998; Anderson et al., 2006), we investigated various outcomes of the BM transition at hand.

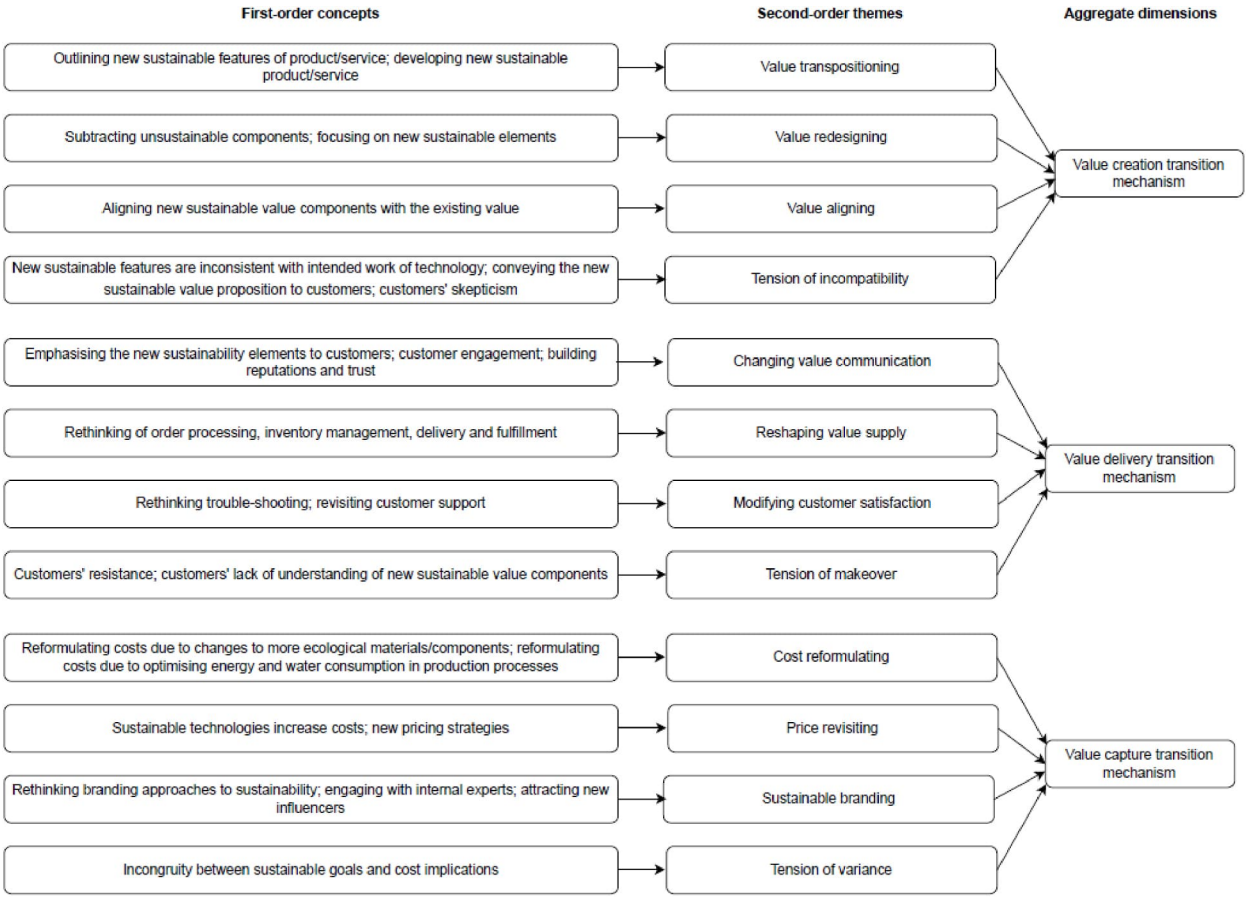

Fig. 1. Data structure.

4. Findings

Transition towards an SBM involves a concurrent change in existing value creation, value delivery, and value capture processes. Our data analysis revealed a set of mechanisms deployed by these firms in traditional industries to transition from a traditional BM to an SBM. In the following section, we illustrate these mechanisms through representative quotes; more evidence and additional quotes are provided in Table 4.

4.1. Transition of value creation

4.1.1. Value redesigning

Our findings show that the transition of value creation is triggered by **identifying** unsustainable elements, **searching** for ways to eliminate or improve these, and visibly elevating sustainability aspects. For example, paper production is intensive in terms of resources and energy. Our informant company collaborates closely with customers to determine whether the same level and quality of production can be maintained by using less energy. Cooperation with customers allows the company to find a suitable solution to mitigate unsustainable practices. In the case of paper production, collecting data and analysing the relationship between the use of energy and the level and quality of production helped **to redesign** the unsustainable element of operations. Here, value redesign **helps to analyse** the existing business model, **recognise** unsustainable elements, and **develop approaches** to eliminating or minimising them.

> "It requires going through with the customer to see if the same production or quality levels can be made with less energy. We would probably do that anyway but now we've included data very strongly. It's easier to show the trends to the customer." (*Paper production*)

However, classifying a product or service, or any element thereof, as sustainable or non-sustainable is **challenging**. First, the criteria for defining sustainability can vary, particularly in the absence of a clear, universally accepted classification system. Second, collecting and verifying data on the sustainability of raw materials and products is a laborious endeavour. Information is scattered, inconsistent, or difficult to verify, hence making it harder to provide accurate data to consumers. Combined with the global outreach,

Table 3
Transition of value-related elements towards SBMs.

Context: initial BM and goal of transition	Intervention(s) (decisions or actions)	Mechanisms	Outcomes: SBM
Value creation: Ensuring the variety of value creation alternatives	- identifying unsustainable elements; - searching for alternatives to eliminate/ improve unsustainable elements; - subtracting unsustainable elements; - leveraging existing resources, expertise, and systems	De-alignment and realignment of value creation: - value transpositioning; value redesign; - value alignment; - tension of incompatibility	- recognition of unsustainable elements; - development of the approaches to address unsustainable elements; - redesign of unsustainable elements; - sustainability benefits to a broader range of stakeholders; - increase in efficiency and overall transparency; - overcoming scepticism and increasing customer trust; - introduction of new sustainability features; - infusion of sustainable principles; - cohesive and consistent approach to customers; - cost savings; - streamlined sustainability initiatives
Value delivery: altering the logic of value delivery	- conveying new sustainable features/ products/services to customers; - improving customer engagement; - change of suppliers	Substitution and expansion of value delivery: - changing value communication; - reshaping value supply; - modifying customer satisfaction; - tension of makeover	- tailored communication approaches for various stakeholders; - a two-way exchange; - mutual trust and sustainable relationships; - established interaction with senior-level decision-makers; - improved customer satisfaction; - strengthened competitive advantage; - realisation of sustainability potential
Value capture: ensuring consistency between value logics	- re-evaluating costs; - decision to convince a customer to adopt a green solution; - building a strong case for the sustainable solution; - engagement with internal experts	Redirection and stabilisation of value capture: - cost reformulating; - price revisiting; - sustainable branding; - tension of variance	- economic benefits; - re-aligned cost structures; - positive environmental impact; - competitive pricing strategy; - price inflation; - internal experts' endorsement

data scarcity precludes the collection of comparable data regarding sustainability.

> "People might be willing to pay more for a sustainable product but how can they really know, how can we classify it, how can we provide comparable data on such a difficult topic because the raw material business is a global business." (*Mining*)

4.1.2. Value transpositioning

Our data indicate that transition towards an SBM entails developing new sustainable features in a product or service, or introducing to the market an entirely new sustainable product or service. This involves **value transpositioning**, that is, a shift from creating monetary value only for company shareholders towards **bringing** sustainability benefits to a broader range of stakeholders. **Increasing efficiency and output** or **adding more transparency** to the production process generates more value for customers as they can follow processes more closely.

> "A new type of analytical tool that measures fuel consumption and fuel quality allows us to see what happens inside the machine, it adds transparency, so the customer knows what is happening, because they usually only get the full picture during annual maintenance shut-down. That is probably the biggest added value." (*Paper production*)

However, this does not occur without producing **tensions**.

> "Our main obstacle is to convince our customers that the technology works, that it brings the benefit, that it doesn't disturb their old but streamlined operations." (*Mining*)

In the process of value transpositioning, a company faces two challenges. On the one hand, a company works on introducing new sustainable features into its products and services, or it develops entirely new sustainable products. On the other hand, the company recognises that proving to customers that the technology at hand works as intended represents a major hurdle. Demonstrating functionality by means of clear evidence, as in the example above, and possibly conducting trial periods **builds customer trust** in a technology's capabilities. A further challenge lies in conveying the value proposition of the technology to customers, who need to understand how this technology will positively impact their operations, productivity, efficiency, cost savings, and other relevant aspects. Providing concrete examples and data-driven evidence of benefits, as in the example above, can help **overcome scepticism**.

Table 4
Additional evidence derived from data analysis.

Aggregate dimensions and themes	Representative quotations
Value creation transition mechanism	
Value redesigning	**Mining:** "Mining produces quite a lot of CO_2 emissions, and companies are aware of this, so they are putting a lot of effort into reducing their CO_2 emissions."
Value transpositioning	**Shipbuilding:** "It was a new technology that gave more efficiency, more output, and more construability to the process. So, we thought that this is going to be the future. It hasn't really taken off until now, but it is clear that this technology is the one that is going to be dominant in the years to come."
Value alignment	**Paper production:** "We have to start taking care of larger end-to-end projects. Not single pieces of equipment, though these need to be taken care of as well, but we should have more and more people who can look at the big picture from a sort of consultancy perspective."
Tension of incompatibility	**Shipbuilding:** "Always when you put in lots of new technique, that has to speak to each other, and they have not been tested, they speak different languages, the different system, if we say it easily, then it's always a challenge to find a common language and a common ground."
Value delivery transition mechanism	
Changing value communication	**Shipbuilding:** "I want the clients in the international market to see us as a reliable supplier, also a little bit more than a supplier. We are actually a company that is bringing energy-efficient shipping to the next level. We are [bringing] this type of technology into a conservative market, so very important, maybe Number One in the background. I want that in the background, we are a reliable supplier that they trust us; that they are something they can rely on when they want to build a new ship, they look at our technologies." **Paper production:** "Safety is one of the first words we hear from our customers. […] We have to be close to our customers to be part of the early conversations when issues begin, and we are, and I think that has changed with our approach to be closer [as part of the SBM transition]."
Modifying customer satisfaction	**Mining:** "When people go to the dealerships to buy electric cars, they obviously want to make sure that they do the right thing."
Reshaping value supply	**Shipbuilding:** "We have lots of companies suitable for this [sustainability] line of business in [Finnish coastal city], so we want to enable them to be part of this project. But they have to compete with everyone else when we start to build the ship. We have this large procurement process where we put all the companies, who is going sell the engines to the ship, who will take care of the electricity system, who will take care of the steering of the ship, and so on." **Mining:** "Obviously, sustainability responsibilities are in the core of our operations—you cannot have long-term, viable, successful mining operations without social license to operate and without the highest standards of sustainability. And suppliers play a big role here."
Tension of makeover	**Mining:** "People just don't want to have mining operations, but they really want to have all the metals on their gadgets." **Paper production:** "Sometimes [the customer's] expectations are unrealistic. They think we could just double the lifecycle of the product […] but nobody is willing to compromise the productivity of the machine."
Value capture transition mechanism	
Cost reformulation	**Paper production: "**So one thing we are trying to do, which is quite new over the last few years [i.e., the transition period], is trying to combine different proposals in one single solution to the customer. So then we can bring more value to the customer and also to us."
Price revisiting	**Mining:** "But when you are in a position that your product is more desirable than that of your competitors because of the good sustainability that you can offer, then you basically can have a higher price for your production or otherwise your product is more valued and more desired by the customer than your competitors' product."
Sustainable branding	**Shipbuilding:** "We have a really high standard of doing things here in the Nordic countries, like taking care of the waste or reusing all kinds of things that might be able to be reused. And that is something that along the way they haven't been able to tell the story to the customer […] that we have solar panels on the roof, and we are buying green electricity, and we are taking care of the waste management, so we have zero waste, and so on. And this is about branding, I would say, that we are not good at this." **Mining:** "Our purpose is for Earth, and for us, that is quite new. Well, two years ago, our new general director was pushing this kind of new change. It was actually quite good."
Tension of variance	**Shipbuilding:** "It was also a big, big learning experience for the shipyard, because they had not built such a ship with such technical solutions [towards sustainability] before, so there had been many troubles on the way." **Paper production:** "In the past, you would just build a mill and whoever lives next to the mill, well, it's their problem for living next to us. I think now customers are more listening to the local people in the area, the smells and noise."

4.1.3. Value alignment

Subtracting unsustainable elements or **introducing** new sustainability features or new products and services naturally triggers changes in the logic of value creation. New sustainable aspects of value creation need to be **aligned** and harmonised with extant value creation processes.

> "This kind of model won't fit into every environment. […] We've identified the most important elements connected to the core business and know we have technologies that we can trust. And then there are things that bring added value to the daily operations and link the organizations together, and that is what we're developing. So, it's not directly business critical, rather making the organization more effective and harmonizing operations with modern sustainable technology." (*Paper production*)

> "But at the same time, when our customers come with some ideas, he would like something else, we do a little bit of both. We really can't say we are the other one. So we have our goal and we are open to expand." (*Shipbuilding*)

> "It is a complex thing. Any business trying to achieve a long-term economic sustainability must be socially sustainable as well." (*Mining*)

The statements above imply that sustainability is not a separate entity but, instead, an integral part of value creation. It is essential **to infuse** sustainable principles and practices into pre-existing processes rather than treating them as isolated initiatives. Alignment ensures that an organisation presents a **cohesive and consistent approach** to customers, thereby allowing organisations **to leverage** existing resources, expertise, and systems. This can lead to **cost savings** and **streamline** the integration of sustainability initiatives.

4.2. Transition of value delivery

4.2.1. Changing value communication

Our data illustrate that the transition of value creation concomitantly implies reimagining the process of value delivery. In particular, **value transpositioning** leads to changing value communication. New sustainability elements or new sustainable products and services **need to be conveyed** to the customers in the right way and, hence, changing value communication implies **tailored approaches** when engaging with various stakeholders.

> "So it is about finding the right way of communicating and to hear their concerns and then respond to them. With different stakeholders, it is a different process." (*Mining*)

This suggests that communication should be strategic and appropriate in terms of the preferences, needs, and communication channels of different stakeholders. **Engaging customers** involves actively listening to feedback, questions, and concerns so as to gain insights into their perspectives. Importantly, communication is not one-sided but a **two-way exchange**: effective engagement involves not only conveying information but also actively seeking input and feedback. In turn, tailoring communication strategies to the needs of diverse stakeholders, actively listening to their concerns, and responding to them thoughtfully can foster **positive interactions**, build **trust**, and contribute to the organisation's overall **success and reputation**. This also reflects the recognition that effective communication is a key driver of **sustainable relationships** and **collaboration** between organisations and their stakeholders.

However, transition towards an SBM can face **resistance** from customers due to a lack of understanding. If customers fail to grasp fully the benefits or implications of transition towards greater sustainability, they might resist it. Clear communication about the purpose, benefits, and potential outcomes of the innovation at hand is therefore crucial.

> "Yeah, but right now, not many customers are yet concerned about the sustainability of the steel in their car. But in the future …." (*Mining*)

4.2.2. Modifying customer satisfaction

Transition towards an SBM is a complex and multifaceted process. Value redesigning and value transpositioning both promote **bringing additional value** and improving customer **satisfaction**. As our data illustrate, modifying customer satisfaction builds upon **close collaboration** with customers. Changing value communication enables **constructive dialogue** between the parties, thus contributing to the development of **collaborative decision-making** and improved customer satisfaction.

> "We're talking about an energy control system and the way we have approached it is that we don't have a product in place. But we haven't promised to deliver a whole system, rather within this schedule, to the degree that it is realistic, we deliver the components that are important and if we decide together that it is reasonable, we can develop the whole system. Throughout this journey we have worked with a customer who has a very innovative way of working." (*Paper production*)

Here, both parties contribute not only to shaping the final system, but also work together closely to ensure customer satisfaction and enhance the potential for the successful implementation of a new energy control system.

4.2.3. Reshaping value supply

Transition towards an SBM requires modifications also in a company's supply chain. The following quote illustrates that company suppliers may not comply with the sustainability requirements due to long transportation distances, thereby forcing the company **to change** suppliers.

> "Big players like Tesla or BMW evaluate the CO_2 emissions very much. In our case, transportation emissions are much lower than some of the competitors coming from Australia, China and from there to Europe. And this is the value for automotive customers who in future must publish total CO_2 emissions per car they sell, and this is part of the sustainability, and we are well positioned." (*Mining*)

It becomes evident that **consumer awareness** and **concern** over environmental issues are driving changes in traditional industries, pushing companies towards greater sustainability. The above illustrates that making changes in a supply chain allows the **unleashing** of a sustainability potential and **strengthening** of competitive advantage. Value delivery may require reshaping the value supply also in terms of the company's internal structures, such as how expertise and support are organised in terms of job roles, and how boundary-spanners are trained to carry out new responsibilities as a consequence thereof.

> "But what you soon realize is that you're going through that journey without thinking about it, in the way you approach things and people at the mill. I guess you didn't really realize it until it was really pointed out in the training." (*Paper production*)

This quote is part of an Account Manager's explanation of how BM transition has influenced their job for the reason that "it used to be direct selling and now you are looking to sell solutions". As a consequence, customer experience is altered by having this Account

Manager work alongside customers and be part of their annual scheduling.

4.3. Transition of value capture

4.3.1. Cost reformulation

Introducing a sustainable solution can be appealing because of both its positive impact on the environment and its **economic benefits**. As the following example illustrates, a novel innovative type of technology revolves around producing steel by consuming less energy, which is attractive for environmental and sustainability-related reasons as well as generating **financial advantages** for customers.

> "The solution has very strong environmental appeal, sustainable appeal. But at the same time, the main idea is to produce steel with less energy, meaning it has also very strong appeal to the wallet of the customers because the less energy is used, the less money customers are paying." (*Mining*)

As emphasised here, the solution's primary goal is to "produce steel with less energy", thus directly linking the concept of energy efficiency to **cost savings**. By using less energy in the steel production process, the overall cost of production can be reduced. Such cost-effectiveness can be very appealing to customers, particularly those who are price sensitive, and culminate in a more **competitive pricing strategy**.

4.3.2. Price revisiting

However, sustainable technologies can also have the opposite effect of **increasing costs and inflating prices**.

> "Steel producers are pressured by the government and the EU and so on to reduce their CO_2 emissions. But their customers don't really want to pay for that yet." (*Mining*)

This suggests that while there is regulatory pressure to reduce emissions, customers can hesitate about bearing the additional costs associated with implementing emission-reduction measures, particularly when they are downstream manufacturers or industries reliant on steel products. The reluctance of customers to pay for emission reductions **indicates a tension** between their environmental goals and their readiness to pay more. Mining companies might face challenges in passing on the costs of implementing greener practices to their customers, who may prioritise cost-efficiency in their own operations. The excerpt above highlights the delicate balancing act performed by mining companies: on one hand, they are under external pressure to align with environmental regulations and reduce CO2 emissions while, on the other hand, they need to consider the economic implications of such changes, especially if customers remain unwilling to absorb increased costs.

Changing a BM may therefore require a larger overhaul in how prices are formulated. A shift from product sales to solutions sales means restructuring the pricing logic away from selling products based on customer demand, and towards creating a close customer relationship through contractual buying, where the manufacturer takes responsibility for a slice of their customer's business.

> "We should work together to figure out this kind of co-operation. I think it's value, this kind of long-term service package could bring us cost benefits, security, and reliability." (*Paper production*)

However, managing customer expectations can cause tensions, as becomes evident in the following two extracts from the same customers regarding contractual business before and after the launch of the communications campaign of the business-model change:

> "They want to do the best thing for the mill to be successful […]. The only downside is that changes cost money." (*Paper production*)

> "It is absolutely amazing what they can do to help us be more proactive in addressing issues. I can't imagine not spending the money to do that." (*Paper production*)

4.3.3. Sustainable branding

Our data indicate that sustainable branding starts with **building a strong case** for the benefits and advantages of a sustainable solution, thus laying the foundation for its eventual adoption. In this, the primary goal is **to convince** the company to adopt a green solution for its products by presenting compelling reasons for why the sustainable solution is superior to the technology presently used. As the example below illustrates, the efficacy of **sustainable branding** depends on the ability **to engage with internal experts** who can promote and advocate for the green solution within the company. These experts assume the role of internal marketers, championing novel green solutions among their peers. Their **endorsement** carries weight and enhances credibility, and ultimately **influences** a company's decision-making process.

> "You have to go into the company by first arguing why [a] green solution is better than [the] old technology that they have, it would be better to use in their upcoming product designs. Then, you have to start with the technical people, those who understand why it is better, so they can start the internal marketing inside their company." (*Shipbuilding*)

However, as illustrated in the following excerpt, **tension** can arise between genuine environmental conservation and the desire to appear environmentally conscientious.

> "We are forced to remove and transport the natural sand just for the sake of the green image." (*Mining*)

Here, actions might be undertaken primarily to create a positive public perception rather than to address actual ecological impact, and a company may be forced to prioritise appearances over substantive environmental efforts. The above quote underscores the complex interplay between environmental considerations, sustainable branding, public perception, and actually implemented actions.

5. Discussion

Based on our findings from three industries, we proceed to discuss transition towards SBMs in terms of its **c**ontext, **i**ntervention points, **m**echanisms, and **o**utcomes (see Table 3). Given our focus on value-related process within BMs, we structure our discussion around three inter-related parts (layers) of firms' BMs: value creation, value capture, and value delivery. By examining transition towards SBMs in relation to these three BM dimensions, we build on Snihur and Wiklund (2019), who maintain that the significant processes and procedures necessary for developing and transforming BMs are inherently complex.

First, at the level of *value creation*, the starting aim of transition is to ensure the variety of sustainable value creation alternatives. In this, transition towards an SBM involves a series of **interventions** and **outcomes** that are interconnected through a mechanism of de-alignment and realignment of value creation. Initially, this involves recognition of unsustainable elements within the existing BM or a process referred to by Long et al. (2018) as 'diagnosis'. Identifying areas of operation that are detrimental to the environment, society, or the company's bottom line form the starting point for change. Subsequently, the intervention revolves around the exploration of alternatives aimed at eliminating or ameliorating these unsustainable elements, which requires thorough planning, research, and strategy formation. Organisations need to devise approaches to mitigate negative impacts and promote sustainability throughout their operations. The redesign of unsustainable elements often entails revisiting business processes and product offerings, thereby allowing sustainability principles to be integrated into every aspect of the business model, from product design to manufacturing and distribution (Allais et al., 2017). Consequently, the **outcomes** extend beyond environmental considerations, including reaching a broader array of stakeholders and encompassing communities, employees, and diverse shareholders. Simultaneously, transition to an SBM generates an increase in efficiency, output, and overall transparency (Marczewska and Kostrzewski, 2020). Sustainable practices inherently yield resource optimisation, waste reduction, and enhanced communication, thereby catalysing a notable enhancement in an organisation's overall performance (Foss and Saebi, 2017).

Overcoming scepticism and increasing customer trust is another significant **outcome** (Farooq and Wicaksono, 2021). Transition towards an SBM creates challenges and opportunities not only for an individual firm (Bocken and Geradts, 2020) but also for a broader range of stakeholders (Kanda et al., 2021; Ranta et al., 2018). As organisations subtract unsustainable elements of BMs and demonstrate their commitment to sustainability, consumers and stakeholders become more confident in their practices, resulting in greater loyalty and support (Kim and Hall, 2020). This is further promoted by the development of clear and unified sustainability messaging and practices across all touchpoints so as to ensure a cohesive and consistent approach to customers. Moreover, organisations often introduce new sustainability features to their products or services, offering innovative solutions that align with ecological and social concerns (Foss and Saebi, 2017; Massa et al., 2017). In this way both environmental responsibility and business competitiveness are fostered.

Furthermore, leveraging existing resources, expertise, and systems during transition towards an SBM allows for other **outcomes** such as the reduction of waste, energy consumption, and operational inefficiencies, and in this way organisations can achieve cost savings and reap substantial financial benefits (Foss and Saebi, 2017). Finally, transition towards an SBM leads to streamlined

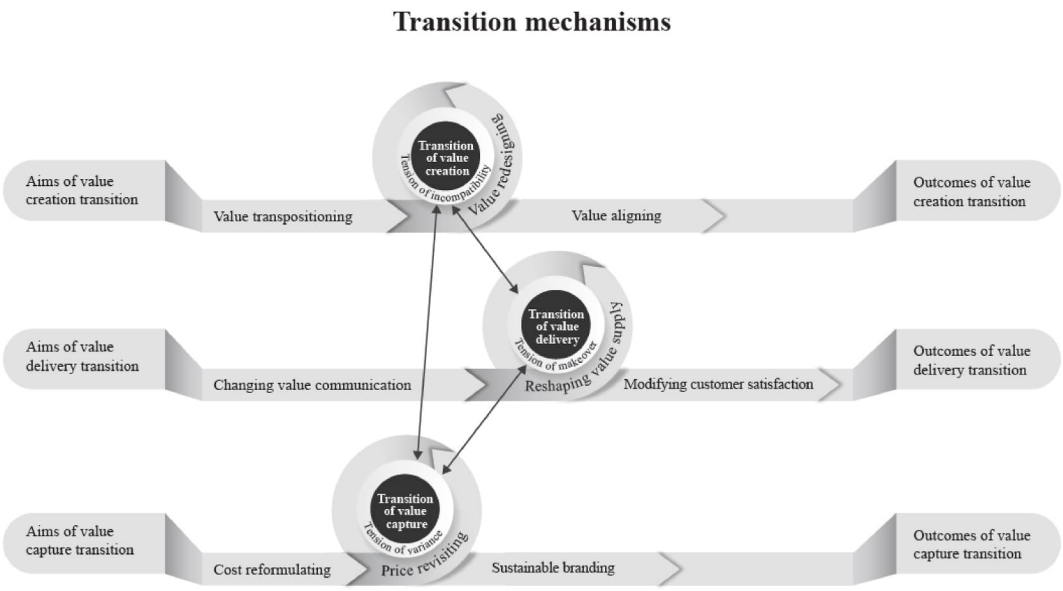

Fig. 2. Transition towards a sustainable business model.

sustainability initiatives: rather than pursuing isolated projects, organisations adopt a comprehensive, integrated approach wherein sustainability principles are infused across all organisational processes (Geissdoerfer et al., 2016).

Overall, at the level of value creation the **mechanism** of transition includes interrelated BM sub-dynamics such as the **transpositioning of value**, which includes outlining new sustainable features or even the entire newly sustainable product/service; and **value redesigning** is associated with subtracting unsustainable components and focusing on new elements. Here, firms may face the natural **tension** caused by initial incompatibility between old and newly created value; hence, this tension needs to be overcome by **aligning new value components** with existing value (Ashforth et al., 2014) (see Fig. 2).

Second, value redesign naturally entails modifications at the level of *value delivery*, thereby altering its inherent logic. In terms of **interventions**, conveying new sustainable features, products, or services implies communicating and introducing innovative sustainable attributes, products, or services to customers. This emphasises the importance of transparently sharing information about sustainability enhancements in order to capture customers' interest (Mol, 2015). The **outcome** of this changed value communication was the development of customised communication strategies for different stakeholders, thus ensuring that sustainability messages resonate effectively with each group and serve to foster deeper understanding and support (Endrejat et al., 2020).

Another **intervention** relates to improving customer engagement necessitates building stronger relationships with customers, understanding their needs, and actively involving them in sustainability-related conversations and initiatives, thereby creating a more loyal and informed customer base. The **outcome** of this improving customer engagement through changes in value communication and stakeholders' involvement in sustainability discussions is fostering a two-way exchange of information (Chuah et al., 2020). This allows for the meaningful exchange of ideas, concerns, and insights, thereby creating a more collaborative environment. In turn, such two-way exchange contributes to the cultivation of mutual trust and the establishment of sustainable relationships with customers as another **outcome** of transition. Trust is a cornerstone of long-term partnerships and is nurtured through transparent communication and shared sustainability goals (Mintrom and Rogers, 2022). The heightened engagement and collaboration resulting from these interventions enhance the organisation's reputation. Consequently, a reputation for commitment to sustainability results in attracting like-minded partners and stakeholders, further reinforcing sustainability efforts. Conveying sustainable features and engaging with customers more deeply leads to improved value delivery and modifies customer satisfaction (Matthyssens and Vandenbempt, 2008), as customers appreciate products and services that align with their values and preferences.

We also observed that an **intervention** in the form of suppliers' change triggers reshaping of the value supply and necessitates a reconsideration and adjustment of the supplier network (Mason and Leek, 2008). This signifies a shift in procurement strategy, prioritising suppliers who align with sustainable practices and values, thereby influencing the overall sustainability of the supply chain (Zimmer et al., 2016). A stronger focus on sustainability, coupled with improved supplier relationships and customer engagement, produced an **outcome** of enhanced competitive advantage (Bocken and Geradts, 2020), which can lead to differentiation in the market and an increased market share. Ultimately, these interventions enable organisations to unlock and realise the sustainability potential of their business models (Foss and Saebi, 2017). A BM's sustainability potential refers to the capacity and inherent capability of that business model to operate in a manner that minimises negative environmental and social impacts while maximising positive contributions to sustainable development. In essence, this signifies the ability of a BM to align with and advance sustainability objectives (Aagaard et al., 2021).

Overall, the transition **mechanism** at the level of value delivery involves the tight interactivity between sub-processes such as **changing value communication** with customers, **reshaping value supply** (e.g., the rethinking of order processing, inventory management, delivery/fulfilment, troubleshooting, and customer support), and **modifying customer satisfaction** procedures. Our data indicate that all of these modifications in value delivery may undergo **tensions of makeover**, that is, a disparity between how customers formerly found value and how they do once firms refocus on sustainability (Gonzalez-Arcos et al., 2021) (see Fig. 2).

Third, changes in value creation and value delivery naturally lead to changes at the level of *value capture* with the aim of ensuring consistency between value logics A fundamental **intervention** in pursuit of sustainability is to be found in the re-evaluation of costs (Lamberton, 2005). Upon critically assessing its expenditures and resource allocation, a company sets the stage for potential changes that can align with sustainable practices. This introspective analysis yields economic benefits as an **outcome**. By identifying cost-saving opportunities and resource efficiencies, a company can realise tangible financial advantages. Such instances bolster the case for sustainability by demonstrating compatibility with financial viability (Foss and Saebi, 2017). The economic benefits as the **outcomes** of transition accrued from sustainability initiatives can also inform the development of a competitive pricing strategy, which leverages the cost advantages associated with sustainability and positions a company favourably in the market. Conversely, the adoption of sustainability practices may trigger price inflation, especially if premium materials or processes are involved (Wossen Kassaye, 2001). However, this **outcome** can be justified by emphasising the added value and positive environmental impact associated with sustainable offerings. The interrelated mechanisms of cost reformulating and price revisiting allow not only the optimisation but also realignment of cost structures to account for sustainable practices.

A further catalyst for transition towards an SBM is found in the decision to persuade a customer to adopt a green solution, which we identify as another **intervention**. This proactive approach reflects a commitment to environmentally responsible practices and introduces the possibility of broader adoption throughout the value chain. In turn, building a strong case for a sustainable solution entails showcasing the environmental and economic advantages thereof by means of sustainable branding, thereby reinforcing its appeal to both existing and potential customers (Brady, 2003).

Finally, we identify the **intervention** in the form of engaging internal experts that further supports the advancement of sustainability initiatives. These experts provide valuable insights and guidance on integrating sustainability principles into various aspects of the company's operations (Kivimaa et al., 2019). The **outcome** of these transition is internal experts' endorsement and support of sustainability initiatives adds weight and credibility to these efforts, hence contributing to the development of a robust SBM and

fostering a culture of sustainability within the organisation.

Overall, the transition **mechanism** at the level of value capture includes the dynamic interplay of sub-processes of **cost reformulating** and concurrent **price revisiting**; these can result from shifts to using more ecological materials/components or optimising energy and water consumption in production processes, among others. It follows that firms need to rethink their **branding** approaches and emphasise the new sustainability elements for customers. Importantly, firms need to be aware of the potential **tension of variance** that results from the incongruity between the extant form of value capture and its new form brought about through transition to an SBM (Foss and Saebi, 2017) (see Fig. 2). The summary of our discussion is presented in Table 3.

6. Conclusions

6.1. Theoretical contributions

First, our work informs the literature on sustainability transition from the BM perspective (Bolton and Hannon, 2016; Bocken and Geradts, 2020; Snihur and Bocken, 2022). We follow mechanism-based theorizing (Pajunen, 2008) and unpack *how* the transition to an SBM occurs. We use the benefits of this approach (Hedström and Swedberg, 1998; Anderson et al., 2006) to show the intricate details, and fine-grained linkages between BM sub-elements and sub-processes that form mechanisms through which SBMs come about. Our model illustrates that BM elements in value creation, delivery, and capture are interconnected and, therefore, need to change simultaneously as a whole so as to ensure the harmonised attainment of sustainable business goals without compromising profitability. The risk of possible value destruction in SBM transitions is recognised in the literature (Yang et al., 2017), and this calls for more detailed knowledge of the mechanisms that enable such a process. Importantly, this paper proffers a conceptual contribution by differentiating between BMs where sustainability is added as a value offer———i.e., a business model for sustainability———and SBMs where sustainability is integrated into value-related processes. As the field suffers from a lack of conceptual clarity and commonly uses similar terms interchangeably (Pieroni et al., 2019; Lanzolla and Markides, 2021), this distinction affords a way of classifying levels of sustainable transition in line with companies' core business objectives. Furthermore, our study addresses Foss and Saebi (2017), who highlight the need to study the antecedents and outcomes of BM changes. The CIMO framework we apply here allows us to take a step towards achieving this. Specifically, we develop an integrative, and at the same time more nuanced, approach by showing not only specific goals and outcomes of transition towards SBMs in three different contexts but also concrete interventions (decisions and actions) and detailed dynamic mechanisms of this change. *Second*, we offer new insights into the dynamics informing BMs during their transition to sustainability. By unveiling those mechanisms that influence this transition, we peer into the black box of firms' value-level activities and identify the tensions inherent therein. These tensions are important———and all but unavoidable———sub-dynamics of the mechanisms at hand, and ultimately determine the difference between good intentions and a transition's successful outcomes.

6.2. Limitations and directions for future research

The significant data collection and analysis of our research notwithstanding, we clearly acknowledge the limitations of this study. First, because our research context primarily centres on traditional manufacturing industries, the scope of future investigations would be widened by exploring further settings. For instance, research could scrutinise whether the findings presented here apply to digital companies, including platform firms and e-commerce sellers, and delve into novel antecedents and mechanisms facilitating such companies' transition to SBMs. This context proffers particularly intriguing opportunities, especially in light of on-going debates on whether the digitisation of firm operations yields more favourable sustainability outcomes (Ciulli and Kolk, 2019). A further compelling research avenue could focus on companies inherently dedicated to sustainability, such as circular economy enterprises. Here, the central question revolves around enhancing SBMs and assessing those strategies designed to achieve this goal. We encourage scholarly discourse on the relative nature of sustainability in forthcoming studies, including inquiries into whether SBMs can sometimes result in diminished sustainability outcomes. Absolute sustainability is impossible to achieve, and, hence, an ideal rather than a feasible outcome. Therefore, sustainability is normative depending on subjective evaluation (other than objective measurements of CO_2 emissions, for instance). Thus, future studies could explore the normative aspect of sustainability and how it is framed.

Beyond this, our study revealed tensions inherent in the transition to SBMs. An intriguing path for future research involves investigating whether such tensions are invariably always present or if a smooth transition is feasible. Are these tensions always the same or are they case- or context specific (Hahn et al., 2015; Oskam et al., 2021)? How do spatial and temporal aspects impact the nature and development of these tensions (Hahn et al., 2015)? Such explorations should encompass identifying those factors that trigger the tensions. Additionally, scholars could investigate the micro dynamics of transitioning towards an SBM and investigate how sustainability managers and immediate stakeholders respond to these tensions and propose mitigation strategies (Van der Byl and Slawinski, 2015; Annosi et al., 2024). Can tensions act as enablers of collective action between various beneficiaries (Rey-Garcia et al., 2021)? Furthermore, because our research has not delved into the legal, political, and institutional frameworks that play a pivotal role in SBM transitions, future research adopting such a perspective could further explore the opportunities and challenges generated by the transition to an SBM. Lastly, our study has not addressed the impact of the transition to an SBM on local communities, particularly in the context of industries such as mining, shipbuilding, and paper production. We strongly recommend that future studies encompass this crucial aspect to shed light on how communities are affected in their vicinity.

6.3. Practical implications

This study provides practical implications for both business managers and implementers of organisational change, as well as policy-makers at the societal level. In the domain of business, companies increasingly experience pressure to act sustainably, yet incorporating sustainability not only in the products they sell or the marketing material they distribute but also at the very core of who they are and how they operate requires a change in company mindsets. Thus, first, by connecting changes to value processes, this study shows managers the various actions required in different value activities to ensure sustainability is embedded within a company's systems without forfeiting profitability. Balancing a company's economic needs with its sustainability goals provides a practical approach to achieving sustainability.

Second, by presenting a framework for how sustainability is embedded in value activities, this study also provides managers with a tool to map out transition and identify areas where sustainability efforts may be applied insufficiently or have not been communicated clearly to internal or external stakeholders. By building on the work of Broccardo et al. (2023), who discuss the uncaptured value of SBM transitions, this study shows that the sustainability transition connects with value processes at multiple levels. While all levels need to be considered in order for transition to attain its goals, sustainability is not an absolute ending point and there is space to negotiate an acceptable level that suits the needs of intermediaries. Hence, a third managerial implication of this study lies in showing sustainability as a two-way street shared with stakeholders, especially highlighting customer touchpoints and how a company's actions lead to enhanced value offers.

Finally, from a managerial perspective, this study illuminates the tensions inherent in such transition. As tensions take place between stakeholders, it remains important for managers to be aware that even actions that can be considered ultimately beneficial for stakeholders can still raise tensions during transition, and that these need to be managed effectively in order to ensure successful outcomes.

Expanding our gaze to encompass more than the domain of business, this study also provides societal implications by noting that BM transition is not dictated exclusively by a company but, instead, occurs in collaboration with its stakeholder groups. All of those involved have a role to play in the transition to an SBM; and for this transition to gain widespread momentum across the economy, it is necessary for external actors such as customers or partners to recognise the value embedded in companies' activities and to join in working to resolve the tensions inherent within them.

CRediT authorship contribution statement

Irina Atkova: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Tamara Galkina:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation. **Man Yang:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Tiina Leposky:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Petri Ahokangas:** Writing – review & editing, Data curation.

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Data availability

The data that has been used is confidential.

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