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How to renew business strategy to achieve sustainability and circularity? A process model of strategic development in incumbent technology companies

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Abstract

Strategic development to promote sustainability and circularity challenges incumbents to fundamentally renew their way of doing business. However, the management of this type of strategic development process, that is, strategic renewal aiming at achieving sustainability, remains largely unknown. Therefore, we investigated what constitutes incumbents' strategic renewal aimed at achieving sustainability and how to manage each stage of this process. We conducted a single-case study of the incumbent tech company, Neste Oyj, which is renewing from a fossil-based business to a sustainable and circular business. We analyzed multisourced interview- and document-based data collected from a 25-year longitudinal case study by applying a processual approach and the critical incident technique. We proposed an empirically based process model of business strategy renewal comprising five stages, each of which follows the subprocesses of strategic formulation, implementation, and evaluation. The findings and the process model extend the theoretical understanding of incumbents' business strategy development to achieve sustainability and circularity. The proposed model will enable managers to understand what management issues to focus on and what actions are needed at each stage of the strategic renewal process.

KEYWORDS
business strategy, circular economy, environmental sustainability, longitudinal case study, strategic development, strategic renewal, strategy process, sustainable development

1 | INTRODUCTION

The transition to environmental sustainability—particularly through the implementation of circular economy (CE) principles—challenges companies to rethink their strategic development and long-term business practices (Gandolfo & Lupi, 2021; Rovanto & Bask, 2020). Although this topic has been discussed since the 1990s (Roome, 1992; Starik et al., 1996), it has become more timely than ever, and research in this field has increased significantly in recent years (see, e.g., Farrukh et al., 2020). The business strategy literature on environmental sustainability has focused on sustainability and CE strategies, as well as sustainable and circular business models (Liu & Kong, 2020; Rovanto & Bask, 2020; Santa-Maria et al., 2021). In

Abbreviations: CE, circular economy; CIT, critical incident technique; NGO, nongovernmental organization.

contrast, the sustainability and CE literature has approached the topic by indicating how sustainability and CE transition demand changes in companies' operations, innovative practices, and stakeholder relationships (Brown et al., 2021; Mousavi & Bossink, 2017), which impacts companies' strategic development in the long run. Although both research streams have fundamentally agreed that companies' roles and actions are critical in achieving sustainable development (Bertassini et al., 2021; Chen et al., 2020; Loorbach et al., 2010), there has been no consensus on whether and how a business strategy advances companies' quests for sustainable development (Liu & Kong, 2020), or how business strategies are developed and implemented in practice to achieve sustainability (Engert et al., 2016; Papagiannakis et al., 2014; Rodrigues & Franco, 2019). Therefore, it is critical to investigate how sustainability is integrated into companies' business strategies.

Although managing business strategy development to promote sustainability is critical, it is extremely challenging for incumbent companies. The reason is that sustainability demands that incumbents drastically rethink and renew their existing operations, competences, organizational culture, and stakeholder relationships (Bertassini et al., 2021; Gandolfo & Lupi, 2021; Hofmann & Jaeger-Erben, 2020; Kaipainen & Aarikka-Stenroos, 2021). Therefore, for incumbents, strategic development for sustainability is a complicated process that fundamentally shifts their way of doing business (Engert et al., 2016; Gandolfo & Lupi, 2021; Keijzers, 2002); hence, this type of strategic development is called "strategic renewal" (Agarwal & Helfat, 2009). Prior research has focused on how sustainability and circularity change incumbents' business logics and demand that incumbents reshape their established business models (Frishammar & Parida, 2019; Gandolfo & Lupi, 2021; Ranta et al., 2020; Rovanto & Bask, 2020). Furthermore, previous studies have recognized that sustainability strategy development is a key practice in successfully updating incumbent business models (Santa-Maria et al., 2021). However, prior research has not considered how incumbent companies should renew their business strategies to promote sustainability in alignment with their changing business models. Therefore, it is crucial to investigate the strategic renewal process of incumbent companies aimed at achieving sustainability.

Strategic development for sustainability has been recognized as a dynamic, iterative, and time-consuming process (Fowler & Hope, 2007; Keijzers, 2002; Papagiannakis et al., 2014). Therefore, we used a process approach (Langley et al., 2013) to investigate how incumbents could renew their strategic direction and capabilities over time (Schmitt et al., 2018). Because the renewal process does not happen overnight, strategic development for sustainability is often considered to consist of different stages, each of which has specific characteristics (see e.g., Eccles et al., 2021; Frishammar & Parida, 2019). It is critical to investigate the renewal process, its stages, and assumingly emerging processual patterns to understand the management issues that emerge throughout the process as well as how incumbents could address these issues in a timely manner to succeed in renewing their business. However, further processual research is needed to gain this new understanding (Bertassini et al., 2021; Rovanto & Bask, 2020), particularly based on longitudinal data and analysis (Bertassini et al., 2021; Fowler & Hope, 2007; Madsen & Ulhøi, 2016; Zollo et al., 2013). Accordingly, we apply the process approach to examine incumbents' strategic renewal processes, which are expected to consist of different stages with differing management issues.

In examining the integration of sustainability into a business strategy and following the process approach, sustainability can be understood as a "continual process of organizational innovation and development on all fronts" (Fowler & Hope, 2007, p. 36), which meets the environmental, economic, and social needs of present and future generations (World Commission on Environment and Development [WCED], 1987). For incumbents, reconciling the environmental and economic dimensions of sustainability in this process is strategically attractive because the improved use of energy, resources, and waste (i.e., environmental sustainability) allows incumbents to generate profits and positive returns on assets and equity (i.e., economic sustainability) (Bryson & Lombardi, 2009; Bassetti et al., 2020; Gandolfo & Lupi, 2021; Gimenez et al., 2012; Porter & Van Der Linde, 1995). One of the key solutions applied to achieve this goal is for companies to implement a circular economy (CE) in which material and energy loops are slowed, closed, and narrowed (Geissdoerfer et al., 2017). However, we still lack an understanding of how companies in real life can manage their strategic development, such that it generates both environmental and economic sustainability over time. Therefore, in this study, we examine the ways in which an incumbent's strategic renewal process addresses the environmental and economic aspects of sustainability (herein after "sustainability").

Although sustainability and circularity have crucial effects on companies and thus are increasingly being studied to advance sustainable development (Santa-Maria et al., 2021), we still lack an understanding of how companies can best manage their business strategy development to achieve both environmental and economic sustainability (Engert et al., 2016; Liu & Kong, 2020). It has remained unclear how to manage such strategic development as a process (Rovanto & Bask, 2020) that consists of multiple stages, each of which has different management issues (Frishammar & Parida, 2019). In particular, the process of strategic development in incumbents' renewal situations demands investigation (Gandolfo & Lupi, 2021).

Motivated by increasing theoretical and managerial needs to overcome sustainability challenges for incumbents (Schrettle et al., 2014; Sharma, 2020; Scherrer et al., 2007), we focus on incumbents' strategic development process toward sustainability, that is, "strategic renewal," through which the company intentionally changes its strategy and related operations (Agarwal & Helfat, 2009). By applying this focus, we intend to contribute to filling a major gap in understanding and managing extreme strategic development situations faced by incumbent companies, such as a renewal process to achieve sustainability. We address the existing gap in the literature by answering the following two research questions: *(RQ1) What constitutes an incumbent's strategic renewal process aimed at achieving sustainability*; and *(RQ2) How can this process be managed?* In answering the first research question, we empirically

analyzed the process of strategic development, including the stages and processual patterns that allow incumbent tech companies to renew their business strategies to achieve sustainability and circularity. When we understood what constituted the renewal process, we could answer the second research question. We did so by identifying the key management issues at each stage of the renewal process, which enabled the entire strategic renewal process to be successfully managed. By identifying the business strategy renewal process and its management issues in the incumbent tech companies, we gained insights into the ways in which their management could facilitate implementing the strategic development processes stage by stage, culminating in the renewal of the business strategy to achieve sustainability and circularity.

To examine a strategic renewal process applied to achieve sustainability, we conducted a qualitative, longitudinal, historical, single-case study of the strategic development process applied by the incumbent tech company, Neste Oyj, which has operated in the oil and energy industry and undergone an arduous strategic renewal over decades. By developing high-level chemical process technologies that allow for turning waste, residue, and vegetable oils into fuel, the company has managed an extreme strategic renewal from a fossil-based business to a sustainable and circular business in a 25-year process. We analyzed data collected from semi-structured interviews, annual reports, and over 250 pieces of secondary data with the critical incident technique to identify process stages, processual patterns, and management issues throughout the strategic renewal. As our key contribution, we developed a process model that indicates the key management issues in incumbents' strategic renewal to achieve sustainability stage by stage. This model contributes to research at the intersection of strategic management, environmental sustainability, and CE, and it supports business managers in implementing and accelerating strategic renewal to achieve sustainability in incumbent companies, particularly in the tech business.

This paper is organized as follows. In Section 2, we review the literature on the management of strategic development processes, particularly those aimed at achieving sustainability and circularity, and discuss them from the perspectives of incumbent companies. In Section 3, we present the methodology and describe the case study. In Section 4, we present the findings of the strategic renewal process. In Section 5, we discuss the findings, propose a process model, discuss the implications for theory and practice, consider the limitations of our study, and recommend avenues for future research.

2 | THEORETICAL BACKGROUND

Drawing on the strategic management literature, we first discuss the processual dimension of strategies, their development, and the extreme strategic development of incumbents, that is, strategic renewal. We then apply this processual approach to the integration of environmental sustainability and circularity into business strategies, emphasizing the perspective of incumbent tech companies.

2.1 | Strategy as a process: Strategic development and renewal of incumbent companies

A strategy is often conceptualized and theorized as a process in various models (Burgelman et al., 2018). The process is deeply rooted in the concepts of strategy and strategic development. Strategic alignment of change both inside and outside a company occurs in a continuous process of adaptation to establish a strategic fit (Ben-Menahem et al., 2013; Fainshmidt et al., 2019; Mintzberg et al., 2003) through a combination of activities (Agarwal & Helfat, 2009), choices (Langley et al., 2013), and chance events that occur over time (Mackay & Chia, 2013). According to the classical concept, the process of strategic development consists of three subprocesses: formulation, implementation, and evaluation (Cohen & Cyert, 1973; Mintzberg et al., 2003; de Wit & Meyer, 2010, pp. 42–45). However, this conventional view has been expanded as more non-linear process models have been developed, which have increasingly considered strategic development repetitive, cyclic (Cohen & Cyert, 1973) and interrelated (Nicholas, 2009) and thus likely to develop emergent processual patterns and stages as the company develops its strategy over time.

Strategic renewal is a specific type of processual strategy development through which an established company modifies or replaces its core competences to ensure long-term performance (Schmitt et al., 2016, 2018). The intentional replacement, or refreshment, of a company's attributes with the aim of affecting the long-term opportunities of the company is what makes strategic renewal different from other conceptualizations of strategic development or strategic change, such as strategic additions or deletions (Agarwal & Helfat, 2009; Schmitt et al., 2018). Accordingly, the concept of strategic renewal applies particularly to incumbent companies that already have an established core business, market position, and core business practices and competencies, which need to be replaced and refreshed to secure competitiveness with the support of complex relationships involving stakeholders in the encompassing business ecosystem (Gandolfo & Lupi, 2021; Kaipainen & Aarikka-Stenroos, 2021).

In this study, we adapted the definition of strategic renewal that emphasizes its processual nature: "Strategic renewal describes the process that allows organizations to alter their path dependence by transforming their strategic intent and capabilities" (Schmitt et al., 2018, p. 85). According to this definition, strategic renewal requires a company to break free from its past strategic paths by actively and intentionally creating new paths over time based on the combination of past and future visions (Garud et al., 2010). Two types of strategic renewal can lead to major changes in a company's attributes: discontinuous or incremental (Agarwal & Helfat, 2009; Riviere & Suder, 2016). Discontinuous strategic renewal deals directly with major changes, whereas proactively executed incremental renewal is a continuous process intended to keep pace with a changing external business environment. Incremental renewal may reduce discontinuities over time, allowing for experimental new business opportunities in addition to mature business activities. However, discontinuous strategic renewal may be necessary when

changes in the environment are difficult to anticipate or when it is difficult to effectively organize a continuous adaptation (Agarwal & Helfat, 2009).

2.2 | Strategic development processes to achieve sustainability, particularly in incumbent technology companies

Sustainable development has become a key issue in business strategy development (Engert et al., 2016; Martin & Rice, 2010). Becoming sustainable involves a continual process of organizational innovation and cross-cutting development (Fowler & Hope, 2007) that are aligned with both the present and future generations' economic, environmental, and social needs (World Commission on Environment and Development [WCED], 1987). This process is reflected in companies with an inherent accumulation and development of innovation (Doluca et al., 2018; Kaipainen & Aarikka-Stenroos, 2021), learning (Siebenhüner & Arnold, 2007), managerial views (Madsen & Ulhøi, 2016), environmental knowledge, and sustainable decision-making patterns (Papagiannakis et al., 2014; Schaltegger & Wagner, 2011).

The process of integrating sustainability into business strategy varies according to company, but it is particularly challenging in incumbent companies that struggle to renew their linear business models to achieve sustainability and circularity (Frishammar & Parida, 2019; Rovanto & Bask, 2020; Kaipainen et al., 2020). For incumbents, adapting the principles of sustainability and circularity means a fundamental yet under-researched shift in logics for value creation, delivery, and capture (Frishammar & Parida, 2019; Gandolfo & Lupi, 2021; Ranta et al., 2018, 2020), reflecting changes and updates needed in the development of business strategies (Gandolfo & Lupi, 2021; Ranta et al., 2018, 2020). Sustainability fundamentally challenges incumbents' conventional operations because it requires the development of new knowledge and the unlearning of old business practices (Mousavi & Bossink, 2017; Shrivastava & Scott, 1992; Siebenhüner & Arnold, 2007). Renewal for sustainability has been found to require incumbents to redesign their business model and value creation (Hofmann & Jaeger-Erben, 2020; Ranta et al., 2020), business and technical operations (Albino et al., 2009; Shrivastava & Scott, 1992), as well as stakeholder relationships, networks, and business ecosystems (Aarikka-Stenroos et al., 2021; Kaipainen & Aarikka-Stenroos, 2021). In practice, incumbents often attempt renewal through incremental innovations and circular extensions to their linear business models, such as the usage of recycled materials, extended product lifecycles, and improved waste management (Rovanto & Bask, 2020; Schaltegger & Wagner, 2011). However, because of the challenges and incremental implementation of strategic renewal, incumbents are often criticized for being slow to act or for purposely hindering the spread of sustainable innovations to maintain their strategic position (Smink et al., 2015).

Thus far, incumbents' renewal to achieve environmental sustainability has been considered from a process perspective derived from organizational learning (Banerjee, 2002; Siebenhüner & Arnold, 2007) and driven by dynamic feedback from inside and outside the company (Papagiannakis et al., 2014). Because sustainability and circularity challenge conventional ways of doing business, organizational learning is considered a key element in their effective implementation (Hofmann & Jaeger-Erben, 2020; Siebenhüner & Arnold, 2007). Environmental action is typically initiated by the sustainability demands of key stakeholders and the outcomes of previous environmental decisions (Papagiannakis et al., 2014). In the short term, environmental changes to a company's strategies remain incremental (Siebenhüner & Arnold, 2007), as the strategy is adjusted in a "single-loop" learning process. This is done to follow environmental legislation and maintain support for environmental issues and employee training (Banerjee, 2002). When the original goals are compared with environmental outcomes, the emerging feedback can affect both future expectations of the strategy's success and the company's level of commitment to environmental goals. Consequently, increasing levels of environmental activity have been integrated into business strategies (Papagiannakis et al., 2014). Integrating environmental concerns both functionally and holistically throughout the entire corporation exemplifies "double-loop" learning (Banerjee, 2002), which involves radical strategic renewal, including renewal actions such as sustainability communications and stakeholder involvement (Siebenhüner & Arnold, 2007).

For incumbents operating in technology businesses, strategic renewal to achieve environmental sustainability requires securing growth and competitiveness by developing and aligning business and technology strategies to be sustainable and circular (Kaipainen & Aarikka-Stenroos, 2021). Technology development, as a part of strategic management, is time consuming and necessitates changes in capabilities, products, business strategies, and processes (Bharadwaj et al., 2013). Therefore, it needs to be anticipated before the realization of new business demands. To ensure competitiveness (Avison et al., 2004) and the efficient utilization of technology (Luftman et al., 1993) in their strategic renewal, technology incumbents need to take advantage of their existing core competencies (Wicki & Hansen, 2019) and improve them by applying new knowledge, learning, and competence-renewing activities that make their business sustainable (Mousavi & Bossink, 2017; Riviere & Suder, 2016; Siebenhüner & Arnold, 2007). In practice, it appears that technology and business strategies are intertwined (Chiesa & Manzini, 1998; Kaipainen & Aarikka-Stenroos, 2021). Technological competences can either be developed to support an established business strategy (Vernet & Arasti, 1999) or to elaborate and fundamentally renew a business strategy (Chiesa & Manzini, 1998). This is assumed to be a key issue in the strategic development of technology incumbents who update their strategies to enhance sustainability and circularity.

By integrating our theoretical approaches into a framework, we considered strategic renewal for sustainability to be a purposively directed process that continuously seeks organizational innovation and development (Fowler & Hope, 2007; Schmitt et al., 2018). This process comprises learning (Banerjee, 2002; Siebenhüner & Arnold, 2007) and feedback (Papagiannakis et al., 2014) on processes

that develop over time in repetitive loops with incremental and/or radical consequences (Agarwal & Helfat, 2009). Such processes in incumbent tech companies imply the need for interlinked technology and innovation, as well as business strategies that are developed through dynamic interactions over time (Kaipainen & Aarikka-Stenroos, 2021). Thus, in investigating strategic renewal for sustainability and circularity among incumbent tech companies, we considered sustainable development interlinked with technological innovation and management, as well as business strategy and management. In the following section, we explain how this process approach and framework were used to empirically analyze one incumbent tech company's strategic renewal to achieve sustainability.

3 | METHODOLOGY

3.1 | Research design and case selection

To explore how the process of strategic renewal toward sustainability and circularity developed over time, we applied a qualitative research methodology based on a historical, longitudinal, single-case study. We utilized purposeful and theoretical single-case sampling to identify a revelatory and extreme exemplar that allowed excellent research access (Eisenhardt & Graebner, 2007; Yin, 1994), which allowed for the exploration of successful strategic renewal under extreme circumstances. A single-case study is an established method for exploring continuing progress toward sustainability (Fowler & Hope, 2007; Gandolfo & Lupi, 2021; Wicki & Hansen, 2019) and for identifying a company's sustainability-focused change process (Arnold & Hockerts, 2011; Brown et al., 2021; Wicki & Hansen, 2019). By adding the process approach, we were able to focus on determining how and why the strategic renewal process emerged, developed, and grew over time (Langley et al., 2013).

In the theoretical sampling procedure (Eisenhardt & Graebner, 2007; Yin, 1994), we sought a case that represented the entire strategic renewal process of an incumbent company that renewed its core business into one that was sustainable and circular. Additionally, because the goal of effective sustainability demands that incumbents conduct major strategic undertakings by re-inventing and developing technologies and products (Siebenhüner & Arnold, 2007; Wicki & Hansen, 2019), we selected a company that operated a technology-based business. Based on these criteria, we selected Neste Oyj, an incumbent in the oil and energy industry. Both the scarcity of fossil resources and the emissions from oil production challenge this industry, in which traditional incumbent oil companies search for ways to do their business sustainably. Hence, they have sought to develop sustainable and circular innovations, such as bio-based fuels, with the aim of changing their product portfolio and eventually their entire strategy to achieve environmental sustainability. Neste has been a pioneer in conducting this exceptionally radical strategic development, from a fossil-based business to one based on sustainability and circularity. Therefore, it is an example of successful strategic renewal in an industry that has traditionally been considered harmful to the environment and to be challenged by conflicting pressure by stakeholders (Kolk & Levy, 2001). Furthermore, this case was revelatory because it enabled a longitudinal, retrospective investigation of a renewal process toward sustainability (Wicki & Hansen, 2019). The selected company was able to provide open access to data that allowed for gaining insights into the mechanisms and processes that facilitated the renewal. These insights were gained by examining the incidents and stages that occurred throughout the strategy process (Van de Ven, 1992).

The selected company—Neste Oyj (shortened to Neste)—is a Finnish oil refinery founded in 1948. In 2021, the company employed over 5000 people, had revenues of 11,750 million euros per annum, and operated in 14 countries across the globe. As an innovative technology forerunner, Neste has managed its strategic renewal from a traditional fossil-based oil refinery to a sustainable business, becoming the global market leader in the renewable fuel industry through a 25-year strategic renewal process. Because 25% of Neste's employees work in innovation and technology, the core of Neste's competences and strategy is a strong technological understanding of high-tech chemicals and polymers, allowing for the production of fuels and other chemical products from non-traditional sources, such as waste and residue, using the latest chemistry processing technologies with the support of digital solutions. Although Neste's capacity for renewable products in 2020 was approximately one-third of the capacity for oil production (Neste Oyj, 2020), the comparable operating profit in renewable business (including renewable transportation and jet fuels, renewable polymers, and chemicals) in 2021 was 1,334 million, in contrast to 50 million in oil products (Neste Oyj, 2021).

3.2 | Data collection

We multisourced longitudinal data during the research period 1996–2021, including data collected in semi-structured, retrospective interviews with top managers, which were followed by two group discussions, one with the top management interviewees and the other with Neste's strategy team, to validate preliminary mapping results and gain deeper insights into the results of our analysis. Another key data source comprised all available annual reports from 2005 to 2021. To support and triangulate the main data, we collected more than 250 pieces of secondary document-based data. These data sources and their utilization are presented in Table 1.

Regarding the interviews, nonprobability expert sampling was used to recruit top managers with a good overview and understanding of Neste's longitudinal strategy development. These managers were targeted across departments to gain a broad understanding of managerial perspectives throughout the renewal process (Van de Ven, 1992). Gaining such access can be difficult, especially in large corporations, as top managers value their time highly (Okumus et al., 2007). Consequently, we applied snowball sampling based on referrals from already-accessed interviewees to reach a wider target sample. Seven interviewees from different departments met our criteria based on their seniority. The interviewees ranged from top

TABLE 1 Data sources and their utilization

Data type	Data (amount of data)	Utilization in analysis and reporting
Interviews & group discussions	Top management interviews (1.5 h on average, $n = 7$): • Research & technology, vice president • Renewables platform, top management • Head of strategy, operations and brand marketing • Sustainability and public affairs, senior vice president • Public affairs, feedstock regulation, top management • Head of communications • Key account manager, sales Nordics, top management	Principal use in deepening, complementing, and verifying the preliminary mapping Provides the company managers' perspective on causal connections throughout strategic renewal with personal, subjective, and open perceptions
	Group discussion with the seven top management interviewees Group discussion with 12 members of the Neste strategy team	
Annual reports	Company's annual reports from 2005 to 2021 ($n = 16$)	Principal use in allowing a full overview of the record of events with precise dates in preliminary process mapping Provides a corporate perspective for analysis
Secondary data	Over 250 documents and other material comprising: • Trade journal articles ($n \geq 15$) • Magazine and newspaper articles ($n \geq 10$) • Finnish broadcasting company videos and podcasts (1 h on average, $n = 6$) • Theses about the case company ($n = 4$) • Scientific articles about the case company/its technology ($n = 7$) • Company blog posts and news ($n \geq 150$) • Company videos ($n = 21$) • Company presentations ($n = 4$) • Company interactive lecture (1.5 h) • Stakeholder websites ($n \geq 35$)	Principal use in complementing and validating information from other data sources and allows supportive analysis Provides complementary stakeholder and media perspectives throughout the strategic renewal process

managers to senior executives with 5–25 years of work experience at Neste. The data collected from these interviewees allowed for gaining in-depth insights into the retrospective case history over time. In addition to interviewee access, information access and cognitive access were also available during the interviews, despite the sensitivity of some events that occurred during the strategic renewal process under discussion.

3.3 | Data analysis and research quality

Remaining open to unexpected empirical findings, we applied an abductive analysis to move flexibly between the theory and the empirical data (Dubois & Gadde, 2002). This approach enabled us to identify and explore the findings, partly based on the theoretical background and partly on an inductive analysis of the phenomena emerging from the case study. This inductive analysis played a major role, particularly in mapping the longitudinal strategic renewal process by applying the critical incident technique (CIT) (Bott & Tourish, 2016; Gremler, 2004; Hughes et al., 2007). The CIT was suitable for our purpose because it provided a rich data set that generated an accurate record of events (Gremler, 2004), while remaining flexible in accommodating new discoveries (Bott & Tourish, 2016; Hughes et al., 2007). In practice, we mapped critical incidents related to Neste's strategic sustainability issues, which principally concerned renewable fuel technology (NExBTL), to a timeline of year-level detail.

The preliminary mapping was based on data collected from the annual reports and secondary material, which yielded a full overview of the record of events during Neste's strategic renewal, including precise dates and the corporate perspective. The preliminary mapping was verified and then complemented by data collected in the interviews and group discussions, which provided wider perspectives on the personal, subjective, and open perceptions of company managers, enabling us to make causal connections between the events and their effects on the company's strategic renewal to achieve sustainability. The diversity of data sources, including secondary data collected from external sources, allowed for data triangulation and examination of multiple viewpoints during the analysis.

To generate insights into the nature, frequency, and processual patterns of the mapped critical incidents, we applied a classification process (Gremler, 2004; Hughes et al., 2007) based on the following strategic themes: strategy and organization, investment, technology

and research, regulation and society, programs, and strategic partners. The insights gained from the critical incidents and the classification process enabled us to distinguish stages and processual patterns throughout the timeline of the strategic renewal process, which were distinctly identified because of key incidents that visibly changed the path of the company's strategy. In the theoretical analysis and conceptualization phase of this research, the empirical findings from the process stages (see Figures 1 and 2) were conceptualized and integrated into the five-stage process model (see Figure 3).

Longitudinal studies are considered highly reliable and have high internal validity (Arnold & Hockerts, 2011). Moreover, the quality of our research was ensured by applying various tactics. Data triangulation was applied to determine whether data saturation had been reached, and researcher triangulation was applied to ensure that the interpretations of the data were valid. The results of the data analysis were validated in follow-up group discussions and according to interviewees' comments on the preliminary results via email. The compilation of longitudinal and multisource data enabled us to form a deep critical understanding of the case, which enabled us to derive reliable results. Thus, the research quality was supported by methodological transparency and informative documentation of the studied phenomena and context.

4 | RESULTS

4.1 | Case overview

After having refined fossil fuels since 1948, the Neste company started to renew toward sustainability to overcome the long-term unsustainability of the fossil-based business. Based on the continuous high-tech innovation of new chemistry processing methods, Neste developed a new renewable fuel technology (NExBTL). This technology enabled the strategic renewal of and long-term changes in Neste's business model, from supplying Russian low-quality raw oil to distributing it to Northern Europe by expanding both its supply and commercialization networks. However, the strategic renewal process was time consuming: it took 15 years from the technological invention in 1996 to the profitable commercialization of renewable fuels in 2011. Today, Neste has moved its successful strategic development away from a fossil-based business by applying the chemical and polymer competences learned from NExBTL technology to new business openings in aviation and renewable plastics businesses.

Based on our analysis of critical incidents, Neste's strategic renewal process was divided into four stages that occurred between 2000 and 2021. Figure 1 presents an overview of these stages and of the preceding period in the late 1990s before concrete strategic development action was taken. A detailed discussion of the stages, management issues, and business and technology innovation strategies throughout the process is presented in Section 4.2. The conclusion is presented in Table 2.

4.2 | Stages and management issues during Neste's strategic renewal process

4.2.1 | The roots of renewal (late 1990s)

Although the strategic renewal process began in the early 21st century, significant issues related to the success of this process were found in Neste's history. Neste was traditionally known for its strong technology-based competences in chemistry processing and fuel refining. Since its founding in 1948, Neste has used these competences to innovate technologies for processing low-quality raw oil into high-quality fuel. Thus, even in its early history, the company's strategic management was challenged to encourage innovation, and accordingly, it allocated resources to R&D to enable exploration.

By the 1990s, Neste had been investigating traditional biodiesel technologies, similar to many of its competitors. It was necessary for strategic management to be aware of this technological development in the industry to maintain the company's pioneering status, reputation, and long-term competitive advantage. However, not satisfied with the quality of biofuel trials at that time, the company sought to explore other technological solutions to produce sustainable fuels. In

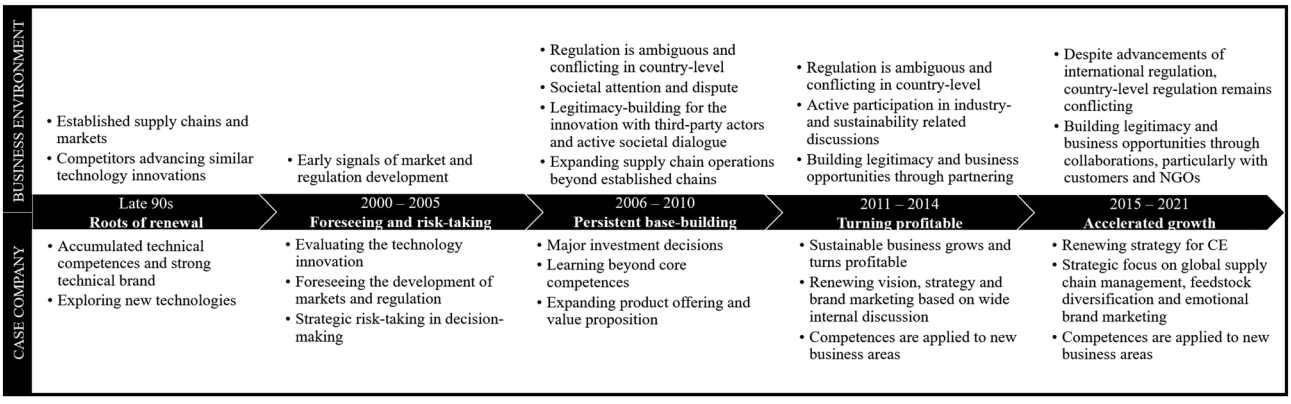

FIGURE 1 Overview of Neste's strategic renewal process toward sustainability and circularity

1996, Neste invented a new technology for renewable fuel production, NExBTL. Unlike traditional biofuel esterification, NExBTL technology enables the use of vegetable oils, waste, and residues as feedstock in the renewable fuel hydrogenation process, which resulted in a fuel with higher quality than traditional biofuel. This technological invention was the core component of Neste's strategic renewal, as it enabled the company to circulate carbon from bio-based feedstock in a sustainable way, thus reducing the greenhouse gas emissions that traditionally result from the production and use of fossil fuels. However, as neither markets nor regulations existed for fuels produced by this technology, the invention was only patented and not considered for commercialization yet.

4.2.2 | Foreseeing the prospects of innovation and strategic risk-taking (2000–2005)

The first official, distinguishable stage of strategic renewal started by predicting the requirements of societal sustainability transition for Neste's business regarding changing markets and regulative environments. Because neither had been developed at that time, the horizon for making long-term decisions was limited, which required that Neste's strategic management make risky business and investment decisions based on the company's vision of strategic renewal toward sustainability. This extraordinary risk-taking is described by the Head of Communications as follows:

> Of course, now, when looking back, one can say that it [investment in renewable fuel production] has truly been a very large and maybe even a risky decision because it demanded a lot of money, and still, in a way, there was no guarantee for the business to exist. (Head of Communications)

During this period, the European Union (EU) began working on the first biofuel directives. To achieve its target of becoming a leading northern oil company, Neste decided to invest in its first domestic renewable fuel production plant in Porvoo, Finland. The EU's first biofuel directive discussions were strong encouragement for initiating this investment, which was a key step in the company's strategic renewal.

4.2.3 | Persistent base-building for a sustainable business strategy (2006–2010)

At the beginning of the second process stage, the company's strategy was updated with the goal of becoming the global leader in renewable fuels. This was followed by investment in a second domestic production site. The industrial-scale use of NExBTL technology enabled Neste to launch its first product in renewable road transportation with a sustainable and economically viable value proposition. However, there was no broad consensus on the regulation of this new type of bio-based fuel. Therefore, at first, Neste was not able to commercialize the product, and it was only allowed to provide renewable fuel to its employees. This demonstrated that the renewable fuel was as efficient and safe as it was claimed to be, which built credibility in the eyes of regulators that would allow its commercialization. Subsequently, multiple countries permitted the commercialization of renewable fuels. However, national-level interpretations and implementations of EU biofuel directives still hinder their commercialization in some countries. Overcoming commercialization boundaries is essential in strategic development to achieve sustainability.

After launching the first renewable fuel, Neste began to receive negative attention from nongovernmental organizations (NGOs) that questioned the sustainability of Neste's palm oil supply chain. Because this had a significantly negative impact on the company's brand image, key stakeholders, particularly customers and even their own employees, questioned the sustainability of the company's business strategy. These concerns encouraged Neste to improve its sustainability efforts to strengthen a long-term, successful business strategy. Neste realized the strategic importance of collaborating with a wide range of stakeholders, including third-party auditors and NGOs, to understand and learn from the issues in sustainable supply chain management and to globally expand its business ecosystem with supply chains to feedstocks that were perceived as more sustainable, thus building new sustainability competencies:

> We were developing new competences that were not directly involved with oil refining. (Senior Vice President, Sustainability and Public Affairs)

Although the second process stage was not easy in Neste's renewable business strategy, and the renewable business was not yet profitable, the strategy implementation was accelerated by investing in international production sites in Singapore and Rotterdam in the Netherlands. Investment and commitment to the selected business strategy in the second stage were essential not only to reach production capacity but also to establish the credibility and competences necessary to overcome barriers to the implementation of a sustainable business strategy.

4.2.4 | Turning vision into profitability (2011–2014)

Because of the efforts made in the second stage the renewable business finally became profitable in the third stage. This milestone was vital because it served to strengthen the company's faith in the new business strategy, despite the challenges of commercialization, and it encouraged the company to make even more ambitious updates to integrate sustainability into the business strategy. For the first time, these strategic updates were based on the collective views of the personnel through an annual dialogue that unified the company's vision of striving for environmental sustainability by becoming the preferred partner in the cleaner traffic fuel market. Aligned with the sustainable value proposition of renewable products, Neste's marketing strategy

became more emotional in its appeal, changing the long-term message Neste wanted to transmit to stakeholders about its renewed business.

The tech company regarded R&D as crucial for strategic success, and particularly for building competences to utilize new renewable vegetable oil and waste feedstocks. Along with a growing feedstock variety, Neste's R&D efforts expanded business strategy opportunities with an extended renewable product portfolio. For example, the first renewable jet fuel was developed for commercial use in cooperation with Lufthansa Airlines in 2011. While establishing new partnerships, Neste maintained strategic cooperation with many other customers, suppliers, research partners, NGOs, and industrial associations in its business ecosystem. Here, Neste participated in both industry- and sustainability-related discussions to leverage understanding of the industry and sustainability issues and to fuel the company-level strategic renewal itself.

4.2.5 | Accelerated growth through sustainable technology and strategic collaboration (2015–2021)

After building a solid base for the company's renewed business and managing emerging difficulties during the renewal process, the fourth stage was characterized by the management of growth in terms of both economic and environmental sustainability. Highlighting and communicating the fundamental strategic renewal to the company's employees, its extended stakeholder portfolio, and potential new strategic partners, Neste changed its name from Neste Oil—under which the company had operated as an independent company—to Neste Oyj. In addition to the continuously evolving technology-based strategic renewal process, Neste's renewable business expanded to the field of bioplastics and biopolymers. This expansion was accelerated by new, strategically managed technology, research, and partnering opportunities. The renewables business unit was split into three divisions (i.e., road transport, aviation, and polymers and chemicals) to emphasize them according to the constantly updated business strategy.

This stage of strategic renewal highlighted the need for continuously aiming high based on strategic goals. To stay in a market leader position with secured production capacity and feedstocks as key strategic resources, Neste decided on the largest NExBTL refinery investment in its history, and it strengthened the global supply chain and feedstock diversification by increasing its collaboration with supply chain actors and acquiring one of its major animal fat waste suppliers. However, the most important role in forwarding strategic renewal was potentially played by pioneer customers, who proactively partnered with Neste to mutually advance the company's strategic renewal processes. As partner companies, they strengthened Neste's strategic renewal and position as a desirable partner and market leader:

> The City of San Francisco had adopted our products into use. Google had our product, and their commuter buses use it. This is how the company's reputation spreads. (Head of Strategy, Operations, and Brand Marketing)

Neste's story demonstrates the overall strategic renewal process needed to successfully incorporate sustainability into the business strategy of an incumbent technology company. During this challenging 25-year process, we identified key critical incidents and key issues in strategic management, which are presented in Table 2.

4.3 | Summary of the results

The results of the longitudinal study of Neste's development process showed that its strategic renewal for sustainability required that it manage many large-scale changes in its operations and relationships, including stakeholders in its business ecosystem. Our case study showed that the core of the business was renewed from producing fossil fuels to producing renewable fuels over a period of 25 years, which required many actions by the company's strategic management. The renewal over time was so fundamental that the company changed its name, Neste Oil, which it had as an independent company since it split from Fortum in 2005. In 2015, Neste removed "oil" from its name, becoming Neste Oyj. This change of name indicated the company's shift from a fossil fuel to a renewable, environmentally sustainable and circular business, exemplifying the discontinuous strategic renewal process typical of many incumbent companies (Agarwal & Helfat, 2009).

The transformation required that management learn how to replace conventional business approaches (Siebenhüner & Arnold, 2007), such as seeking new global markets, managing supply chains for feedstocks beyond existing ones, and building new partner networks beyond the existing business ecosystem. By developing new competence and product portfolios, the company's strategic management solidified its sustainability path, thus unifying its vision both within the company and with its external stakeholders. Although the company's strong technological background and core competences in high-tech chemical processing were strategically adapted to meet the call for sustainability, new, expansive knowledge was needed to face newly emerging radical changes in markets, supply chains, and partner networks caused by the strategic renewal for sustainability. Thus, our findings strongly support the importance of learning in implementing sustainability in companies (see Banerjee, 2002; Siebenhüner & Arnold, 2007) and demonstrate that this aspect is key in the strategic development of integrated business and technology strategies in proactively renewing to achieve sustainability over time, particularly among incumbent technology companies. The findings of the present study apply to strategic renewal in the present, long-term strategic development will continue with new business openings.

> Now, we have everything planned for the near future, and partly for the next decade. Currently, we are

TABLE 2 Key critical incidents and strategic management issues throughout the stages of Neste's strategic renewal process toward sustainability

Stage	Selected key critical incidents	Rationale for strategic renewal process	Key issues for strategic management
The roots of renewal (late 1990s)	Invention of sustainable technology	Innovation allows for the development of a renewed sustainable product portfolio, which is the core for business strategy renewal.	Ensuring innovative atmosphere and resourcing in R&D to enable exploring Striving for pioneering while staying aware of competitors' technological development
Foreseeing the prospects of innovation and risky decision-making (2000–2005)	Environmental regulation begins to develop on the global level	As the regulations in business environment and ecosystem are slowly changing within a limited horizon, it is challenging to both predict future business demands and steer business strategy with a sustainability orientation.	Recognizing and evaluating the prospects of technology innovation Strategic risk-taking based on foreseeing market opening and regulation development
	Investment decision for first domestic production plant	The investment decision is a concrete action that ensures the production capacity of the new business line, secure the long-term potential for the new business strategy, and communicates the strategic renewal.	
Persistent base-building for sustainable business strategy (2006–2010)	Updated ambitious goal to become a global leader in renewable fuels Launching first products and dealing with commercialization challenges Investment decisions for second domestic and two international production plants	Make concrete plans and goal setting for the strategic renewal and showing it to the stakeholders, thus enabling them to commit to shared sustainability goals for mutual benefits. Research and development successfully continue to commercialize new products, upon which the new business line and renewed business strategy are built. Investments are necessary for building new production capacity for the renewables business line; the business strategy demands evaluating a need for such investments early on and on continuous basis, also in new locations, to allow scaling up sustainable business.	Considering further investments, both domestically and internationally Expanding feedstock variety and supply chain operations globally Diverse competence building in sustainable business and its practices Expanding product offering and value proposition Managing the ambiguous regulative environment Managing negative societal attention and disputes with active dialogue and third-party auditing
Turning vision into profitability (2011–2014)	Sustainable business becomes profitable Internal strategy dialogue leads to updating vision and brand strategy New partnership contracts to develop a new business line Reaching technical capability to industrially process new feedstocks	Receiving measurable and successful results of the strategic renewal encourages continued renewal efforts. Continuous updates to the strategy are important for strengthening the effects of the renewed strategy over time. Particularly the opinions of all employees in strategic updates to commit them to the implementation of the renewal process. Building a new sustainable business line aligned with	Unifying the vision and direction of business strategy Renewing for emotional brand marketing Managing regulations that are ambiguously interpreted at the country level Actively participating in industry- and sustainability-related discussions Building legitimacy and business opportunities through partnering Applying developed competences and establishing partnerships to

TABLE 2 (Continued)

Stage	Selected key critical incidents	Rationale for strategic renewal process	Key issues for strategic management
		business strategy demands partners that share their knowledge, build legitimacy for the new business, and help with commercialization. Strategic renewal requires learning to use core competences in a new way to process more feedstocks and thereby produce more alternative products with increasing effects on sustainability.	create new business lines and serve new markets
Accelerated growth through sustainable technology and strategic collaborations (2015–2021)	Updating the vision and changing the company name to promote sustainability Establishing new partnerships in various customer segments Investment decision for third international production plant Updating organizational structure and strategic goal to become global leader in sustainable and CE solutions	The fundamental nature of strategic renewal is openly demonstrated to all stakeholders to commit partners with similar values for mutually beneficial development. The growing number of customers and large brands support the commercialization of renewable business lines with direct transactions and by increasing business legitimacy and faith in the selected business strategy. Constant evaluation of further investments increases the share of renewable business, aligned with the sustainable business strategy. Constant evaluation of strategic direction and needs for further developing the business strategy to be increasingly sustainable with the implementation of CE principles; strengthen the attention given to emerging sustainable business areas.	Strengthening global supply chain management and technical capabilities for diversification Increasingly collaborating with various actors, particularly strategic customers Managing with the regulation, which, despite advancements at the global level, remains ambiguously interpreted at the country level Applying developed competences to create new business lines and serve new markets

> discussing what our world will be like in 2030–2050. (Senior Vice President, Sustainability & Public Affairs)

In our analysis of critical incidents in the company's history, we identified stages and processual patterns in the company's strategic renewal process (see Figure 2). Each of these stages typically included strategic decision-making regarding the vision, strategy updates, new partnership contracts, changes in the value chain, and new business openings. By analyzing the emerging processual patterns based on critical incidents, we found that the passages between conventional strategy process stages were neither unambiguous nor discrete, and that coincided during the ongoing strategic renewal process (see Farjoun, 2002; Nicholas, 2009). For example, updates and evaluations of organizational structure and vision were critical incidents that occurred repeatedly during the full renewal process. Therefore, we could determine from the critical incidents at a stage level that the subprocesses of formulation, implementation, and evaluation were repeated patterns in each stage of the strategic renewal process (see Figure 2).

5 | DISCUSSION AND CONCLUSION

5.1 | Discussion

Our findings support the idea that sustainability is a continuous process that pertains strategically to all aspects of a company (Fowler & Hope, 2007). Based on our findings, we conceptualized a five-stage process model of strategic renewal for sustainability (Figure 3), arguing that this type of strategic development constitutes processual patterns comprising three subprocesses: strategy formulation, implementation, and evaluation. These processual patterns are

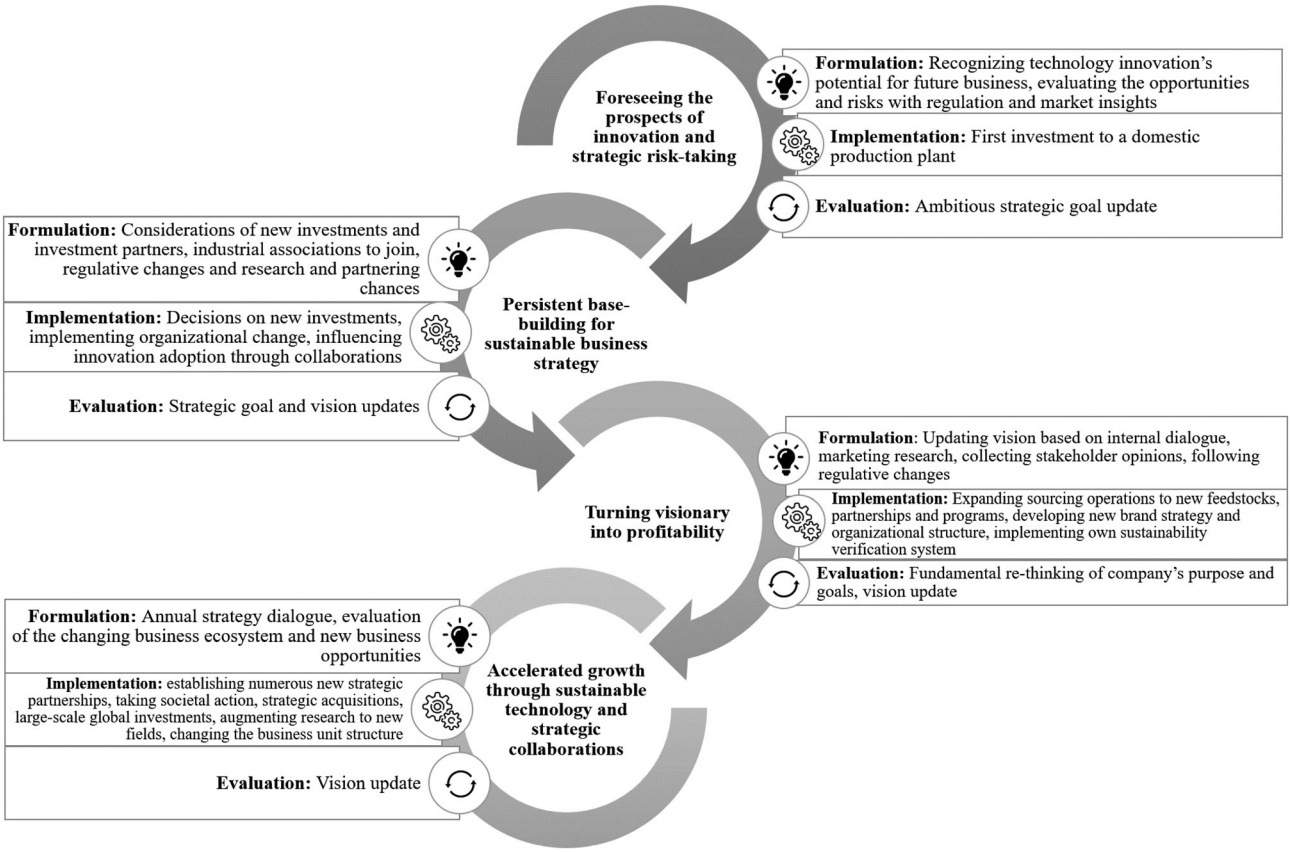

FIGURE 2 Stages and processual patterns comprising the subprocesses of formulation, implementation, and evaluation during the full strategic renewal process

repeated at each stage of the process. The model includes the key management issues in each stage. The model is aligned with prior evidence of the repetitive and cyclical nature of strategy processes (Cohen & Cyert, 1973).

To accelerate the emergence of new stages in the strategic renewal process, positive feedback from sustainability outcomes and stakeholders played a critical role. However, utilizing this positive feedback loop (Papagiannakis et al., 2014) to advance the continuous overall renewal process to achieve sustainability required the strategic management of the incumbent technology company to make proactive but risky decisions, particularly early in the process:

> After a certain step, the progress begins to feed itself, but as it won't be automatic, it has to be kept going. (Senior Vice President, Sustainability, and Public Affairs)

In particular, incumbents in the sustainability forerunner position are one step ahead of their business environment and ecosystem, whether they wish to or not. Therefore, strategic management in sustainability forerunner incumbent companies, particularly in the technology business, requires strategic moves and large, costly investments, even though it is not certain that the business ecosystem will respond positively over time. Such unpredictable environments typically require discontinuous strategic transformation (Agarwal & Helfat, 2009), which could explain why renewal to achieve sustainability is difficult and time consuming, as noted by Keijzers (2002), among other scholars. As the results of the present study showed, managing disruptive strategic renewal can be misaligned with compliance with ambiguous, slowly developing, or even nonexisting regulation, which would otherwise be suggested as the first steps in integrating sustainability in a single-loop learning process (see Banerjee, 2002). Instead, incumbent companies' management has no other choice than to skip the first learning loop and, similar to double-loop learning, proactively instigate radical changes, including actions such as sustainability communications and stakeholder involvement (Siebenhüner & Arnold, 2007). However, in practice, this discontinuous transformation can be hindered by the slow development of regulations and markets, as well as challenges to innovation, such as vision, development, and commercialization (Kaipainen & Aarikka-Stenroos, 2021).

By identifying the stages and their management issues in a strategic renewal process for sustainability, the present case study demonstrated how to align technology and business strategies for sustainability in practice. Incumbent technology companies need to

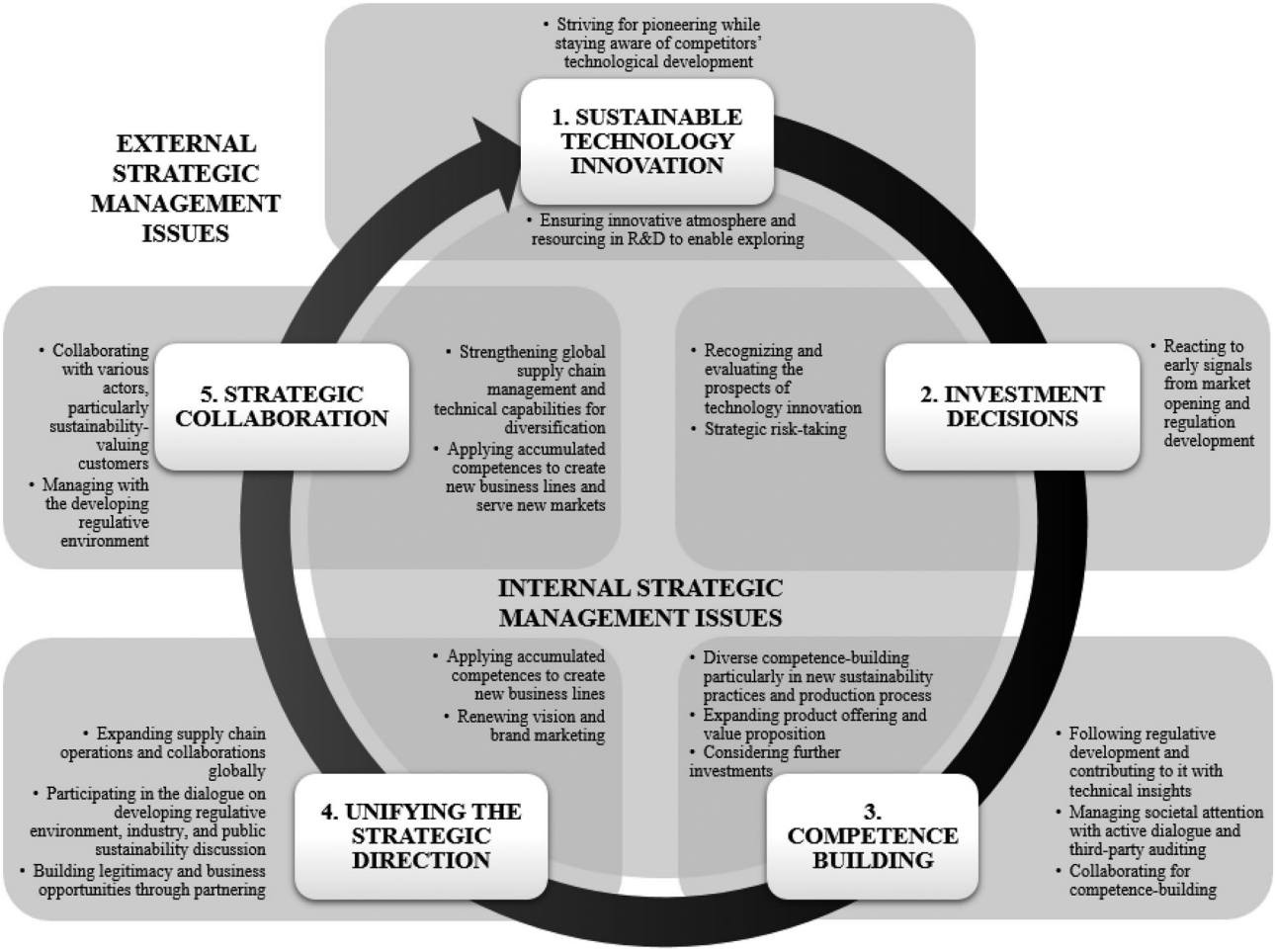

FIGURE 3 Five-stage process model for managing a tech company's strategic renewal toward sustainability and circularity

proactively modify their technologies and invent new ones to renew their business strategies and maintain competitiveness. In this case study, the technology strategy emerged first as the result of technological innovation, and it served as an input in business strategy development (see Chiesa & Manzini, 1998). However, over time, the role of technology changed from providing strategic input to providing support for the established business strategy (see Vernet & Arasti, 1999) through the opening of new sustainable business lines. This interplay of technology, innovation, and business strategy was necessary for the tech company to succeed in strategic renewal to achieve sustainability. This finding supports the understanding that technology and business strategy must be aligned in strategic renewal to achieve sustainability.

In summary, our process model captured the iterative and overlapping nature of the renewal process, allowing for the analysis of its constitution and conceptualizing the key stages in the strategic renewal process, as well as the main management issues in each stage. As shown in Figure 2, each stage proposed in Figure 3 followed the processual subprocess pattern of formulation–implementation–evaluation.

5.2 | Contributions to theory and practice

Our study analyzed a tech incumbent's strategic renewal process to achieve sustainability. The findings revealed the stages, processual patterns, and management issues that constituted the strategy development process. In addition to the process of business strategy development, the findings showed that sustainability required the incumbent company to update its technologies, production, products, competences, partnerships, supply chains, and business model. These findings were conceptualized in a process model (Figure 3) that describes how incumbents can conduct strategic renewal to achieve sustainable tech business in five main stages. We also found the management issues that the incumbent company needed to solve at a particular stage in the renewal process. Our study makes several theoretical contributions to the business strategy literature on environmental sustainability and to research on sustainability, CE, and strategic management.

First, new knowledge about the strategic development process required to achieve sustainability and its management contributes to the business strategy literature on environmental sustainability, in which recent studies have investigated practices for incumbents'

sustainable and circular business model transformation (Rovanto & Bask, 2020; Santa-Maria et al., 2021). Our longitudinal and processual approach allowed us to generate a new understanding extending from the development of business models to that of dynamic business strategies, thus capturing how business strategies are constituted in stages over time by repeating processual patterns of formulation, implementation, and evaluation of business strategy. Our empirical findings revealed critical management issues in the business strategy development process, and our process model indicated that they needed to be addressed timely (Figure 3). In conceptualizing the renewal of an incumbent company, we also contributed to the understanding of how sustainable business strategies are developed and implemented in practice (Engert et al., 2016; Papagiannakis et al., 2014). The findings of our study indicate that in the sustainability context, the renewal process is discontinuous in nature (Agarwal & Helfat, 2009), and it requires a proactive strategy that includes radical changes, similar to double-loop learning (Siebenhüner & Arnold, 2007), to address management issues such as sustainability communications and stakeholder involvement.

Our findings develop new understanding on how technology incumbents' strategic development unfolds through innovation in both technology and business, also contributing to the business strategy literature on environmental sustainability. Our study extends prior research that found that sustainable innovation, particularly business model innovation, was fundamental in renewal to achieve sustainability (Gandolfo & Lupi, 2021; Liu & Kong, 2020; Rovanto & Bask, 2020). Our findings demonstrated that technology innovation plays an important role not only at the beginning of business strategy development but also during the entire renewal process. Therefore, our study showed that as the incumbent tech company's strategic renewal process unfolds, it requires the strategic management of both business and technology innovation development over time to invent, develop, and commercialize new products that are aligned with the renewed business strategy.

Second, our study on how a company implemented sustainability and circularity in its strategy also contributes to the sustainability and CE research, which has lacked an understanding of how companies can strive for sustainability by starting, continuing, and implementing CE through managing their strategy development processes, from inventing circular technologies to scaling circular businesses. From the process perspective enabled by CIT, which is still lacking in the extant research (Rovanto & Bask, 2020; Teruel-Sánchez et al., 2021; Zollo et al., 2013), our study demonstrated that sustainability and CE were part of the strategic management of business and technological innovation over time. These findings demonstrated that business strategy development is interlinked with sustainable development, and instead of developing a separate sustainability strategy (Santa-Maria et al., 2021), a company could integrate sustainability practices into the core of its business strategy over time (see Engert et al., 2016; Liu & Kong, 2020; Martin & Rice, 2010; Schrettle et al., 2014). The integration of sustainability and business strategies in the stages in our proposed process model could support incumbent companies that struggle with sustainability and CE transition and help them with managing slow and demanding technological changes in markets, value chains, business models, and strategies (Kaipainen & Aarikka-Stenroos, 2021; Keijzers, 2002; Ranta et al., 2018). From the perspective of sustainability and CE research, our study emphasizes that sustainability and circularity are important strategic concerns for companies, and therefore need to be integrated in strategic management decision-making throughout continuous strategic development and renewal to achieve sustainability.

Finally, the findings of our study revealed that extreme strategic development occurs in a process. This contribution also applies to sustainability discussions in strategic management research, as it explains that companies can experience extreme turns in their strategies. Our study demonstrated that extreme and typically discontinuous strategic development (Agarwal & Helfat, 2009) constitutes stages and processual patterns, which can be managed from the first innovation to sustained business growth, taking into account both internal and external strategic management issues during the process. Our longitudinal study of a 25-year strategic renewal shed light on such processes by investigating process stages and processual patterns. Figures 2 and 3 show the cyclic nature of strategy, which is characterized by a repetitive processual pattern of formulation–implementation–evaluation subprocesses and the importance of proactive managerial steering throughout the process (Garud et al., 2010). Therefore, in developing a business strategy in a renewal situation, such as integrating sustainability, the process is iterative and requires addressing the management issues identified in our empirically based process model at each stage, as well as across these stages. Based on a new perspective on sustainability and circularity, these insights into extreme types of strategic development contribute to the strategic renewal literature (Agarwal & Helfat, 2009).

Our study has several implications for management. Although company-level sustainability processes can be long and complicated (Keijzers, 2002), as shown in the present case, taking advantage of the proposed process model and using it as a guideline would enable managers to identify important stages and management issues to address, and by doing so, to integrate sustainability and circularity at the core of their business strategy (see Figure 3). At the beginning of the incumbent's renewal process, strategic management needs to focus on making the right predictions and bold investment decisions while including its stakeholders in learning about sustainability issues. Extreme strategic development to achieve sustainability changes both companies' internal operations and values as well as value chains, which requires management to align internal and external stakeholders and thus benefit from their collaboration to accelerate renewal and find new sustainable and circular business opportunities. Thus, the process model would help business and technology managers understand that incumbent companies must proactively advance the renewal to sustainability in and across process stages. The proposed model will enable managers to understand what management issues to focus on and what actions are needed at each stage of the renewal process.

Finally, from the perspectives of policymakers, NGOs, and industrial associations, the key lesson of the present study is that their

involvement and collaboration during the process is an integral part of incumbent technology companies' renewal for sustainability. Therefore, actors who are interested in supporting sustainable business transformation should actively engage and collaborate with incumbents to support them in their renewal stage by stage. In doing so, they will advance the goals of sustainable development.

5.3 | Assessing limitations and avenues for future research

We selected an established single-case design that enabled our investigation of an exceptional in-depth strategic renewal to achieve sustainability (Fowler & Hope, 2007; Gandolfo & Lupi, 2021; Wicki & Hansen, 2019). Although this design limited the generalizability of the results, it enabled the research outcomes to be transferred to similar companies (Wicki & Hansen, 2019). The proposed process model could be particularly applicable to renewing innovation- and technology-based incumbent businesses in which innovation is inherent, engaging not only the internal departments of the company but also its partners in its transition to sustainability (see Geels, 2011). Consequently, further research is needed to determine how the proposed model would function in different business contexts, such as service businesses. Thus, to complement the findings of this study, we recommend that future research utilize a multiple-case design to expand and validate knowledge about strategic renewal processes across industries, markets, and national borders. The findings of our in-depth study allow for further comparisons among diverse companies, industries, and contexts.

We limited our study to process stages, processual patterns, and strategic management issues during a company's strategic renewal to achieve sustainability and circularity. In future research, it would be interesting to explore the particular drivers of the renewal process. Moreover, the roles of business ecosystems, market creation, and innovation could be examined in future research to expand our understanding of managing strategic sustainability integration among technology companies, as well as other types of companies.

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