Edited by
Annabeth Aagaard

Business Model Innovation

Game Changers and Contemporary Issues

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To Viktoria and Kristian

Foreword

Business model innovation is hardly a new phenomenon. To improve their value creation and competitive advantage, firms have always experimented with their value propositions, the customer segments they target, their value chain organization, etc. Technologies, customer preferences and norms, cultures, and legislation are continuously changing, and business model innovation creates value by better meeting customer needs and preferences in a changing world. However, over the last few decades, change that motivates business model innovation has dramatically increased, and there are now more, and more deep-seated, drivers of such innovation—dramatically complicating the task of innovating business models. Real game changers are the increasing emphasis on corporate social responsibility championed by diverse stakeholder groups, notions of sustainable transition and the circular economy, and the massive technological change that is underway, driven by large language models and other artificial intelligence technologies.

These changes are relatively recent, they are massive in both depth and scope, and they require very careful stocktaking and understanding of how they are going to influence how we approach business model innovation. Most of the changes don't affect a mere single component of the business model, but potentially all business model components. For example, the change brought about by AI is going to influence value propositions, value capture mechanisms, and value chain organization. Changing business models in response to the AI revolution requires carefully considering how the changes to the different business model components relate. The same applies to seizing innovation opportunities from AI through business model innovation. To understand these challenges, require theoretical development informed by deep knowledge of what is currently happening with respect to how business models are being reshaped under the impact of the above changes to preferences, technology, regulation, and so on.

To do exactly this, Professor Annabeth Aagaard of Aarhus University has gathered some of the leading thinkers on business model innovation in this fine collection. This includes a number of leading academics who have been pioneers in thinking about business models and have decisively shaped our thinking about business models, such as professor Christoph Zott, Raphael Amit, Edward Giesen, Paavo Ritala, Marin Jovanovic, Oliver Gassmann, Lucas Miehé, Nancy Bocken, Wim Vanhaverbeke, Florian Lüdeke-Freund, Peter Wells, Petri Ahokangas, Irina Atkova, Seppo Yrjölä, Marja Matinmikko-Blue, Llewellyn Thomas, Erkko Autio, and Christopher Tucci. It also includes authors some who have joined the conversation more recently. The chapters are brilliant, mixing theoretical development and empirical application. The chapters deal with recent massive game changers in the business landscape, such as digital platforms, ecosystems, sustainability, the circular economics, AI and 4G-5G-6G, and how they relate to business model innovation. As such the chapters greatly advance the existing business model literature. I highly recommend the book to those who have followed this literature and want to learn of the most recent advances. Both academics and practitioners stand to benefit from perusing it.

However, I think there is another, more subtle important lesson to learn from this book, which has to do with the more general acceptance of business model ideas in the academic community. My basic thesis is that game changers such as those mentioned above will naturally make business models and business model innovation central, perhaps *the* central, units of analysis in much of (macro-)management research, first and foremost in strategic management, but also in fields such as technology management and international business.

There is of course little doubt that business model innovation has clearly become highly important in contemporary discussion of numerous business-related phenomena. Check google Ngram (https://shorturl.at/tJPX9) and you will see what looks like an almost vertical line starting toward the end of the 1990s. And ask ChatGPT and it will tell you something like this (actually, this is what it told me): "the notion of 'business model innovation' is indeed influential. It represents a strategic approach for organizations to adapt and thrive in rapidly changing markets by developing new ways to create and capture value. By rethinking how they operate and deliver value to customers, companies can gain a competitive advantage and drive growth". I strongly believe ChatGPT isn't (in this case) hallucinating, and that "indeed" business model innovation is "influential"—although ChatGPT doesn't tell you among *who* the notion of business model is influential.

There is little doubt that to most practitioners—those are literally closest to the phenomena of interest—notions of business models and business model innovation make perfect intuitive sense. They are useful for structuring strategic discussions and for summarizing the essence of the enterprise. But, those with an academic, rather than a business background, will know that while most management scholars have heard of business model innovation, many find it hard to define, some are skeptical of the value of the concept, and a few dismiss it entirely. To some extent this is ironic, as social science and management research is shot through notions and concepts that become highly influential and respectable, even though if they are for a long time poorly defined. The concept of "utility" in economics and that of "sustained competitive advantage" in strategy may serve as well-known examples. However, concepts that are fluffy at the edges and sometimes even at the core may still be useful because they organize research and thinking and because they capture something essential.

It is true that there are still no generally agreed-upon, clear-cut definitions of business model innovation around. However, the skeptics need to be told that the concept needs to be taken seriously. Business model innovation has emerged as an extremely useful concept because it offers a holistic take on business and how they change under the impact of a multitude of changes that no other concept or theorizing offers. Increasingly, firms are creating or are embedded in business ecosystems; they have to negotiate relations with an ever-expanding set of stakeholders that may represent diverse wants and perspectives; and they are facing new, fundamental technological change. Firms need to consider the individual components of business models—value proposition, customer segments, value chain and ecosystem organization, internal resources …—but they also need to consider how these components are related. Often innovation of one of the components entails innovation of another component. Firms increasingly compete through their business model innovations. This is becoming increasingly clear under the impact of the game changers mentioned above that are reshaping the business landscape in fundamental ways. More partial views of the enterprise such as those represented by traditional competitive strategy thinking are not becoming obsolete. However, their inherent limitations are becoming increasingly clear as they cannot offer the holistic view that is required to grasp enterprise success under contemporary conditions.

The time is ripe, therefore, for the general acceptance, even triumph of notions of business models and business model innovation in academic research, just as business model thinking has long been accepted and prominent in the thinking of practitioners. I think this is going to happen within the next few years. When it happens, it will in no small measure be because of books such as this one. So, stay ahead of things and peruse this book. You will learn a lot and it will prepare you for the coming changes in how we think about the fundamental nature of the business enterprise.

Professor Nicolai J. Foss
Copenhagen Business School
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Introducing Business Model Innovation and the Game Changers of Tomorrow

Annabeth Aagaard

Introducing

This introductory chapter sets the stage for a comprehensive exploration of the game changers influencing business model innovation. It establishes the business model as a critical strategic tool, pivotal for generating customer value and achieving a competitive edge. The discourse navigates through the nuanced perspectives that define business models as architectures for value creation, delivery, and capture, highlighting the need for a consensus on their definitive meaning within the academic and business communities. The chapter emphasizes the dynamic nature of business models, illustrating their capacity to evolve in response to the external environment, technological advancements, and market shifts. This adaptability underscores the essence of business models as vehicles for strategic agility and innovation, essential for businesses to

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A. Aagaard (ed.), *Business Model Innovation*,
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thrive in an unpredictable landscape. As an opening to the book "Business Model Innovation - Game Changers and Contemporary Issues," this chapter lays the groundwork for the subsequent, in-depth discussions on various game-changing factors reshaping business models today. Following chapters in the book will delve into these topics, offering a diligent examination of how these game changers are driving the evolution of business models, presenting new challenges and opportunities for firms across industries. Through this exploration, the book aims to provide readers with a deep understanding of the current and future landscape of business model innovation, equipping them with the insights needed to navigate and lead in the ever-changing world of business.

Synergizing Business Models and Business Model Innovation

The business model is recognized as a pivotal strategic management instrument, instrumental in generating customer value and fostering a company's competitive edge, as noted by Zott et al. (2011), Zott and Amit (2013, 2015), Wirtz et al. (2016), Ritter and Lettl (2018) and Shepherd et al. (2023).

In the realm of strategic management scholarship, the construct of the business model is often articulated with considerable depth and nuance. Teece (2010, p. 191) provides a seminal definition, describing it as the "architecture of the value creation, delivery, and capture mechanisms a firm utilizes." This definition encapsulates a comprehensive framework that includes the firm's "value proposition, market segments, and the value chain activities" essential for the actualization of this proposition, a perspective further elaborated by Chesbrough and Rosenbloom (2002). These scholars delve into the intricacies of how these components are not merely assembled but are intricately interwoven within the firm's strategic fabric, a discourse expanded upon by Foss and Saebi (2017) who dissect the interconnections within this architectural framework, offering a granular understanding of its dynamics. The academic dialogue presents a rich tapestry of interpretations regarding the role and essence of business models. Osterwalder and Pigneur (2010, 2013) conceptualize the business model as a blueprint delineating the pathways through which a business creates and captures value. In contrast, Magretta (2002) perceives it as a narrative, a compelling story that elucidates the operational mechanics of enterprises. Chesbrough and Rosenbloom (2002) and Teece (2010) contribute to this discourse by emphasizing the structural and design-oriented dimensions of business models, highlighting them as frameworks and architectures for the mechanisms of value creation, respectively. The scholarly landscape, as evidenced by the burgeoning corpus of literature, has meticulously cultivated a comprehensive yet dispersed comprehension of business models, a narrative thoroughly reviewed by Zott et al. (2011), Amit and Zott (2012), DaSilva & Trkman (2014), Massa et al. (2017), Foss and Saebi (2018), Lanzolla and Markides (2021), and Snihur and Markman (2023).

A pivotal aspect underscored by Doz and Kosonen (2010) and Weber and Tarba (2014) is the business model's interaction with its external environment and its adaptability and strategic agility, demonstrating how a business model's evolution within an organization can be strategically orchestrated. Echoing this sentiment, Wirtz et al. (2016) and Massa et al. (2017) view the business model as a distilled and aggregated representation of a firm's critical activities, aligning with Foss and Saebi (2018) and Sjödin et al. (2020), who emphasize the model's role in defining the firm's value proposition and its strategic approaches to creating, delivering, and capturing value. Building on this foundation, Casadesus-Masanell and Zhu (2010) argue that a firm's strategic enactment of its business model, through a synergy of activities, serves as a crucible for strategy execution, resonating with Teece's (2010) insights on the mechanisms of value creation. This strategic construct delineates a specific pathway for competitive engagement (Velu & Stiles, 2013) and is subject to a dynamic continuum of transformation. Managers are tasked with navigating this terrain through a process of experimentation, reconfiguration, and a recalibration of business logic, leveraging the business model as a strategic lever for addressing change, driving innovation, and ensuring the firm's evolutionary adaptability (Burnell et al., 2023; Demil & Lecocq, 2015; Felin et al., 2020). This elaborate discourse underscores the business model's centrality as a conduit for strategic thought and action within the contemporary business landscape.

Particularly, business models must be adopted and innovated to respond to changes in the business environment, new technologies, or to leverage emerging opportunities (Chesbrough, 2006; Johnson et al., 2008; Teece, 2010; Teece & Linden, 2017; Bresciani et al., 2021; Leppänen et al., 2023; Shepherd, 2023). Those changes require a continuation of innovating on existing and/or new business models. Business model efficacy hinges on a firm's dynamic capabilities—its capacity to integrate, construct, and reconfigure competences to navigate or instigate market changes (Teece, 2007, 2018; Teece et al., 1997). These capabilities, rooted in routines and managerial acumen, are crucial for developing, refining, and adapting business models, directly impacting long-term profitability. As Foss and Saebi (2017) point out, the evolution of the BM literature can be categorized into three streams of research: (1) business models as classification of business, (2) business models as antecedent of businesses performance, and (3) business models as a unit of innovation. Since the business model is portrayed as a unit of innovation (Achtenhagen et al., 2013; Teece, 2010), some studies also associate it as a basis and/or ability for transformation and change (Johnson et al., 2008). Accordingly, the process of business model innovation can be defined as a process that deliberately changes the core elements of a business and its business logic (Frankenberger et al., 2013; Snihur & Zott, 2020).

Despite these expansive contributions, a consensus on a definitive operating definition remains elusive, as highlighted by Casadesus-Masanell and Ricart (2011, p. 102), who observe the persistent ambiguity surrounding the term. This sentiment is echoed by George and Bock (2011, p. 83), Zhang et al. (2020) and Filser et al. (2021), who critique the academic discourse for its fragmentation and the lack of uniformity in definitions and the delineation of construct boundaries, underscoring a critical area for ongoing scholarly exploration and clarification. In addition, Wirtz et al. (2016, p. 37) highlight a prevailing lack of consensus within the academic community, noting that "there is still no complete clarity in the literature, in particular about the purpose or the right of the business model approach to exist, or even the contrast to established concepts."

Moreover, the process of business model innovation remains an ambiguous concept (Sjödin et al., 2020; Massa & Tucci, 2013). Therefore, the timing and requests for publications exploring business model innovation and the new venues driving tomorrow's business models have never been more extensive, as the need for game-changing business models is prevalent in these times of disruption, digitalization, environmental and social impacts, and grand challenges (Martí, 2018). However, present book contributions on BM and BMI characterized by a striking lack of cumulative theorizing (Foss & Saebi, 2018) and do not adequately account for the impact of grand challenges and mega trends on driving BMI in the near future.

The Megatrends and Game Changers of Doing Business Today and Tomorrow

The landscape of global business and business development is being reshaped by a series of pervasive and powerful mega trends, each acting as game changers and catalysts for profound change. Hence, we are in an epoch marked by rapid and seismic shifts, with these trends as the principal architects of business model innovation. Climate change is the clarion call that resonates across industries, galvanizing enterprises to embrace sustainability, sustainability transitions, and circular economy tenets (Aagaard, 2019b, Aagaard et al., 2021; Bocken & Konietzko, 2022; Bocken et al., 2014; Elkington, 1997; Geissdoerfer et al., 2017). This realignment goes beyond the mere fulfillment of regulatory mandates; it represents a deep strategic shift toward resilience, ethical stewardship, and long-term value generation. Companies are integrating environmental considerations into their strategic core, catalyzing innovation and enhancing resource efficiency (Longoni & Cagliano, 2018). This proactive stance positions them at the vanguard of the burgeoning green economy, ready to capitalize on the growing consumer demand for responsible business practices.

At the same time digital transformation is changing the business landscape. It extends beyond just innovative enterprises and tech behemoths, impacting organizations of every scale in a multitude of sectors

(Warner & Wäger, 2019). Digital platforms are central in driving digital business model innovation and disrupt traditional market structures by facilitating ecosystems where data, ideas, and services are exchanged with unprecedented fluidity, spawning new forms of value creation and exchange (Cennamo, 2021; Parker et al., 2016, 2017). In continuation of this, Gregory et al. (2020) emphasize the critical role of data and AI as strategic assets that platforms can leverage to augment user value. With digital disruption, and AI at its vanguard, business models are being radically redefining and so is the concept of doing business (Garbuio & Lin, 2019). It is not merely altering established models; it is the crucible for the creation of entirely new paradigms (Iansiti & Lakhani, 2020). Hence, AI is the fulcrum upon which the levers of advanced analytics and intelligent automation pivot, propelling decision-making, operational agility, and customer engagement to new heights (Jia et al., 2024; Rammer et al., 2022; Ransbotham et al., 2017).

In the face of global instability marked by economic, geopolitical, and public health fluctuations, businesses are compelled to evolve their models, leveraging such adversities as catalysts for strategic innovation and growth. This necessity for agility and foresight is not merely reactive but a proactive embrace of transformation, essential for sustaining competitive advantage. Demographic shifts further necessitate this evolution, urging businesses to refine their offerings, marketing, and talent strategies to cater to varied population dynamics (EU, 2019; PWC, 2024). In this context, the imperative for nuanced stakeholder engagement, emphasizing transparency and reputational management, becomes integral to business model innovation. Companies are thus recalibrating their approaches, embedding a commitment to employee welfare and equity as core to their strategy, recognizing its value in cultivating trust, brand loyalty, and enduring customer relationships. For instance, firms like Tesla's strategic adjustments in supply chain management reflect an innovative response to mitigate geopolitical and economic risks, embodying a shift toward resilience and sustainability in business modeling. Similarly, the healthcare industry's adaptation, illustrated by companies like Philips and Medtronic, showcases how demographic trends drive business model innovation, with personalized, AI-enhanced products addressing the nuanced needs of an aging populace.

In essence, the confluence of these megatrends necessitates a strategic orchestration that is complex yet coherent. Innovative business models that can adeptly harness the potential of sustainability, digital transformation, and demographic shifts while navigating the intricacies of global and social instabilities will not merely survive; they will flourish and redefine the marketplace. Leaders who can synthesize these diverse forces into integrated, forward-looking strategies will be the architects of the next frontier in global business innovation and development.

Implications of Megatrends: Redefining Business Model Innovation

Building upon the understanding that megatrends are reshaping the landscape of global business, we turn our attention to the explicit and game-changing impact on business model innovation. The very fabric of how value is created, delivered, and captured is undergoing a metamorphosis, prompted by these catalytic forces. In this next section, we explore the game changers of business model innovation, dissecting how researchers are delving into these phenomena and how practitioners are steering through these transformative times. As we delve into the current and future game changers in BMI, it becomes clear that sustainability, circularity, digitalization, artificial intelligence (AI), open innovation, platforms, and ecosystems stand at the forefront of redefining business strategies and operational paradigms. This overview seeks to intertwine these pivotal themes, shedding light on their implications for the evolution of business models in a rapidly changing world. In the current era, businesses are confronted with an unprecedented pace of change, driven by technological advancements, shifting societal expectations, and the urgent need for sustainable practices. The concept of BMI has thus evolved from a strategic option to a critical imperative for survival and growth. Hence, this book delves into the heart of this evolution, exploring how innovative business models are not just responding to changes but actively shaping the future of industries and societies through these overarching game changers.

Embedding Sustainability and Circularity in the Heart of Business Model Innovation

Concurrently, the escalating urgency of environmental sustainability and social equity has propelled the integration of sustainable practices into the core of business model innovation (Stubbs & Cocklin, 2008; Schaltegger et al., 2016; Aagaard, 2019a; Klein et al., 2021; Dembek et al., 2023; Aagaard et al., 2021 and Lüdeke-Freund et al., 2024) underscore the strategic incorporation of sustainability into business models, aiming to achieve the Triple Bottom Line of economic, environmental, and social value (Elkington, 1997) as well as mandatory non-financial disclosure agreements (Jackson et al., 2020), such as CSRD Corporate Sustainability Reporting Directive (EU, CSRD, 2024). This commitment is further elaborated through the Triple Layered Business Model Canvas proposed by Joyce and Paquin (2016) and the business models for sustainability innovation (BMfSI) framework by Lüdeke-Freund (2020; 2024), offering practical frameworks for embedding sustainability into business operations. The concept of circular economy introduces a radical rethinking of traditional business models, emphasizing waste minimization and resource efficiency. For example, (Geissdoerfer et al. 2023; 2017) provide a critical examination of how circular business models can foster economic viability while addressing pressing environmental challenges, thereby opening new avenues for innovation and competitive advantage. The growing awareness of environmental challenges and societal inequities has propelled businesses to integrate sustainable and circular practices into their core operations (Assmann et al., 2023; Reim et al., 2021; Nidumolu et al., 2009; Schaltegger et al., 2016). Moreover, the concept of circular business models represents a radical departure from traditional linear approaches, emphasizing the importance of designing waste out of systems and creating regenerative value loops (Linder & Williander, 2017). This model not only addresses environmental concerns but also opens new avenues for innovation and competitive advantage, challenging businesses to rethink how products are designed, used, and reused, while using digital technologies (Chauhan et al., 2022; Neligan et al., 2023). The increasing emphasis on sustainability and the transition toward circular economies have become paramount in driving business model innovation (Bocken & Konietzko, 2022; Bocken et al., 2014). Companies are integrating the principles of sustainability and circularity not just to mitigate environmental impact but also to unlock new value propositions and revenue streams (Santa-Maria et al., 2022; Ringvold et al., 2023). A quintessential example is the shift from ownership to access, as exemplified by the automotive industry. Traditional car manufacturers, once solely focused on selling vehicles, are now innovating to offer mobility-as-a-service. This is not merely a response to environmental concerns but a strategic reorientation toward sustainable value propositions that resonate with the consumer's growing preference for access over ownership (Baines et al., 2024). Companies like Volvo with their "Care by Volvo" subscription service are redefining the customer relationship, providing flexibility and inclusivity in user experience.

Digitalization, AI, and the Evolution of Business Models

As highlighted by Foss and Saebi (2018; 2017), BMI has become essential for firms aiming to navigate the complexities and opportunities of the digital economy, marking a paradigm shift in strategic thinking and execution. Digital technologies are at the heart of this transformative wave, serving as both disruptors and enablers of new business models (Frankenberger et al., 2020). The genesis of this transformative wave can be traced to the digital revolution, which has redefined the boundaries of what is possible in business (Teece, 2023; Teece & Linden, 2017). Digital technologies, from blockchain to artificial intelligence (AI), are not merely tools but foundational elements that are reconfiguring the very essence of business models (Ferràs-Hernández et al., 2023; Burström et al., 2021; Aagaard, 2019a; Brynjolfsson & McAfee, 2014, 2017; Weill & Woerner, 2013). This digital shift has given rise to new types of business models, such as platform-based and ecosystem-oriented models, which leverage network effects and collaborative strategies to create value in ways that were previously unimaginable (Björkdahl et al., 2024). Tidd and Bessant (2018) emphasize AI's transformative potential, from reshaping product and service offerings to revolutionizing operational processes. AI is not just an operational tool but a strategic asset that can predict trends, personalize customer experiences, and drive efficiency, thereby playing a pivotal role in the evolution of business models. The discussion on the interplay between AI and business models sheds light on how AI can be harnessed to create innovative solutions that address complex business challenges (Lou and Wu, 2021; Jorzik et al., 2024). In addition, the emergence of new mobile communications technologies represents another frontier of innovation, redefining how businesses connect with customers and operate in the digital space (Ahokangas and Aagaard, 2024). This technological evolution is creating new opportunities for businesses to innovate their models, particularly in terms of connectivity, customer engagement, and service delivery, e.g., as viewed in the digital healthcare sector (Essen et al., 2023). In the realm of digital disruption, the story of platform businesses and platform business models stands out prominently (Chu and Wu, 2023; McIntyre et al., 2021; Zhao et al., 2020). Consider the case of the financial technology sector, where companies like Stripe and Square have revolutionized payment processing by constructing platforms that integrate seamlessly with a multitude of business models (Arnone, 2024). These platforms not only facilitate transactions but also amass valuable data, offering insights and enabling ancillary services that traditional financial institutions were slow to capitalize on. At the same time, the exploration of digital technologies act as twin enablers of sustainability and circularity highlights a synergistic relationship that can amplify the impact of business model innovation (Broccardo et al., 2023; Chauhan et al., 2022; Di Vaio et al., 2020; Garbuio & Lin, 2019). By leveraging digital technologies, businesses can enhance their sustainability efforts, creating more efficient, transparent, and resilient models that cater to the demands of a rapidly changing world through sustainable technologies (Holland et al., 2024; Bohnsack et al., 2014), as in the case of electric vehicles.

Business Model Innovation Through Open Innovation, Platforms, and Ecosystems

The paradigm of open innovation has gained traction as businesses recognize the value of collaborating beyond their organizational confines to accelerate innovation and tap into external sources of ideas, technologies, and capabilities (Chesbrough, 2003, 2006, 2010). This approach is particularly relevant in the context of digital ecosystems and platforms, where the fluid exchange of information and resources necessitates new strategies for intellectual property management, partnership, and co-development (Lehmann et al., 2022). The rise of collaborative ecosystems marks a significant shift toward cooperative innovation strategies. Moore's (1996) concept of business ecosystems highlights the value of collaboration among diverse stakeholders, from start-ups to multinationals, in driving innovation and creating sustainable competitive advantages. This ecosystemic approach is increasingly pertinent in a digital age where cross-sectoral and interdisciplinary collaborations can catalyze the development of novel business models (Jacobides, 2019, 2022; De Meyer & Williams, 2020). The emergence of platform-based and ecosystem-oriented models, as discussed by Parker et al. (2016), exemplifies how digital platforms are revolutionizing the way businesses create and capture value, fostering unprecedented levels of collaboration and innovation. Platform-based business models and the orchestration of ecosystems represent a significant evolution in how companies operate and compete (Cennamo, 2021; Kretschmer et al., 2022). Platforms act as facilitators of multi-sided markets, bringing together diverse participants and enabling interactions that create value for all involved (Teece et al., 2022). Hence, platform ecosystems enable value creation and digital business model innovation by orchestrating diverse participant interactions, thereby redefining market boundaries (Parker et al., 2016, 2017; Wulf & Blohm, 2020). The rise of Generative AI within these ecosystems introduces a hyper-personalization paradigm, allowing for real-time, precise customization of services to meet individual user preferences (Wessel et al., 2023; Rane et al., 2023). These platform-based business models leverage network effects and shared resources, fostering environments where businesses, customers, and partners collectively innovate and solve complex challenges—even grand challenges (Ritala, 2023). As businesses navigate this complex landscape, the role of ecosystems and collaborative innovation becomes increasingly important.

The Aim of the Book

In the contemporary business landscape, the concept of business model innovation has transcended the realm of mere corporate strategy to become a fundamental driver of sustainable competitive advantage and organizational resilience. This edited volume, titled "Business Model Innovation - Game Changers and Contemporary Issues," aims to provide a comprehensive exploration of the pivotal forces and emerging trends that are shaping the future of business models. In the realm of business model innovation, the landscape is continually reshaped by emergent trends and transformative forces. Hence, the aim of this book is therefore to help fill this void and to present a theory-based textbook that explores the new venues of business model innovation targeting international universities and learning organizations, their lectures/professors, and students as well as managers of public and private companies, start-ups, NGOs, and policymakers. Accordingly, the key contribution of this book is to explore the new models and theories related to business model innovation and to contribute to the knowledge of how companies, organizations, and networks can design, implement, and apply business model innovation in the future. Another contribution of this book is to view business model innovation in different contexts, as BMI can be conducted and integrated in several ways with very different objectives, potentials, and outputs depending on the specific context. In addition, a key contribution is to inspire junior and senior BMI researchers to pursue the identified research gaps and venues for further research as presented in the individual book chapters. Finally, we hope that this book enables students/employees, start-ups, and established companies to seize the new BMI opportunities and prosper from networks and platforms in driving future business model innovations. While this book focuses on the potentials of BMI from a theoretical and research-based approach, the question is also highly relevant for practitioners, as the business model perspective reveals several components that need to be actively managed to create customer value, networks while creating new markets, businesses, and optimizations. The book therefore also seeks to explain and explore how companies build their organizations, strategies, processes, and networks to ensure successful design, integration, and management of new business models throughout the value chain and ecosystem. As business model innovation continues to be a central theme in both academic research and practical application, the exploration of these game changers becomes ever more critical. Scholars provide the frameworks and insights, while practitioners test and refine these concepts in the real world. Together, they forge the path forward, navigating through the complexities presented by these megatrends, and crafting business models that are not only robust and responsive but also equitable and sustainable in a rapidly evolving global landscape.

Overview of the Book Chapters

In the dynamic landscape of contemporary business, the imperative for innovation extends far beyond products and services to encompass the very models through which businesses operate and create value. "Business Model Innovation: Game Changers and Contemporary Issues" embarks on a scholarly expedition to dissect and understand the transformative forces at the helm of business model innovation (BMI). This edited volume, curated with contributions from leading academics, meticulously explores the intricate interplay between emergent technologies, sustainability imperatives, and the evolving paradigms of collaboration and competition within digital and physical ecosystems. Through a critical examination of current literature and empirical studies, the subsequent chapters are dedicated to a specific dimension of BMI and collectively offer a nuanced perspective on how businesses can navigate the complexities of the twenty-first-century business environment.

This chapter, authored by Annabeth Aagaard, introduces the concept of business model innovation and an overview of the key game changers in BMI. It sets the stage for the other chapters of the book and a deep dive into the capabilities, strategies, and frameworks that enable firms to not only adapt, but also thrive amid relentless change.

Chapter 2 authored by Christoph Zott, Raphael Amit and Edward Giesen extends this dialogue by focusing on the strategic underpinnings of BMI capability as a critical lever for sustaining competitive advantage. This exploration underscores the necessity of an agile, innovative mindset in harnessing the potential of BMI.

In Chapter 3, Lucas Miehé and Oliver Gassmann present an in-depth analysis of collaborative ecosystems. Their insights reveal new avenues for joint innovation, emphasizing the power of collective intelligence in the creation of value.

The narrative progresses with Chapter 4 by Paavo Ritala and Marin Jovanovic, which categorizes B2B platform business models into platformizers, orchestrators, and guardians. This classification illuminates the diverse strategies platforms employ to dominate their domains.

Sustainability transitions as catalysts for new business models are examined in Chapter 5 by Florian Lüdeke-Freund, Peter Wells, and Annabeth Aagaard. Their discussion highlights the imperative of integrating sustainability into the core of business strategies to drive innovation and create enduring value.

Llewellyn Thomas and Erkko Autio, in Chapter 6, introduce a Triple Bottom Line Canvas as a tool for sustainable BMI, stressing the integration of economic, social, and environmental missions for holistic value creation.

Chapter 7 by Nancy M. P. Bocken delves into circular business model innovation, mapping out the pathways and game changers that facilitate the transition toward more sustainable and regenerative business practices.

Annabeth Aagaard and Wim Vanhaverbeke, in Chapter 8, articulate the synergies between digital technologies and sustainability within business models, showcasing how digitalization can be a powerful ally in achieving sustainable outcomes through twin transition business model innovation.

The exploration of new mobile communications technologies and their impact on business models is the focus of Chapter 9 by Petri Ahokangas, Irina Atkova, Seppo Yrjölä, and Marja Matinmikko-Blue, offering a forward-looking perspective on connectivity and customer engagement.

Finally, Chapter 10 by Annabeth Aagaard and Christopher Tucci ventures into the realm of AI-driven BMI. This chapter underscores AI's pivotal role in pioneering new frontiers in value creation, encapsulating the essence of innovation in the age of artificial intelligence.

Each chapter in this volume not only contributes to the academic discourse on BMI but also provides actionable insights for practitioners navigating the complexities of modern business landscapes. Through this compilation, we aim to illuminate the multifaceted nature of BMI, offering a comprehensive guide for academics, practitioners, policymakers, and students alike. The discourse within these chapters challenges conventional wisdom, advocating for a proactive, strategic approach to BMI in crafting the future of business in an ever-evolving global economy and society. This integrated overview sets the stage for the detailed explorations within "Business Model Innovation - Game Changers and Contemporary Issues," aiming to provide readers with a nuanced understanding of the trends, challenges, and opportunities facing BMI. By weaving together insights from leading scholars and practical examples, the book seeks to offer a roadmap for navigating the complexities of innovating business models in an era marked by rapid technological change, increasing sustainability demands, and the imperative for digital transformation. It serves as a vital resource for academics, practitioners, and policymakers striving to create value in a world of unprecedented challenges and opportunities. Through this synthesis, the introduction seeks to encapsulate the essence of business model innovation's role in navigating and shaping the future of global business practices, emphasizing the importance of adaptability, sustainability, and collaborative innovation in creating enduring value.

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2

Business Model Innovation Capability: A Game Changer for Sustaining a Firm's Edge

Christoph Zott, Raphael Amit, and Edward Giesen

From Isolated Business Model Innovation to BMI Capability

Business model innovation (BMI), at its heart, is a design task (Amit & Zott, 2021; Zott & Amit, 2015). It has become the focus of senior managers' efforts to sustain the competitiveness and prosperity of their companies. For example, faced with competition from innovative business models in their industries, often from digital new entrants such

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as Uber or AirBnB, "four-fifths of Chief Company Officers are experimenting with alternative business models or thinking to do so (IBM, 2015, p. 23)." Aware of the ongoing threats to their businesses, C-level executives are motivated to innovate their business models in a continuous and systematic manner. Yet, how can their firms develop capabilities that enable the continuous design of BMI?

This is an important strategy issue. Business model design requires managers to define precisely how the company is embedded in its "ecology"—that is, in the multiple networks of firms, institutions, technologies, and customers that surround it—thereby determining not only the possible partners that can help it co-create value, but also its likely competitors. The business model is thus one of the most fundamental strategic design tasks that CEOs and general managers must carry out, and a task that they may have to reconsider periodically given the speed of change in their respective businesses and industries.

Scholars, too, are interested in this issue and are turning their attention from firms' isolated attempts at BMI (e.g., Cozzolino et al., 2018; McDonald & Eisenhardt, 2020; Peprah et al., 2022) to BMI as an ongoing stream of innovations (Snihur & Zott, 2020; Warner & Wägner, 2019), and in fact, as an organizational capability.

Current Thinking on Business Models

Building on prior research (Amit & Zott, 2001; Zott & Amit, 2010), we conceive of the business model as a value-centered activity system that is designed and enabled by a focal firm in order to meet perceived market needs. The key dimensions of a business model are: (1) its content (i.e., what activities are enabled by the business model); (2) its structure (i.e., how the activities are linked in the business model); (3) its governance (i.e., who performs the activities that are enabled by the business model—which activities are performed by the focal firm versus those performed by partners, suppliers, or customers); and (4) its value logic (i.e., why the business model creates value and why it enhances value appropriation) (Amit & Zott, 2001; Zott & Amit, 2007, 2008, 2010).

In short, the business model is about the what, how, who, and why of the activity system orchestrated by a focal firm.

We consider a business model design of an incumbent firm to be innovative when the firm changes its activity system so that the new system is novel for the firm and possibly also in the product-market spaces in which it competes (Amit & Zott, 2012). This may imply a significant strategic shift, in particular when the new business model creates new sources of revenues, or when it redefines the rules of competition for an entire industry (Visnjic Kastalli et al., 2013). To cite some well-documented examples, by leveraging connectivity, DELL implemented a customer-driven, build-to-order business model that replaced the traditional build-to-stock model of selling computers through retail stores. And when Apple introduced the iPhone in 2007 and subsequently the App store, it revolutionized the smartphone handset industry, representing a profound transformation. Apple's business model shifted from being a product-centric firm—developing, manufacturing, and marketing stylish and expensive bundled hardware and software—into a powerful digital platform, based on the iOS operating system. The shift enabled Apple to create more value for all business model stakeholders, such as app developers, telecommunication companies that operate wireless networks around the world, and of course users, while capitalizing on the use of its hardware and thereby substantially enhancing its own market value.

In addition to complementing a firm's product-market strategy (Zott & Amit, 2008), what makes business model innovation potentially powerful is that competitors often find it more challenging to imitate or replicate a novel business model than to copy a single novel product or process, due to the systemic nature of business model innovation and its intangible and tacit characteristics. Although it is relatively easy to undermine and erode the returns of product or process innovation, innovation at the level of the business model can be the source of sustainable competitive advantage. Further, due to technological changes as well as changes in consumer preferences market conditions change over time which may call for changes in the firm's business model. The questions that managers may need to ask in this context include: Should we develop a business model innovation capability? And if so, how can we do it? The latter question constitutes the focal research question of this chapter.

Two streams of academic research seem particularly pertinent for informing this research question: first, the literature on capability development, and second, the literature on business model innovation. Surprisingly, relatively few studies have examined their intersection and proposed specific processes or frameworks for BMI capability development. This is the gap on which the current study focuses.

In the first literature stream, researchers have examined primarily the role of knowledge articulation and codification for capability development (Zollo, 1998; Zollo & Winter, 2002). Although great strides have been made to explain capability development, there are gaps in our knowledge, in particular regarding the development of dynamic capabilities (Romme et al., 2010). In the second literature stream, much research has focused on the development of innovative business models and its associated outcomes (Foss & Saebi, 2017) yet researchers have only sporadically examined the capacity of firms to do this reliably and repeatedly. A business model innovation capability involves ongoing design and testing of business model improvements (Mitchell & Bruckner Coles, 2004; Warner & Wägner, 2019), as well as systematic identification of value creation potential and associated risks (Euchner & Ganguly, 2014). Such a capability also likely involves senior managers' novelty orientation, which refers to cognitive practices such as industry-spanning search and complex system thinking (Snihur & Zott, 2020). However, little is known about the specific processes by which a business model innovation capability can be established. Since the capacity to innovate the business model can be conceptualized as a dynamic capability (Amit & Zott, 2016), the gaps in both literature streams converge.

In this chapter, we seek to advance the literature by focusing on the question of how to develop a capability for BMI and by providing an actionable process framework for manager.[1] Anchored in the received

[1] We build on an emerging stream of literature on the process of business model innovation. For space considerations, we do not offer a full-blown literature review. The received literature essentially describes the BMI process as consisting of an experimental phase of exploration and ideation, followed by a period that focuses on implementation or exploitation (see, for example, Amit & Zott, 2021; Sosna et al., 2010, Zott & Amit, 2015).

strategic management literature and in substantial fieldwork on business model innovation in established firms, we propose a normative, three-phase process framework for building a business model innovation capability (see Fig. 2.1). The first phase in our framework requires managers to adopt a business model perspective in order to complement their typical focus on products and services, to understand the strengths and weaknesses of their current business models, and to grasp the key dimensions along which they can be innovated. We call this the "awareness stage." In a second phase, managers—as business model innovation designers—need to frame the design problem that they are facing, for example, by calibrating their aspirations with technological, financial, and human capital feasibility. We call this the "framing stage." In the third phase, managers need to carry out the creative business model (re-) design and implementation work in a well-defined design process. We call this the "design stage."

The key idea advanced in this chapter is that building a business model innovation capability requires an initial spark provided in Phase One (awareness stage), and then gradual development through iterative cycling between Phases Two (framing stage) and Three (design stage)

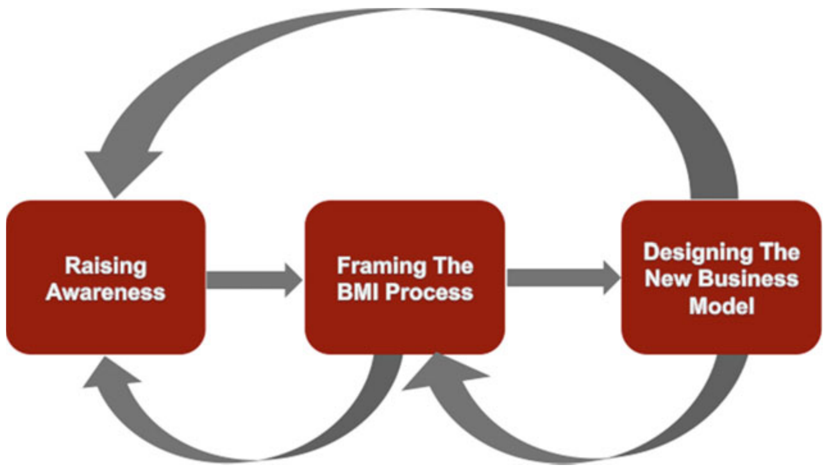

Fig. 2.1 Framework for developing business model innovation capability (*Note* The various arrows indicate a highly iterative [as opposed to linear] process)

across various business model innovation initiatives. Creating awareness (Phase One) helps framing (Phase Two) and vice versa. Enhanced awareness and framing then guide the design effort (Phase Three), which in turn heightens awareness of business model innovation (Phase One) and sharpens attention to key boundary choices (Phase Two). These dynamic loops deepen managers' awareness of the design tasks at hand and allow them to develop their skills, build the mindset, and refine the processes that form the basis of an organizational capability that can be defined as "the capacity to perform a particular activity in a reliable and at least minimally satisfactory manner" (Helfat & Winter, 2011). Thus, when carried out repeatedly and mindfully over multiple business model innovation initiatives, a firm can build a business model innovation capability, which can even be viewed as a dynamic capability (Amit & Zott, 2016; Teece, 2007).

Toward a Framework for BMI Capability Development

In this chapter, we conceptually combine knowledge from academic research on business model design and innovation to develop an understanding of how business models can help explain total value creation and value capture by firms beyond that which is explained by products, services, and operational processes. Specifically, we apply the business model perspective to established firms, combine it with a dynamic design process perspective, and illustrate and complement the derived conceptual framework with data and insights on business model design in established firms.

Our data were obtained from two sources. The first data source is in-depth case studies, based on actual project experience in business model innovation. The second data source consists of a series of surveys conducted by IBM between 2004 and 2015 and submitted to C-level executives, for which over 15,000 responses were collected and analyzed. Participants in IBMs "C-suite Study" were a balanced mix of six C-suite roles. Data collection was designed by country in order to obtain participation that was proportional to that country's share of global GDP. The number of interviews and their distribution across regions and across company sizes ensured an unbiased sample.[2]

The Case of SEC. We illustrate our framework throughout this chapter by way of an anonymized yet real example: Ship Engine Corporation (SEC). SEC is a global company headquartered in Scandinavia that produces and sells diesel engines for both bigger yachts and smaller sea-going vessels. SEC has a long heritage of developing state-of-the-art engines and is commonly viewed as the quality leader in its market segment. SEC realizes its revenues by selling the engines; in this industry, maintenance and services activities are typically performed by smaller third-party contractors.

Phase One: Raising Awareness of Business Model Innovation

Business model innovation (BMI) is realized through a change at the activity-system level, which in turn results from changes to any one of its key dimensions (Amit & Zott, 2012). It complements more conventional forms of innovation such as product innovation; it is a new level of innovation and a distinct new source of value creation beyond products, services, and processes (Zott & Amit, 2007, 2008). As such, it is not as easy to comprehend and relate to as other, more conventional forms of innovation. Therefore, in order to harness its full potential, managers need to raise their own and organization members' awareness of the power of BMI. This means that managers or employees who intend or need to innovate should no longer focus solely on their firms' products and services or on management processes, but also on creative ways in which the firm engages with its stakeholders to conceive, produce,

[2] Interviews were conducted by the IBM Institute for Business Value, in cooperation with Oxford Economics—about 20% through face-to-face meetings, and about 80% through phone interviews. IBM then analyzed participants' contextual responses using the IBM Watson Natural Language Classifier to obtain overarching themes and priorities. In addition, various statistical methods were used to analyze the data. For example, iterative k-means and hierarchical chaining cluster solutions were used to develop relevant archetypes. Segmentation and topic-specific factor structures were developed subsequently to organize responses into more serviceable thematic groupings.

deliver, and consume the firm's products and services. In short, managers and employees involved in their firms' innovation efforts should adopt a business model mindset and embrace the possibility that innovation can happen at the business model level—in addition to innovation at the product/service level.

Such a shift in mindset from the product to the business model level of analysis can be facilitated by strong awareness-creating or enhancing communication from top management on the importance of the topic, as well as through awareness-creating or enhancing workshops that explain and illustrate to managers and employees the underlying concepts and that provide clarity on the competitive ecosystem of the firm supported by examples.

The Case of SEC. Consider the example of SEC. The firm introduced sensors on their diesel engines, which represented a significant investment in developing and building a data platform. Through a gateway, the sensors continuously provided rich data to SEC. Following the investment, the CEO challenged his management team by pointing out that, "It is great to have all these data, but how are we going to monetize our sensor-based platform? What are we going to do with this platform from a business perspective? I want us to think more fundamentally about how this can lead to a new business model for SEC and help us grow our market share significantly." The challenging words from the CEO sharpened the focus of SEC's managers and increased their awareness of the nature of the task at hand: business model innovation that builds on and enhances the products, processes, and technological innovations of SEC.

Types of BMI. Changes to one or more of the key dimensions of a business model, and any crucial supporting decisions such as the choice of revenue models that serve to monetize the firm's business model, can result in various types of BMI that differ in their strategic implications for the innovating firm (Giesen et al., 2007), such as "Industry Model Innovation," "Enterprise Model Innovation," and "Revenue Model Innovation." Awareness of these concepts can further enhance the manager's effectiveness in designing a new business model.

First, innovation in the structure (*how*) and content (*what*) of the business model can help a firm move into new industries, redefine an existing industry, or create an entirely new one. We therefore refer to this type of business model innovation as Industry Model Innovation (IMI). For example, with the introduction of the iPod and iTunes, Apple as a device manufacturer successfully entered the music industry. IMI is often considered a means of disruption of the established order, as almost 30% of CEOs state they are "changing their industry models to be more disruptive" (IBM, 2008, p. 28). But decision makers also admit that IMI "is tough to do" (IBM, 2008, p. 52).

Second, innovation regarding the *who* of the business model (e.g., decisions regarding with whom to partner) can change the role a company plays in its value network. We refer to this type of business model innovation as Enterprise Model Innovation (EMI). As an example, Procter & Gamble wanted to be more effective with their R&D and therefore set up the "Connect and Develop" R&D program, which transformed the company's approach to R&D by shifting it from an inward orientation to intensive partnerships with external scientists. And Illy Café, the famous Italian coffee manufacturer, has become the "spider in the web" in a value network in which they connect and create value for coffee growers, coffee-maker manufacturers, cup manufacturers, cafes, and end consumers. Data suggest that EMI is an attractive and increasingly important option for senior managers because "more than 40% are changing their business models to be more collaborative" (IBM, 2008, p. 7), and "more than two thirds of the CEOs are looking for partnering and thereby innovate the enterprise model" (IBM, 2012, p. 23). Moreover, 90% of C-level executives stated that they wanted to work on open and platform-oriented business models, and 70% of them expected to expand their partner network (IBM, 2015, pp. 23, 9).

Third, a company may also choose to innovate its revenue model, which implies reconfiguring its value proposition and its pricing strategy. We refer to this type of innovation as Revenue Model Innovation (RMI). An example of RMI is Gillette, the forefather of the idea of giving the razor away cheaply and selling the razor blades expensively. Their so-called razor and blade revenue model was subsequently copied many times (e.g., by inkjet manufacturers). RMI is often associated with changes to the firm's activity system. For example, Netflix supported its RMI (vis-à-vis the then-industry-leader Blockbuster) of DVD rentals for a monthly subscription fee with a new business model structure that was geared initially toward postal delivery of DVDs.

Phase Two: Framing the Business Model Innovation Process

Next, we turn our attention to the basic parameters that managers need to consider to frame and guide the (re-)design of their business models, especially in light of important recent technological trends such as the rapid emergence of AI that support the development of new, innovative models. These parameters represent key choices that define the boundaries of the ensuing BMI process.

Anchored in the received literature and field experience, we point to five key choices that are particularly relevant in the context of framing the design of innovative business models: direction, goals, templates, stakeholders, and constraints (Amit & Zott, 2015, 2021).[3] Mindful consideration of these five key choices helps managers prepare the organization for the business model innovation process. Figure 2.2 depicts these choices that managers need to contemplate and on which they may wish to reflect in order to frame their business model design process. Together, these aspects will ultimately shape the outcome (in terms of the what, how, who, and why) of the BMI effort.

The five parameters could interact with each other. For example, if the choice of direction is top-down, then constraints could be introduced later, in order to give senior managers the chance to detach themselves from their often deeply ingrained mindsets (if that were the case).

The Case of SEC. Consider again the example of SEC. Based on the challenging questions from the CEO about a possible new business model for the company, a small project team was formed, which consisted of the management team of the involved business units—the chief digital officer, the chief technology officer, and the chief marketing

[3] Constrains can be conceptualized as internal constraints (e.g., deployable resources) and external constraints (i.e., those imposed by the environment); goals refer to value creation and thus include customer needs (see also Amit & Zott, 2021, Chapter 5).

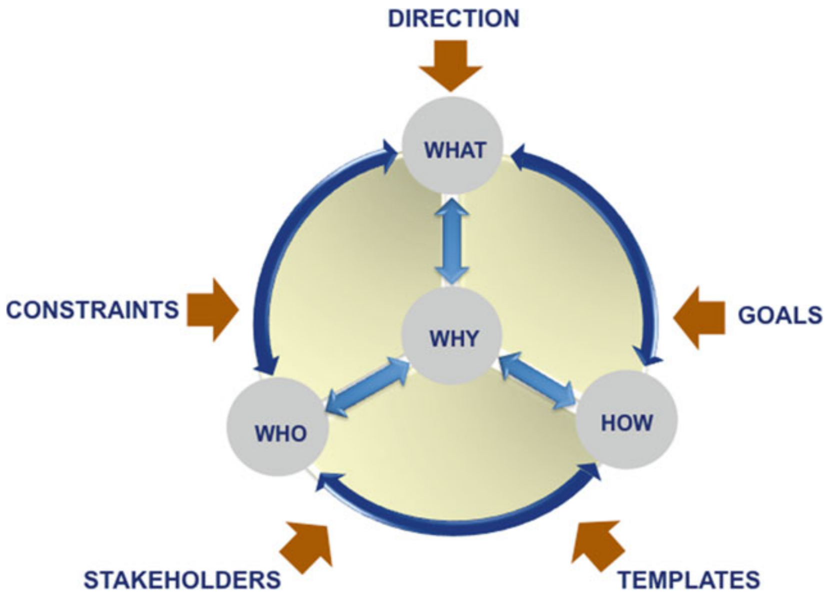

Fig. 2.2 Key Framing issues influencing business model (re-)design (*Note* The five outer arrows are positioned randomly and have an equal impact on the various elements of the business model design [What, How, Who, Why])

officer—supported by a few people from the corporate strategy department. SEC set their project up as a top-down driven project (*direction*), led by the business units with critical involvement from technology and marketing. The CEO did not formulate any specific *constraints* for the team; the broad *goal* was to identify new business opportunities. The team was open to considering other *templates* (e.g., business models from services industries) and the possible involvement of new *stakeholders* (e.g., weather data providers).

Direction

The direction of the business model design process can be top-down, bottom-up, or a mix of the two. A top-down process is anchored in engaging the CEO and the Top Management Team (TMT). If the starting point of the design process is at the very top of the organizational hierarchy, the sequencing of the phases in the ensuing design process (see below: Phase Three) could be different than when the starting point is situated lower, as in the case of a process engaging middle managers. In the top-down case, the generation of ideas is likely to occur early in the process, especially if the goal is highly ambitious (e.g., to come up with a completely disruptive new business model). The CEO and TMT might then wish to adopt a lean start-up approach to playfully invent and test their "next, big, new, business model" idea (Zott & Amit, 2024). A bottom-up process, by contrast, is more democratic in the sense that it is team-based, interdisciplinary, and cuts through organizational hierarchies and across organizational functions, following a more human-centered, "design-thinking" philosophy. It may also involve outsiders such as customers or strategic partners. Nevertheless, in order to move such a project forward, it will need to have the blessing and support of the top management team.

Goals

Boland and Collopy (2004) point out that design problems must have goals, else they are not viable design projects. The goals of a business model (re-)design project refer to the creation and/or capture of enhanced value, for example, through the creation of new and inspiring customer experiences or through the creation of an innovative, scalable, and robust business model that will not invoke retaliation by competitors. Goals require a high level of awareness of the design task at hand and are an important framing issue: If aspirations are high, and if they are supported by the CEO and the TMT, then the BMI design project is more likely to be taken seriously by the rest of the organization, as well as by the other business model stakeholders (e.g., strategic partners, suppliers). It is also more likely to lead to fundamental, perhaps even radical, change.

The Case of SEC. As an example, the SEC CEO stated to his management team that he wished to look for the next disruptive business model.

This clearly set high expectations for the design process; improving the business model incrementally was no longer an option for this company.

Templates

Templates refer to business model blueprints from which managers draw inspiration and from which they can mindfully borrow. Mindfulness here denotes a state of active awareness and refers to the cognitive aspects of business model design—for example, recognition in real time that one is using a design template (Amit & Zott, 2015). These blueprints could be the business models of any incumbent firms (from within the same or different industries), or generic business model archetypes (e.g., "market-platform operator," "servitizing manufacturer," "recycling alliance") (Kortmann & Piller, 2016). This framing issue refers to the extent to which managers as designers "look outside" (i.e., admit external stimuli) for inspiration as part of their business model (re-)design efforts. The kinds of stimuli they consider will influence their design journey (Snihur & Zott, 2020). An example is Amazon Studios, which adopted from other industries the concept of "involvement of the crowd" to review and judge film scripts. Emerging Generative Artificial Intelligence (AI) technologies can be helpful in identifying a broad range of templates that are deployed across industries (Ferràs-Hernández et al., 2023; Sjödin et al., 2021).

Stakeholders

Stakeholders are external partners who may play an active role both in the design process and in the resulting business model (Boland & Collopy, 2004). The degree of openness on the part of the business model designer(s) to collaborate with stakeholders from a range of industries represents an important framing issue because it influences the range of available design options. An example is a global transportation company that held workshops for envisioning new business models, to which it invited external stakeholders such as its direct-equipment customers, logistics partners, end-users, and suppliers. The goal of the exercise was to rebuild a joint business model, leading to new and deeper partnerships and eventually the creation of an entirely new transportation ecosystem.

Constraints

The fifth design parameter to be considered by business model designers is constraints (Boland & Collopy, 2004). The importance of this design parameter is summarized by Brown, who stated that, "the willing and even enthusiastic acceptance of competing constraints is the foundation of design thinking" (Brown, 2009, p. 19). Constraints define the boundaries of a business model (re-)design effort, and they can also serve as stimuli to the invention of new approaches. Constraints are either external (e.g., regulatory, technological constraints) or internal (e.g., resource constraints). The questions a design team needs to contemplate include at which stage of the design process to take constraints into account, and whether it is possible to turn these constraints into opportunities. If managers consider constraints too early in the process, they might impose unnecessary limitations that could prevent the development of creative, "out of the box" designs. Uber, for instance, would never have come into existence if the prevailing taxi laws had been considered as an important element from the outset. On the other hand, considering constraints too late might impose costs and impede implementation.

Phase Three: Designing Innovative Business Models

Following the design literature that partly documents the well-established practices of design firms such as IDEO, design as a process broadly consists of several phases that are linked iteratively (Beckman & Barry, 2007; Bhavani & Sosa, 2008; Boland & Collopy, 2004; Brown, 2009). The design process is typically anchored in human-centered observation, which is followed by a synthesis of insights and the generation of ideas, which are then refined and implemented. We use these phases of the design process as an organizing frame to explain how innovative business models can be designed, and especially how considering the digitization trends and the above-mentioned design parameters (framing issues) influences the likelihood of developing powerful, robust, and value-creating new business models (Zott & Amit, 2015).

Grounding BMI in Careful Observation of Stakeholder Behaviors and Needs

Sound business model design should be grounded in a deep understanding of the current business model and the problems associated with it (e.g., competitive threats, dissatisfied customers, untapped market needs, or vulnerabilities). A careful documentation and analysis of the current model is not a straightforward exercise, however, because few managers engage in such analysis, let alone on a regular basis, partly because they are not equipped with the relevant concepts, tools, methods, and mindset. For example, most managers are familiar with thinking about their firms' offering in terms of products and services, and completely at ease with analyzing individual functions such as production, marketing, or sales. However, few managers have experience with adopting a holistic, system-level perspective, identifying activities instead of functions or organizational units, and analyzing their firm's entire activity system. Yet this is precisely what is needed in order to improve and innovate the current model, and therefore the previous phases of raising awareness and framing the process are crucial.

Accordingly, compared with the conventional application of the human-centered design method in the development of new products or services, observation in the context of new business model design has to be interpreted more broadly than just with respect to how end-users interact with a product. The focus should be on all business model stakeholders—not only on end-users, but also suppliers, partners, and the company itself (Beckman & Barry, 2007). Also, observation should be made about how stakeholders play their respective roles within a given business model, not just on how they interact with the products and services delivered as part of the business model. Importantly, in the context of innovating a firm's business model, observation must include an assessment of the competitive dynamics of the ecosystem within which the firm is embedded. Such an assessment will enable an evaluation of potential retaliation to disruptive BMI.

The conversations and insights that such observation will generate are likely to be highly valuable. Indeed, understanding precisely what business model problem the company is facing could be the most important prelude to designing an effective subsequent solution. To what extent and through which means and techniques observation is carried out partly depends on the chosen direction of the design process. In a top-down process, especially one for which ambitious goals are set, the designers might wish to proceed quickly to the idea-generation stage, in order to spur the genesis of bold new models through inspiration with carefully chosen templates, as well as inspirational BMI examples (both from their own industry and from other industries). By contrast, in a bottom-up process, which pursues the goal to evolve the business model in a more gradual, incremental, phase-by-phase fashion, the business model design team might elect to delve deeply into the observation stage, in order to understand more fully what is (potentially) wrong with the current model and what the possibilities could be for innovating it.[4]

The Case of SEC. To illustrate the importance of observation, consider SEC. The SEC team started its business model design process by assessing a number of topics. They stepped into the shoes of their customers and found out that most repairs of the ship engines happened due to unexpected engine failures. This caused frustration to their customers and an experience of "not being enough in control." The team also observed competitors only to find out that sensors in ship engines was an emerging and immature area, with no real examples from which to learn. They then observed other industries and discovered that in the oil business, sensors were used in pumps located in pipes in remote areas; these pumps are not allowed to fail. The business model moved to a service-oriented business model template: selling predictive maintenance services based on sensor data, on top of selling the pumps. Finally, the

[4] For more detailed techniques that can be applied at the observation stage, see Beckman and Barry (2007).

team also discovered that their own SEC platform was filled with data, but they lacked the deeper analytical data-mining skills to come up with predictive maintenance insights.

Synthesizing Insights from Observation to Prepare BMI

To synthesize key insights from among a vast amount of data is one of the most challenging tasks in the business model design process. It involves collecting and communicating the data gathered during the observation stage, and organizing them creatively into emerging strategic themes, or to specific customer needs. The design work at this stage is akin to the work that qualitative researchers perform when they sift through large amounts of ethnographic and field data in order to generate new insights into phenomena of interest. Although this phase in the design process seems fuzzy, vague, and hard to codify, borrowing from qualitative research methods can provide enhanced rigor, for example, through tabulation techniques.

Synthesizing can be catalyzed by asking the following questions that help the business model designer to develop a strong sense of the opportunities and challenges that the company could be addressing, the problems that it is (or rather, should be) solving for its various stakeholders, and the forces that will shape the design solution: What is particularly good about the current business model? For example, what are customers and other stakeholders extremely happy with? Where are we currently falling short in helping customers solve their problems? How could we serve them better through a newly designed business model? Do we see new and thrilling customer experiences in our industry or in adjacent industries? Do we see disruptive business model innovations on the horizon? Are we in danger of being bypassed? What new opportunities could we explore as a result of important developments in our ecosystem? What new stakeholders could we involve as partners in our business model? How could we collaborate more and/or better with our partners? However, business model designers should bear in mind that there is no blueprint solution for how to perform the synthesizing step, which remains at its heart a creative act (Brown, 2009).

The Case of SEC. For SEC, this phase in the BMI design process was critical, in the sense that the SEC team discovered that the SEC customers perceived the shipping engine to be part of their bigger "overall service concept"; if the shipping engine fails, their service concept fails—the big yacht cannot sail anymore. In other words, they were willing to pay a premium in exchange for "hassle-free services" from SEC.

Generating Ideas for BMI Anchored on Insightful Problem Understanding

Idea generation involves the creation of new design solutions, based on a deep understanding of the design problem that has been developed during the earlier phases. Idea generation for new business model designs either involves making modifications to an existing model that are novel (as Apple did when it added music distribution via iTunes to its production and design-oriented business model), or it involves creating an entirely new model. Both objectives can be met by conducting disciplined brainstorming during which ideas for new business models are generated, inspired by previous observation and synthesis (in a bottom-up process), or by exposure to unusual templates (in a top-down process), or both.

Although brainstorming is perhaps the best documented part of the design process (e.g., the advice to strive for "wild" ideas), brainstorming sessions on BMI need to combine two elements in order to be successful: (1) content—awareness of different design dimensions (what, how, who, why) and corresponding possibilities for innovation; and (2) creativity—deploying ideation techniques and envisioning new inspiring customer experiences (Beckman & Barry, 2007). That's why typical brainstorming rules should be adapted to the context of BMI. For example, "wild" business model ideas are those that push beyond the traditional mental models of managers and break the traditional frame of thinking.

In order to recognize the systemic nature of business models, another important rule should be: "Look at the forest, not just the trees!" It encourages brainstormers to adopt a broad, holistic perspective, so as to avoid getting stuck on the details. Exposure to templates and examples from adjacent, or even completely unrelated, industries can increase the likelihood of breaking the frame. The business model of Nike, a sports apparel manufacturer, served as a template for re-designing the business model of an Asian pulp and paper manufacturer. The example of the sports company triggered the idea of focusing on marketing and outsourcing other activities to partners, even those that were once considered to be "core," such as manufacturing.

Rather than "looking from the outside in," ideas can also be triggered by "looking from the inside out," that is, by asking how the existing assets of the company could be redeployed to different uses. Specifically, a series of guiding questions could serve as a starting point to trigger the creative process, especially if a top-down direction is adopted. For example, the CEO and TMT could ask: Can we connect with the customer of our customer, or even to the end customer? Can we create a new role in the industry for ourselves (e.g., become an aggregator)? Can we move to another industry? Can we come up with a new value proposition? A new pricing approach? Can we partner with others, so that we can concentrate on our differentiating activities? These questions could give rise to the development of ideas for BMI.

The Case of SEC. Consider again the SEC example. Combining their insights generated from observation and articulated through synthesis, the SEC team held an idea-generation session during which they came up with the concept of collecting the data from the sensors on the ship engines, developing superb analytical skills, and combining these two building blocks to offer new value-added predictive maintenance recommendations, from which they would generate new revenue streams. For example, if the captain of a big yacht could get the recommendation to perform a one-hour predictive maintenance of the ship engine tonight, he would save a one-day down time next week during a chartered cruise, and therefore this recommendation would be of high value. This, in turn, led to a dual-mode pricing model for the information service: a flat monthly subscription fee for each customer, combined with a fee per predictive maintenance recommendation.

Refining Ideas for BMI: Consolidating, Prototyping, and Evaluating

Refinement in the context of BMI involves consolidating and/or combining the various ideas generated in the previous stage into one or more new business model designs, prototyping the new designs (e.g., by way of experimenting on a small scale and narrow scope), and evaluating the new designs using such criteria as the extent of new value that is created and appropriated through the new model, the likely retaliation of competitors, the ability to scale the new business model, and more (see Appendix). By combining and repeating these steps (i.e., consolidating, prototyping, evaluating), the main goal in this phase of the design process is to achieve focus and clarity on the details of the emerging design.

The activity of consolidating and/or combining ideas that emerged during the brainstorming phase is, once again, a creative process and as such difficult to codify. Yet it is a necessary step because otherwise the managers as designers might get caught up in an endless loop of generating new ideas, without knowing exactly when and where to stop. Consolidation is followed by prototyping, which is increasingly important for senior executives. Indeed, "to create a successful new business model, you usually need to experiment outside the normal organizational setting. You have to develop and test numerous different ideas, nurture the most promising ones and unleash them only when you believe they can work in the real world" (IBM, 2015, p. 25). In addition, "the CEOs of most successful enterprises place a higher premium on agility and experimentation, because they know these are prerequisites for disruptive innovation" (IBM, 2015, p. 11). Prototyping involves building a mock-up of the business model—or parts of it—at the lowest possible cost. In its simplest form, a business model prototype is a storyboard—a description of "how it works," mixing text, graphical illustration, and video supported by AI tools. It explains what the main activities in the business model are, how they are linked, who performs them, and what products and services are delivered through the activity system to what customers, with what expected benefits for the customers and the other stakeholders in the model. Feedback can then be used to refine the model.

Prototyping can be taken a step further by implementing a crude and simple version on a small scale, thereby enabling experiential learning. The extent to which this is possible will depend on the specific project. Business models that require significant investment in capital expenditures or involve choices of strategic partners that could be difficult to mock-up, are more challenging, yet not impossible, to prototype.

The Case of SEC. Consider SEC again to illustrate how a new business model design can be refined through prototyping. The SEC team first envisioned how customers would experience their new idea (i.e., to offer predictive maintenance services for ship engines). They did so by developing so-called customer journeys in which they envisioned the new interactions between SEC and their customers, including the usage of direct feedback through social media. This exercise led the SEC Board to approve a first market-facing test that included select functionalities. The objective of the test was to observe and learn how the market/customers would respond to the new service. Based on the positive investment decision from the Board, the SEC team brought to life their new predictive maintenance business model through a prototype that they referred to as "wave one." One of the first requirements was to develop an innovative algorithm that would be able to translate measured engine frequencies through sensors into unique insights regarding predictive maintenance, centered on those engine parts which SEC knew were most sensitive to failures. This algorithm formed the basis of a first client-oriented application, which was rolled out to a small customer group. The app notified a captain or boat owner when a specific kind of predictive intervention was recommended. Based on this first functionality the SEC team gained precious insights into how customers perceived the recommendations (e.g., how valuable and effective they were, and what the customers thought about the pricing levels), which in turn informed SEC's decision to roll out the early functionalities on a larger scale. It also led to the development of a next version of the application. Most importantly, SEC began building valuable capabilities for turning sensor data into actionable insights.

Implementing the New BMI Design

Implementation in the context of BMI requires putting all the elements in place that are envisioned by the new design. This includes design elements that refer to the what of the business model (i.e., the activities), its how (i.e., the exchanges), its who (i.e., the partnerships), and also the why (e.g., the revenue model). The demarcation with the previous design stage (especially prototyping) could be rather fleeting, insofar as it may not be easy (nor desirable) to say where trial-and-error stops and full-blown implementation begins, especially when implementation proceeds in a gradual manner and when it is guided by feedback-based learning.

Keen attention must be paid at this stage to the company's organization and strategy, and how they fit with the new business model (Hopkinson et al., 2018). Changes to the operating model and organizational redesign may be required as part of implementation in order to make the new business model work. Also, at this stage, distinctive challenges may arise. Implementation entails the forging of partnerships and the creation of exchange and coordination mechanisms with the parties that are external to the company. In addition, the business model designer needs to take into account issues that relate to the internal organization (including incentive structures; span of control; roles and responsibilities of organization members; HR policies; values, culture, and norms) and product-market strategy (e.g., product-market scope, market timing entry, product-market positioning). The implementation of the new business model may entail changes to any of these elements. In certain cases, the cost of making these changes will be relatively low while in other cases the costs of making the changes will be significant.

A critical element in implementing new business models is that these will also require new *business* capabilities. In SEC's example: selling and delivering shipping engines requires different business capabilities as opposed to selling and delivering predictive maintenance services through a digital platform. Organizations need to decide which critical business capabilities within the new business model will be provided by the organization itself (and how to build these) and which ones by others. For example, supporting capabilities like finance and human resources can be insourced from the parental company. And technology-related capabilities can be delivered by a technology partner.

Building a Business Model Innovation Capability at SEC

The SEC team embedded its prototype-based way of working (Phase Three) as a continuous process in the organization. As a result, a whole suite of predictive recommendation services was successfully introduced (e.g., by adding a functionality on fuel usage). As part of a continuous innovation effort, SEC set up and rolled out a number of "next idea-generation" cycles. This led to a new wave of business model innovations. For example, one idea was to leverage Generative AI to create engine-specific (predictive maintenance-related) instructions, including augmented videos to support the maintenance activity. Another idea was to combine the sensor data with weather data through a partner who could provide very detailed weather data on a small-grid level across the globe. In combination with location-based data of the ship, as well as engine and travel plan insights, this could lead to different trip and timing recommendations. Also, the broader ecosystem was examined, leading to first discussions with insurance companies; if ship engines were used more effectively and the overall risk profile is lower (backed up by sensor data and actionable insights), this could lead to lower insurance premiums, where savings again could be shared by all involved, including SEC as platform orchestrator. SEC also realized that they should not run this platform on their own. They approached a technology firm that built the technology platform and is now running the technical operations of the platform on behalf of SEC. SEC concentrates on selling and delivering the platform-based services.

In a relatively short time frame, then, SEC significantly and continuously innovated its business model. SEC came up with a new value proposition for its customers based on delivering actionable insights on predictive maintenance recommendations derived from engine sensor data complemented with trip and timing recommendations. SEC thereby created a significant new revenue stream with interesting profit margins, based on selling information services. Furthermore, SEC as a ship engine producer is now connected directly with insurance companies about risk profiles of ships and engines, and also moved into a number of new partnerships, for example, in the area of weather data. In short, SEC has built a new capability for BMI: through continuous idea-generation cycles, in combination with prototyping new business model ideas, they began to build and manage a dynamic portfolio of business model innovations.

Conclusion

In a rapidly changing economic, social, and technological environment, company managers must continuously evaluate the extent to which there is a fit between the company's business model and the external ecosystem in which it is embedded, the company's product-market strategy, and its internal organization capabilities and structure. To maintain their edge and maintain the external, internal, and strategic fit, companies must have the capability to continuously innovate their business model. Developing business model innovation capability is therefore a game changer which allows companies to stay at the top of their game in a rapidly changing world.

Building a BMI capability involves raising awareness, framing the design process, and designing and implementing a novel business model. These three phases are dynamically and temporally linked. In the first phase, awareness for the importance of BMI (and what it means, namely, the "what," "how," "who," and "why" of the firm's activity system) needs to be created and/or raised among organization members. This eases the way into the second phase, in which the BMI effort needs to be framed by way of reflecting on, and making decisions about, five key aspects including: Which direction should the business model design process take (top-down, bottom-up, or a mix of the two)? Which goals should be pursued? Which templates could be considered? Which constraints could be taken into account (and when)? And which stakeholders could be involved? Following this framing phase, in the third phase the BMI needs to be designed through a guided, iterative trial-and-error process involving observation, synthesis, idea generation, refinement, and implementation. Over time, if repeated across projects and conducted mindfully, the process can be honed into an organizational capability for BMI.

In summary, this chapter provides an actionable framework for building a BMI capability, and it highlights the strategic role of such a firm-level capability. Importantly, the study fills a gap in the scholarly literature at the intersection of capability development and BMI. To date, the process by which firms can develop a BMI capability has not been articulated clearly. Future research on this important topic is necessary. Existing research on capability development, especially in the context of BMI, has focused mainly on Phase Three in the process model that we outlined in this chapter. Complementing and extending the received literature, this chapter suggests that raising awareness among organization members and carefully framing the design process play equally important roles for BMI capability development. However, this conjecture needs to be further developed theoretically and tested empirically, thus opening new avenues for future research. These two phases in building a BMI capability are important due to the unique characteristic of business models as boundary-spanning activity systems that may be difficult to grasp due to their systemic and holistic nature, and that may also fall outside familiar mental schemata of managers. Moreover, our framework highlights dynamic and mutually reinforcing links between the various process phases involved in building a BMI capability in established firms, which could be explored further in future research.

Appendix: Questions for Evaluating New Business Model Designs

(1) How well are the design goals (e.g., to achieve groundbreaking innovation) being met? How much total value does the new model generate compared to the old one?

(2) Can we find a revenue model and cost structure to allow for adequate value capture by all business model stakeholders?
(3) What are the vulnerabilities of the business model? Where can it break down? (For example, is there a lack of incentive alignment of stakeholders?)
(4) Are constraints effectively being dealt with? What new constraints are created or brought to the forefront? (For example, consider Tesla's direct-distribution model of new cars that eliminates the need for dealers. In several US states, such as Indiana, direct distribution of new vehicles from the manufacturer to the buyer is prohibited by state law. This regulatory restriction adversely affects the entire business model of Tesla.)
(5) How does the new business model compare with those of competitors? What points of differentiation does it offer? How easily can it be imitated?
(6) How scalable is the model?
(7) How adaptable is the new business model to future changes in digital trends and process drivers?
(8) How compatible is the new business model with corporate strategy, and possibly with other business models that the firm might have in other areas of business? Does it imply a new corporate strategy that might make more sense than the existing one?
(9) Are the resources and business capabilities in place to make the new business model a reality, or do they have to be created or acquired (and at what price)? And will we execute on all business capabilities ourselves in the new business model, or will we make smartly use of partners?
(10) How compatible is the business model with the existing organizational structure? Its compensation and incentive mechanisms?

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3

New Venues for Collaborative Business Model Innovation Through Ecosystems

Lucas Miehé and Oliver Gassmann

Introduction

The financial service industry is facing a significant change. Digital transformation enables firms to innovate the industry's fundamental business model along the customer journey, erasing traditional industry borders (Catlin et al., 2018). While customers were loyal to their financial service providers in the past, today, we see hybrid customers using several banks and insurance companies simultaneously. It is not atypical for customers of banks like Citi or HSBC to use PayPal, Apple Pay, or Google Pay for their transactions while at the same time trading shares using Fidelity,

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Interactive Brokers, or Robinhood. The point of sale for insurance policies has primarily moved from traditional insurance companies to search platforms (e.g., The Zebra), transaction platforms (e.g., Amazon), or retailers (e.g., Walmart). Digital transformation has changed how firms operate on multiple fronts—internally, with their customers, and with external organisations (Bloomberg, 2018). Thus, the digital transformation changes the game of the financial service industry along three dimensions: technology, customer service, and market. The disruption changes processes, products, services, and, ultimately, the entire financial service ecosystem.

The ecosystem perspective matters for business models, as collaborations increase among different firms and industries. The digital transformation is the decisive enabler in this context, as it reduces transaction and coordination costs between companies and promotes new collaborations. These collaborations transform the existing relationships between firms and create new business opportunities. Such alternations always change at least one constituent element of existing business models, i.e., the value proposition, value chain, or profit mechanism (Gassmann et al., 2020), leading ultimately to business model innovation. For example, mobile payment is a new offer towards the bank customer, whereas big techs represent new entrance impacting the existing business model of payment schemes. Contrary, the big techs' ecosystems offer new opportunities for diverse firms to expand their business models: retailers can leverage customer data, newspaper can offer new subscription models or financial service provider can built on the app economy to tackle traditional banking. Ecosystems can be considered as a system of aligned and integrated business models (of individual firms) for creating new or better value propositions along the customer journey. Therefore, the ecosystem perspective is central to business model innovation, whereas digital transformation serves as the enabler.

Digital transformation fosters new technologies, including platforms that improve connectivity among different actors. Simplified collaboration is essential for new business models. Today, most individuals carry mobile phones with them at almost all times. Whether their phone's operating system is Google's Android or Apple's iOS platform, individuals use the apps on their phones to access products and services from various firms. At the same time, user data is generated and collected. This data allows app providers to analyse their customers. For instance, eBanking platforms already summarise spending into categories—like food or leisure activities—allowing financial institutions to conclude the individual's retailer or service provider preferences. Customer data is a new resource that will play a fundamental role in engaging technologies like machine learning, as data is necessary to train algorithms. Last but not least, new technologies like blockchain enable innovations like smart contracts, whose potential cannot be fully estimated (nor imagined) yet.

The technological progress resulting from digital transformation also affects the customer by triggering changes in consumer behaviour. Physical touchpoints between customers and their financial advisors are reduced by digital channels, through which customers seek to have their demands fulfilled directly. Customers can access their accounts 24/7 online, no longer needing to wait for a letter to check their account balance. Customers are looking for such convenience; however, the more accessible service becomes for the customer, the harder it is for a single bank to address the demands. Customers no longer demand single products or services, like a mortgage or payment at the gas station. Instead, customers demand comprehensive solutions to their needs, e.g., finance, housing, or mobility. In short, customers want an easy-to-use, one-stop solution. Due to application programming interfaces (APIs), transaction costs for collaboration have decreased; this has enabled cost-effective bundling of products and services to suit these new customer needs.

These technological and customer behaviour changes have profoundly impacted markets and firms' business models. New opportunities deriving from digital transformation are fuelling the industrialisation of the financial service industry. New competitors have entered the financial service value chain. Start-ups like Revolut and firms from other industries like Apple pose a challenge to incumbents. Additionally, regulations such as the European Union's Revised Payment Services Directive (PSD2) encourage border crossings and simplify market access for third-party providers. This promotes cross-company processes and forces financial service providers to collaborate with partners within and outside the financial service industry. Finally, these developments also allow financial service providers to position themselves in new verticals outside the finance market, such as housing or mobility.

To understand the effects of digital transformation described above, the dimensions cannot be considered in isolation (cf. Rosenberg, 1979). Technologies stimulate both customers and the market, which ultimately drives further innovations. Due to the interconnectedness between customers, market, and innovation, the effects of changes to one impact the other, and the dimensions co-evolve together. To understand this phenomenon, the ecosystem concept (Moore, 1993) serves as a suitable lens: put simply, ecosystems focus on the interdependencies among actors and the way they co-create value for the customer.[1]

This chapter is structured as follows. First, we present two illustrative cases of financial service ecosystems. Second, we adopt an academic lens to explain the ecosystem concept and link its characteristics to the cases presented. This section also focuses on different ecosystem designs and success factors before summarising the ecosystem concept by evaluating its strengths and weaknesses. The section ends with highlighting the implications for business model innovation. We then provide three exemplarily use cases for ecosystems in the financial service industry, followed by five trends explaining why ecosystems will gain relevance in the future. Next, we present the avenues for research with an emphasis business model innovation. Finally, we conclude the chapter with recommendations for practitioners on ecosystem participation.

Ecosystems as Part of the Financial Service Industry

Ecosystems are not new to the financial service industry. Card payment systems like American Express, MasterCard, and Visa are well established and considered ecosystems (Gawer & Cusumano, 2014). Although not

[1] Hereby we do not restrict the ecosystem concept to B2C business, as the concept is also demonstrably useful when applied to B2B business (cf. Aarikka-Stenroos & Ritala, 2017). Additionally, knowledge and entrepreneurial ecosystems are beyond our scope as their output does not focus on the customer directly (Thomas & Autio, 2020).

generally a new concept in the financial service sector, ecosystems present a new lens for looking at value co-creation among different actors. The independent actors co-create value for the customer interdependently. Digital transformation, in particular, boosts such collaborations. On the one hand, digital transformation creates new opportunities and enables novel business models (Gassmann et al., 2020). On the other hand, digitisation can also automate coordination efforts, resulting in lower transaction costs (cf. Williamson, 1979). This, in turn, simplifies and ultimately fuels collaboration between businesses.[2]

The existence of ecosystems is a fact. The term's occurrence is skyrocketing in corporate and industrial news (Kapoor, 2018); it has especially gained importance in the financial service industry in recent years (cf. Fig. 3.1). Practitioners agree that the dominant industry logic will fade away as ecosystems rise, the latter providing related products and services for customers (Atluri et al., 2017).

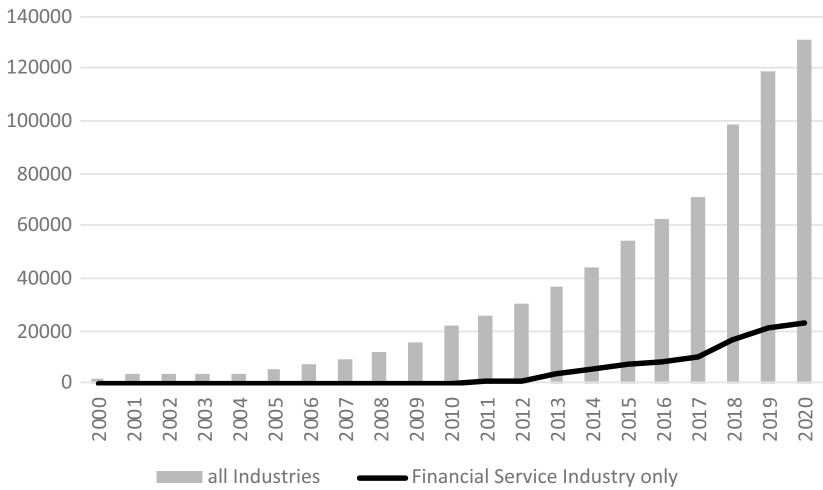

Fig. 3.1 Number of articles mentioning "ecosystem" in corporate/industrial news (*Data Source* Factiva)

[2] At this point we would like to point out that digitalization is not a necessary condition for ecosystems. A simple and well-known example of a non-digital ecosystem is Nespresso (Jacobides, 2019).

Moreover, ecosystems will continuously evolve within the financial service industry due to the ongoing digital transformation, as demonstrated by Palmié et al. (2020). This trend of interdependence affects financial service providers in conflicting ways. Their traditional positions face pressure due to changing technologies and consumer needs; at the same time, however, the transformation also enables them to reposition themselves in value chains outside traditional industry boundaries (Gasser et al., 2017). This section provides two illustrative examples of financial service providers, Ping An and Twint, which indicate how ecosystems can evolve and what they may look like as the digital transformation continues to spur changes.

Ping An Ecosystems

Ping An is a Chinese financial service conglomerate. Peter Ma founded it in 1988 as a property and casualty insurance provider. Within the 33 years since its founding, Ping An has become the leading insurance provider[3] on the Forbes Global 2000 list (Gara, 2021). This rapid growth did not rely simply on the firm's insurance business—which was expanded to offer life (in 1994) and health insurance (in 2005)—nor it's entering the banking business (in 2003), the latter expansion making the firm a financial service conglomerate. Instead, its success lies in Ping An's ecosystems.

Ping An has genuinely mastered digital transformation. Inspired by the possibilities of digital technologies—impressively demonstrated by other successful Chinese companies like the Internet firm Tencent and e-commerce platform Alibaba—Ma took the chance to jump on this trend. It was a risk, as insurance companies were hardly involved in digital technology at the time, but Ping An's digital transformation paid off.

Ping An digitised its core business for the first step in its transformation by establishing end-to-end online channels and back-end processes. At the same time, the financial service conglomerate integrated new

[3] Berkshire Hathaway is also an insurance business but is categorized (by *Forbes*) as "Diversified Financials" (*Forbes*, 2021).

services adjacent to its core business. These included doctor's appointments in addition to health insurance, providing automotive-related information for customers interested in buying a car, including the purchase payment related to the banking pillar and car insurance as a product of the insurance pillar.

These actions mark the firm's first steps towards developing ecosystems. In short, Ping An built platforms that took a customer-centric approach by serving customer needs rather than selling products (cf. Levitt, 1960). These platforms, e.g., the Good Doctor app and Autohome website, can be regarded as "one-stop-shops," enabling Ping An to expand its reach along the customer journey. Step by step, Ping An integrated more services and partners (e.g., hospitals and doctors, car dealers and repair shops) to better serve customers' needs. The firm established multiple ecosystems by connecting its partners and aligning those offers. As of 2020, Ping An runs four ecosystems: financial services, healthcare, auto services, and smart city.

Ping An's success story doesn't end there. The conglomerate enforced a one-account policy across its ecosystems, leading to 598 million users by December 2020 (Ping An, 2021). By engaging digital technologies such as artificial intelligence (AI), cloud computing, and the Internet of Things (IoT), Ping An could analyse its customers' and partners' data in more detail and across its ecosystems. This enabled better integration of Ping An's three core pillars—banking, insurance, and wealth management—in three ways. First, by using new leads to determine which services to offer, car buyers, for example, are automatically offered car insurance. Second, by providing the clients with more sophisticated value propositions, such as a dynamically priced car insurance policy based on their driving behaviour. Third, using the interdependencies of the core pillars to profit from synergies between the different ecosystems, e.g., because car buyers are likely to use the financial service ecosystem to buy their car or pay for repairs. Thus, Ping An created a virtuous cycle in which its core businesses (banking, insurance, and asset management) and ecosystems reinforce each other.

Twint Ecosystem

Twint is the dominant mobile payment app in Switzerland. The eponymous FinTech was founded in 2014 as a spin-off of a retail bank. Twint aimed to provide a payment solution that could be used on mobile phones. At the same time as Twint's founding, other Swiss companies launched their payment applications. Two Swiss retail banks and a financial infrastructure provider teamed up to launch a payment app focusing on peer-to-peer transactions (payments for retail were to follow later), and a telecommunications firm launched another mobile payment solution. Three mobile payments apps were too many for Switzerland, a small country of 8.5 million inhabitants. Accordingly, the first consolidation occurred in 2015, when the telecommunications firm abandoned its app and joined the banks' initiative for peer-to-peer payment. A year later, in 2016, this initiative merged with Twint, whose name mobile payment solutions with integrated peer-to-peer payment continues. In the wake of the COVID-19 crisis, Twint has experienced impressive growth; as of October 2020, the mobile payment solution reported more than three million users, representing 35% of the Swiss population (Dietrich & Wernli, 2021; Twint, 2020).

Twint didn't build its ecosystem by focusing directly on the end customer like Ping An did. Instead, Twint built it by focusing on the business partners involved. Banks, as well as retailers, were convinced that mobile payment would gain importance in the future. In Switzerland, payments are mostly made by cash or debit cards; only a few customers use credit cards. Mobile payment solutions, especially international systems such as Apple Pay, are often based on deposited credit cards. Because credit cards have higher commission fees than debit cards, global mobile payment solutions dissatisfied Swiss retailers. Thus, existing mobile payment systems were unsuited for the Swiss market. Twint took advantage of this issue and aligned with retailers using two strategic solutions. First, Twint offered transactions with lower commission rates than credit cards. Second, Twint integrated loyalty cards into the payment system—which are seldomly integrated directly into the payment process of international mobile payment systems—if demanded by merchants. Correspondingly, Swiss retailers started integrating the new payment system into their cash registers.

Its merger of the two mobile payment solutions cemented Twint as Switzerland's mobile payment standard. This establishment led to the onboarding of other banks, which ultimately integrated further customers. Only two banks offer the payment app themselves, in contrast to the majority that rely on a white label solution from a telecommunications firm. The latter takes the technical specifications from Twint, which operates the platform as the ecosystem's infrastructure.

This infrastructure has continuously expanded. Initially, the interface between the cash register and mobile phone relied on Bluetooth. This technological interface required modifications of the cash register on both the hardware side (installation of a beacon) and the software side (integration into the cash register's operating system). Twint enforced its QR code payment process to overcome those high integration costs, initially developed for online store payments. Twint, with the support of major banks, successfully pressured the local financial infrastructure provider to integrate the QR code payment solution into its card terminals. Near-field communication (NFC) was not an option due to Apple's restriction for third-party app providers. Accordingly, Twint's QR code solution on card terminals attracted more retailers and other service providers (e.g., restaurants, hairdressers), allowing them to adopt the payment system easily. This is because most service providers have a card terminal in Switzerland.

New applications of Twint include payments for parking meters and the integration of charity organisations for donations into the app. Thus, Twint has provided banks with new touchpoints in customer journeys; it has positioned banks into new verticals such as retail or mobility through the constant innovation of its payment interface. In this way, Twint represents another successful financial service ecosystem example.

Ecosystems as a New Concept for Value Co-creation

While the ecosystem terminology is well established in practice (cf. Fig. 3.1), the term has also gained increasing attention among scholars. This has resulted in a boom in recent years (Jacobides et al., 2018). Moore (1993) introduced the ecosystem terminology into the management literature. He chose this term to emphasise the mutual interdependence among actors by analogy to nature. Due to this metaphorical introduction, the ecosystem concept lacked a rigid conceptualisation. This shortcoming ultimately raised concerns about the *raison d'être* of the ecosystem concept in academia (cf. the debate between Oh et al., 2016; Ritala & Almpanopoulou, 2017). Although the ecosystem concept was vague and ambiguous in its early application, it has finally established itself in academic business literature (de Vasconcelos Gomes et al., 2018; Granstrand & Holgersson, 2020; Hou & Shi, 2021; Scaringella & Radziwon, 2018; Tsujimoto et al., 2018).

Scholarly Perspectives on Ecosystems

Ecosystems are studied from different analytical angles, i.e., by focusing on different units of analysis, such as the whole ecosystem or a single actor within, and different research emphases. Based on the latter, the literature can be divided into three streams of research: business, innovation, and platform ecosystems (Jacobides et al., 2018; Thomas & Autio, 2020). Business ecosystem research (e.g., Iansiti & Levien, 2004; Rong & Shi, 2015; Teece, 2007, 2018) focuses on an individual actor (e.g., firms or institutional organisations) and how it manages the dynamics within its community. Innovation ecosystems (e.g., Adner & Kapoor, 2010, 2016; Jacobides et al., 2018; Lingens, Böger et al., 2021a) focus on value creation among actors, i.e., how specialised actors collaborate in the ecosystem and contribute to a focal innovation as complementors (c.f. Nalebuff & Brandenburger, 1996). Platform ecosystems (e.g., Cennamo & Santaló, 2013, 2019; Gawer & Cusumano, 2014; Wareham et al., 2014) focus on managing interdependencies between the platform sponsor and the complementors.

While each of these streams differs in its research emphasis, the business, innovation, and platform ecosystems streams overlap (Jacobides et al., 2018). Regardless of their specific labels (which are becoming less widely used; c.f. Adner, 2017; Jacobides et al., 2018; Thomas & Ritala, 2022), all ecosystems have three characteristics that differentiate the concept from the related research approaches of interdependence and value creation.[4]

First, ecosystem actors must align themselves with materialising the value proposition for the final customers (Adner, 2017; Thomas & Autio, 2020). Referring to the first example above, Ping An needs to align the healthcare ecosystem's participating physicians and medical institutions (e.g., hospitals) as complementors to generate synergies and, ultimately, create superior value for the customer. For example, medical service providers need to be integrated into the Good Doctor app by Ping An, while the service providers must adapt their processes to the app.

The second characteristic of ecosystems is their foundation on non-generic complementarities. The identification of this characteristic, an essential contribution by Jacobides et al. (2018, see also 2020), highlights a unique feature of ecosystems: their complements must be adapted explicitly towards each other. These specific adaptations could be supermodular or unique. In either case, these adaptations require a minimum threshold of customisation and thus investment. This ultimately means the components are not entirely fungible. As shown by our other example, Twint, retailers had to provide an initial investment to participate in the ecosystem—whether the earlier cash register upgrades (Bluetooth beacon and software adaptation) or, later, enable (financial infrastructure provider) and accept (retailers as merchants) the scheme on card terminals (QR code on display).

[4] We do not discuss the differentiation of ecosystems from related forms of interdependence and refer to Adner (2017) for a general overview. Literature also discusses the similarities and differences between ecosystems and associated forms of interdependence in detail, e.g., on alliances and supply chains (Jacobides et al., 2018), networks (Shipilov & Gawer, 2020), and platforms (Altman & Tushman, 2017; Jacobides et al., 2020).

Similarly, banks and their software providers had to develop interfaces for the Twint platform's transaction processes. In these cases, the complementarities (the retailers and the banks) rely on supermodularity (Topkis, 1978, 1998; cf. Milgrom & Roberts, 1990). In a supermodular adaptation, two independent components become more valuable as they reinforce each other; in these examples, the added values were more options for payment at the cash registers and more functions for bank customers. Other complements are unique to the ecosystem, such as the Twint app. The app was solely produced to participate in the Twint ecosystem. It cannot be used for other payment systems such as Apple, Google, or Samsung Pay. The incomplete fungibility of the ecosystem's components is demonstrated by the fact that both types of specific complementarities, supermodularity and uniqueness, require specific investments to align with the corresponding ecosystem (Jacobides et al., 2018).

The third and last unique characteristic of ecosystems is that its actors must identify with the ecosystem (Thomas & Ritala, 2022). Ecosystem actors remain independent despite their interdependence (Gulati et al., 2012); accordingly, they are neither unilaterally controlled nor hierarchically managed (Jacobides et al., 2018). Instead, actors pursue different goals and have mutual understanding, i.e., actors consciously self-identify as part of the ecosystem but do not (necessarily) follow a shared understanding, e.g., of their role in the ecosystem. The minimum requirement for the actors' identification with the ecosystem is that they share the understanding that the community exists and that they are part of it (Thomas & Ritala, 2022). In our examples of Ping An and Twint, the partners in both cases understand their membership in the ecosystem as an additional distribution channel (compared to non-ecosystem actors) or differentiation mechanism (from competing ecosystems) rather than believing that they contribute to a dominant system for healthcare or mobility, or that they are part of the digital wallet.

Figure 3.2 visualises an exemplary ecosystem. The arrows between the actors show the alignment structure, i.e., that the actors align themselves with each other. This alignment can be established either directly, between actors, or indirectly by affiliation (Adner, 2017; Altman &

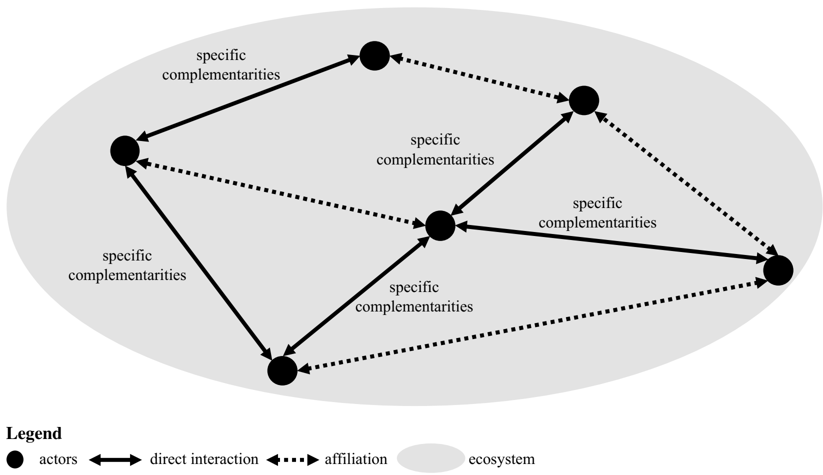

Fig. 3.2 Schematic illustration of an ecosystem (based on Altman & Tushman, 2017)

Tushman, 2017). Alignment is required as the complementors provide specific complementarities (supermodular or unique) customised for the respective ecosystems (Jacobides et al., 2018). The grey area indicates the ecosystem to which the actors belong. These actors know that the ecosystem exists and identify themselves as part of it (Thomas & Ritala, 2022).

Success Factors for Ecosystem Management

Ecosystems are complex groupings that can be designed in different ways. In the following, we point out design options and success factors. Which option is the right for a firm and its ecosystem strategy depends on each firm, ecosystem value proposition, and ecosystem community; there is no “one-size-fits-all” approach.

To establish an ecosystem, one actor can take the lead. In this case, the actor is referred to as the ecosystem's orchestrator. The orchestrator recruits, complements, and integrates them into the ecosystem. Such leadership is beneficial to accelerating the ecosystem's emergence as its development is directed towards the orchestrator's goal (Williamson & de Meyer, 2012).

Most of the literature in both practice (e.g., Atluri et al., 2017; Catlin et al., 2018; Tang et al., 2018) and research (e.g., Adner & Kapoor, 2010; Dattée et al., 2018; Thomas & Ritala, 2022) focuses on ecosystems led by a single orchestrator. However, empirical research has also shown that multiple orchestrators can jointly lead an ecosystem. This approach is recommended for exploratory ecosystems. In these ecosystems, the value proposition requires knowledge from various domains. One actor can hardly build this type of ecosystem on its own and thus needs to engage in outside-in innovation processes (Gassmann & Enkel, 2004; Lingens, Miehé et al., 2021b). Further, ecosystems may also emerge without a leading orchestrator (Ozcan & Eisenhardt, 2009; cf. Altman & Tushman, 2017; Hannah & Eisenhardt, 2018).

Ecosystems aim to improve the value proposition for the final customer. The customer journey serves as a navigational tool to identify potential actors for the ecosystem along customers' touchpoints. Thus, ecosystems can expand along or across the customer journey. For example, Ping An integrated additional services along the customer journey, which formed its health, mobility, and financial service ecosystems. Good Doctor introduced the ability to make doctor appointments for policyholders, followed later by other services from doctors, pharmacies, and hospitals. Within Autohome, Ping An's mobility ecosystem, users receive specific content, e.g., car suggestions for prospective buyers. After buying a car within the ecosystem, customers are directly offered a car insurance policy by Ping An.

Alternatively, ecosystems can emerge across multiple customer journeys by a common touchpoint, as the example of Twint demonstrates. This ecosystem involves multiple customer journeys such as banking, retail, and other services, all of which share the payment process as a customer touchpoint. Both Ping An and Twint's journeys are mapped in Fig. 3.3. Please note that only single alignments are displayed for illustrative purposes for the Ping An ecosystems. Ping An has aligned multiple partners along the customer journey. Further, the ecosystems are interconnected through Ping An's one-account policy, e.g., payments in the health or mobility ecosystem are intertwined with the financial service ecosystem.

An ecosystem must be managed differently depending on the type of integration with the customer journey, i.e., along or across it. A one-stop shop is advantageous if the ecosystem is structured along the customer journey. For example, Ping An's customers enter the health ecosystem through the Good Doctor app. Ping An, as the orchestrator of the ecosystem, acts as the gatekeeper between customers and the complementors—e.g., doctors, pharmacies, or hospitals—and maintains the customer interface. Critical to the ecosystem's success is providing the right services at the right place and at the right time for the customer. Accordingly, the ecosystem is in the foreground of customer perception and acts dynamically in response to the customer.

In contrast, ecosystems spanning multiple customer journeys through a common touchpoint are relatively static and remain in the background; customers focus instead on the actors in the ecosystem than on the ecosystem itself. In these ecosystems, the customers act dynamically; they can enter the ecosystem via several verticals. As the example of Twint demonstrates, these entry points could include banks, retailers, or other service providers. For the ecosystem to succeed, the orchestrator must

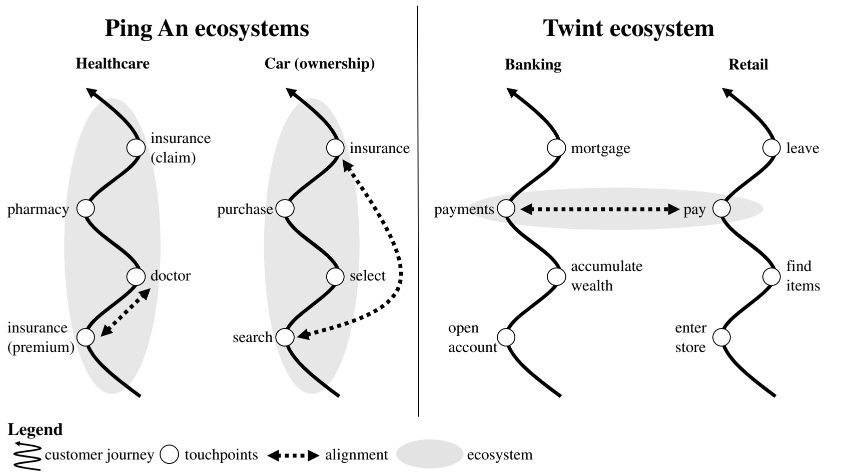

Fig. 3.3 Ecosystem developments relating to the customer journey

have integrated the complements into the ecosystem before the customer approaches them. Figure 3.4 provides an illustrative example of how those two different ecosystem designs relate to customer interaction.

Finally, the composition of its actors is a crucial success factor for ecosystems. As the previous examples have shown, ecosystems are cross-industry collaborations (cf. Aarikka-Stenroos & Ritala, 2017; Davis, 2016; Mäkinen & Dedehayir, 2014; Moore, 1993, 1996). The blurring of traditional industry boundaries enables new business opportunities. Banks, for example, can progressively position themselves in diverse verticals such as retail, housing, or health. Accordingly, practitioners and scholars have discussed whether ecosystems will replace industry logic for performance analysis (Catlin et al., 2018; Teece, 2016). However, the diversity of ecosystem actors is not limited to the industry as a characteristic. It is striking that many startups from the technology sector are successfully integrating themselves using an ecosystem's logic. For example, Stripe, an online payment processor, became one of the most valuable startups within only ten years. Retailers need only to include seven lines of codes into their online shop for online payments.

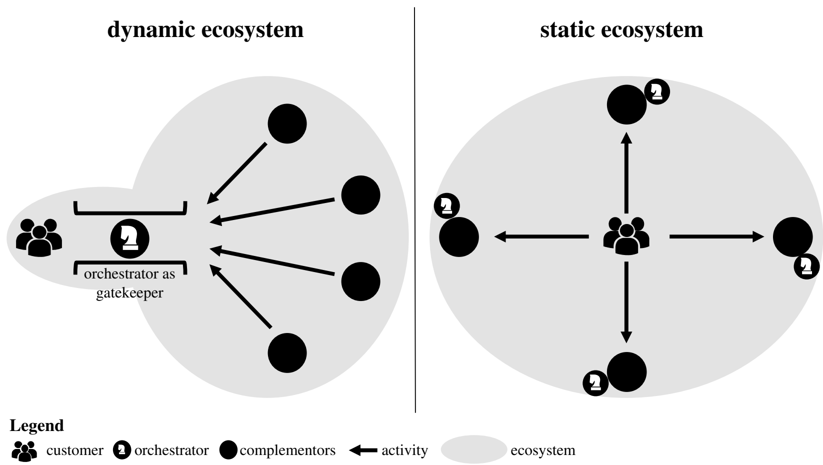

Fig. 3.4 Ecosystem designs for customer interaction

Strengths and Weaknesses of Ecosystems

What is the bottom line on the value of ecosystems for practitioners? In the following, the strengths and weaknesses of ecosystems are presented. This comparison is based on the ecosystem construct and its success factors and is summarised in Table 3.1. Ecosystems open up many advantages and opportunities for firms. By collaborating with other actors, firms create opportunities to enter new markets beyond their industry. They can use ecosystems parallel with traditional business, which ultimately establishes additional sales channels with only minor adjustments to their core product or service. This leverage allows firms to focus more on their core competencies, making them a sought-after ecosystem partner due to their increasingly refined expertise.

In addition to these strengths, however, ecosystems also have weaknesses. In particular, the high dependency on other actors must be emphasised. The entire ecosystem may collapse if a critical partner leaves because the complementarities are intertwined. Further, the mutual integration of the specific complementarities entails adjustment and coordination efforts from each actor. These efforts can be reduced for the complementors by a central orchestrator but never completely diminish. Finally, the potential loss of the customer interface, depending on the firm's position, must be mentioned. Depending on the design of the ecosystem, the customer either accesses the ecosystem solely through the orchestrator (as in the case of one-stop-shops like Ping An's) or leaves the orchestrator out, entering the ecosystem via the complementors (as in the case of Twint).

Table 3.1 Strengths and weaknesses of ecosystems

Strengths	Weaknesses
• Entering new markets • Additional sales channel • Focus on core competence	• Dependency on other actors • Coordination effort • Potential loss of customer interface

Implications for Business Model Innovation: Ecosystems Perspective as Game Changer

The shifts in industries due to digital transformation affect the established collaboration among firms, as explained at the beginning of this chapter. The changing business environment leads to a reconfiguration of the ecosystem alignment structure. These adjustments of the multilateral relationships between firms are the impetus for our argument about why the ecosystems perspective is crucial to business models (innovation). Ecosystems influence the elements of a business model (customer, value proposition, value chain, and profit mechanism) and vice versa (Gassmann et al., 2020).

Any firm's customers can be better served, either by extending the firm's value proposition along the customer journey or by bringing the firm's value proposition into previously untouched industries as those boundaries vanish. The value chain becomes opened within ecosystems through non-generic complements, be it through partners for the firm's own value proposition or a firm generating contributions to another's value proposition. The profit mechanism of a firm goes hand-in-hand with the value capturing mechanism within ecosystems: the profits have to be negotiated among firms, which ultimately leads to the economic co-alignment (Thomas & Autio, 2020) and leading to the legitimisation of participation in an ecosystem (Thomas & Ritala, 2022). It is important to recognise that all opportunities resulting from digitally enabled ecosystems to expand one's own business model simultaneously represent a threat from competitors. Therefore, the only constant for survival is continuous business model innovation.

Use Cases: Ecosystems for the Financial Service Industry

Ecosystems are already an integral part of the financial service industry. The digital transformation of the industry has presented numerous use cases in which ecosystems were essential to the business model.

In each case, the actors jointly create value for the customer through collaboration. Three use cases are presented as follows:

First, banking services themselves offer numerous possibilities for ecosystems. PayPal, which became famous for processing online transactions between buyers and sellers on eBay, provides one example. FinTech has continuously integrated adjacent businesses through acquisitions and collaborations, resulting in the expansion of its ecosystem. PayPal acquired Braintree, a payment gateway supporting payment methods such as credit cards, digital wallets, or local payment systems. The firm's recent collaboration with Google and MasterCard further enables PayPal to compete with banks for payments at card terminals using the NFC interface through the Google Pay app. This example demonstrates that ecosystems are highly dynamic: in the past, PayPal recommended that its users connect their accounts directly to their bank to avoid commission fees from credit card providers such as MasterCard. As of the firm's recent partnerships with MasterCard and Google Pay, PayPal created a financial incentive for customers to increase the transaction volume of its former rivals. PayPal has also expanded its business model beyond payments towards other banking services. New services include fraud detection, risk management (through the acquired startup Simility), and credit and lending (offered directly by PayPal).

The second use case for ecosystems affecting the financial service industry is that of payment systems. In addition to international mobile payment systems such as Apple, Google, and Samsung Pay, there are many national mobile payment ecosystems. While China (e.g., WeChat Pay, Alipay, UnionPay) and France (Lemon Way, Lydia) have multiple ecosystems, a single national mobile payment ecosystem is dominant in smaller countries such as Sweden (Swish) or Switzerland (Twint). For national payment ecosystems to thrive in the long run, they must differentiate themselves from international systems through national features, e.g., customer loyalty cards for local retailers. Payment ecosystems go beyond mobile payment solutions, however. In the Brazilian city of Maricá, the local community bank introduced the social currency Mumbuca. The municipality provides credits and benefit payments in Mumbuca, which beneficiaries can use via their specific payment card or app. Local merchants accept the social currency, with which no alcohol or cigarettes can be bought.

Third, the financial service industry employs decision support system services, relying on ecosystems for data access. These decision support systems represent another case of successful ecosystem use. The FinTech firm WeInvest, for example, provides robo-advisory services to banks, brokerages, and asset managers. Customers can choose between different investment and purchase strategies from professionals via WeInvest's marketplace. This Singapore-based FinTech cooperates with custodian banks, issuers of structured products, (banking) software providers, quantitative research teams, and investment houses. To enable banks to use its service directly, WeInvest integrated partners on its platform. The platform is the alignment structure, with WeInvest's partners as complementors. Another example of the financial service industry using ecosystems to verify decisions is real estate valuation and estimators. Here, hedonic models from regression analysis rely on data from ecosystem partners to confirm or complement traditional valuation methods such as the discounted cash flow method.

Trends Accelerating Ecosystems

Digital transformation will continue to penetrate and transform the financial service industry in the long term. As a result of digital transformation, customers, service providers, markets, and processes become more interdependent. Five related trends indicate that ecosystems will gain further importance in the future. These trends are customer-centricity, the connection between multiple ecosystems, data analytics, distributed ledger technology, and regulations.

First, customer-centricity is becoming increasingly important; this trend provides an opportunity that can be seized by building ecosystems. Digitalisation is continuously reaching into all areas of individuals' lives. Customers' demands for convenience lead them away from individual products and services and towards solutions offered by a single arranger. Accordingly, customer focus is broadening. For example, instead of focusing on building savings, contracts, or mortgages, housing is now viewed more comprehensively—from searching for and purchasing a home to renovations for value retention and resale. An orchestrator can offer an integrated service package by developing an ecosystem with hand-picked complementors. These contribute their specialised complements and adapt their processes to suit the ecosystem. In the case of housing, the real estate agent supports the search process while financial service providers are familiar with financing and taxes. FinTech companies can help as valuation specialists, assessing market prices and providing suggestions for property value retention, the latter of which generate recommendations for renovations that craftsmen carry out. Integrating these services allows the customer to use an ecosystem instead of collecting single offers. The orchestrator acts as a concierge, supporting the customers in finding the right partner and complements to meet their demands.

The second trend indicates that ecosystems will overlap in the future. Digitalisation simplifies the collaboration among firms; this simplification is driving the creation and expansion of ecosystems today. The next iteration in this evolution is the interconnection of ecosystems. Verticals such as finance, housing, mobility, and healthcare are interdependent. Finance connects to the housing via mortgages, taxes, reinvestments, and resale. Mobility is related to location (housing) and payments (finance), e.g., through public transport tickets, cars, or gas purchases. Healthcare is already closely intertwined with finance, especially in the life insurance business. The example of Ping An shows that orchestrators have already started to connect ecosystems. Moreover, independent ecosystems will continuously overlap through individual actors operating in different ecosystems as digitalisation simplifies interconnectivity. Thus, ecosystems do not necessarily need to have a common orchestrator to converge in the future.

Third, linking data points from ecosystems enables completely new analyses and process optimisations. Every interaction in an ecosystem generates data, adding puzzle pieces that fit together to form a complete picture of the customer. Machine learning, for example, continuously improves, resulting in better interpretation of data and helping to capture latent customer needs. This technological progress rarely affects the customer directly; instead, affecting processes. Automated customer analytics reduce human interactions, making processes more efficient. As the example of WeInvest shows, synergies across ecosystem actors can be exploited by merging information to support decision-makers, e.g., risk management.

Further potential in this area lies in IoT, through which devices are increasingly generating data. Today, cars can automatically log the driver's speed and location or process fuel payments at the gas station. Ping An already offers insurance policies based on the driving behaviour of the policyholder. It is not a far leap to conclude that ecosystems will increasingly integrate data from the technologies we use in our everyday life.

Fourth, distributed ledger technology, which enables decentralised platforms via secure transactions while maintaining a high level of privacy, promotes ecosystems. In ecosystems, different partners collaborate to generate value for the customer. Traditional finance requires a central actor that provides financial services to the customer through its business units or the integration of partners. The main actor acts as an orchestrator, arranging the ecosystem and appearing as a trusted authority to the customer. Decentralised finance can dispense such intermediaries, as the blockchain technology forms itself the trusted authority. Thus, decentralised finance creates an ecosystem without a leading orchestrator.

Fifth and last, the market power of individual ecosystem orchestrators is increasingly calling regulators to the scene. Large tech giants have been criticised as they can deliberately influence competition within their ecosystems by shaping governance. Governments are increasingly taking action against such practices. Looking at the European Union, PSD2 requires that banks provide third parties access to their payment services, known as open banking API. Complementors can connect customers' accounts directly with their services through the banks' open API. Each bank provides its own API, so complementors must align precisely to the individual banks. For example, the Royal Bank of Scotland (RBS) supports complementors in its ecosystem with a developer portal. In addition to comprehensive documentation on its API, RBS offers a "sandbox" for developers to test their applications before going live. Other countries, like the Republic of Korea, go further—an open API integration platform exists for the financial service industry. Open APIs simplify collaboration and fuel the financial ecosystem. By using them, FinTech companies can offer their innovative services in a simplified way.

The Ecosystems Concept Offering New Venues for Research on Business Model Innovation

The ecosystem concept is truly a game changer for business model innovation. The examples in this chapter show how existing business models need to adapt and new business opportunities are added. We summarise which three elements are key to business model innovation and why further research on business model innovation is needed.

The rise of ecosystems results from the increasing opportunities from data. Digitisation reduces transaction costs, which simplifies data exchange and thus accelerates collaboration between companies. The simple exchange and linking of data enables more complex business models between firms, transforming linear value chains into intertwined value networks. While Amazon was early in using its own customer data for purchase suggestions on its own platform, data networking enables new value propositions based on customer and firm data from different platforms and ecosystems. Firms can target customers more precisely while the customer itself profits from improved recommendations thanks to increased comparability and transparency of the offers.

The focus on the customer is the second driver, why the ecosystem perspective is vital for business model innovations. Customers want convenience and barrier-free accessibility of services. This is where ecosystems come in, offering not a single value proposition but rather an integrated solution for the final customer. Accordingly, the value proposition must no longer be thought of from the perspective of a firm but from the customer. Today, it is no longer sufficient for a bank to offer traditional products such as the bank account, credit card, or mortgage. Banks must be the point of contact for comprehensive financial services, offering integrated solutions to their customers, e.g., payment options via cell phone. Since companies cannot do everything independently, they must collaborate with other specialised companies, even across existing industry boundaries.

Collaborations with new and increasingly additional partner firms are the last key driver for ecosystems in the context of business model innovation. This results from the previous two arguments. In ecosystems, more firms contribute to value creation. The transformation from value chains to value networks and more complex value propositions affect the value capturing. Accordingly, all individual firms' business models need synchronisation with each other. While credit cards used to have a simple four-payment credit card scheme, today, more actors (e.g., big tech) are added, and all are claiming their share of the revenues. The new participants might be demanding but must not overstress existing firms if they cannot replace them entirely.

These game changers by ecosystems have implications for research on business model innovation. Research on business model innovation has to look beyond the boundaries of a single firm. In the following. We point out promising four venues for future research.

First, there are new venues on the joint creation of the value proposition. While business model innovation mainly focuses on the value proposition of a single firm, ecosystems focus on multi-actor value propositions. The ecosystem value proposition is at the heart of the ecosystem concept and is continuously modified (Thomas et al., 2022). Business model innovation research needs to expand towards aligning multiple actors and their business models, also beyond formal collaboration. Also, the process of continuous refinement and modification of the ecosystem value proposition is worth studying as the non-stopping process of innovating the business model needs to resist and adapt towards external contingencies, especially across different firms. Accordingly, we see much potential in the dynamic alignment of business models between multilateral partners towards a superior value proposition. Also, partners need to engage in dynamic learning from the customer to understand the gains, pains, and underlying assumptions. Existing canvas and blueprints need to be revised to overcome tensions between partners by focusing on formal *and informal* governance within the ecosystem. Consequently, understanding the role of the orchestrator (see Lingens, Miehé et al., 2021b) needs to be advanced and business model patterns be refined, e.g., orchestrator, layer player, customer experience (cf., Gassmann et al., 2020).

Second, the value network of business model innovation offers also promising potential to push the borders of business model research. Within ecosystems, firms collaborate across industries as their boundaries become blurring (Aarikka-Stenroos & Ritala, 2017). New and more diverse partners for value creation expand the perspective of the value creation process. Especially the shift towards a more intertwined value network and increasing B2B2C relationships seem a promising venue for future research. Expanding the scope of the value network towards additional stakeholders such as associations and authorities is beneficial, as they can push policies triggering implications for business model innovation (cf. the ongoing discussion on regulating big techs in the European Union).

Third, business model innovation at the level of individual firm must also be revisited. In the context of ecosystems, individual companies (orchestrators as well as complementors) need not only to adapt their own business model but also to think their way into the business models of partners within the ecosystem. Ecosystem partners must be attracted, be it for setting up an own ecosystem as orchestrator or for joining an existing ecosystem as complementor. The individual firm must therefore be able to propose business models for its partners or align its own business model with others. Ultimately, all firms' business model must generate added value within the ecosystem, which is why an ecosystem can also be understood as a group of interconnect business models. This new approach seems promising to advance the field of business model innovation beyond firm boundaries.

Fourth and last, the role of technology offers multiple promising venues across all elements of business model innovation—value proposition, value network, and value capture. In our book chapter, we put emphasis on DLT/blockchain as an example of decentralised platforms. This new technology demonstrates exemplarily the changing role of traditional orchestrators, as they might diminish or at least get reduced. The impact of new technologies as an external driver offers multiple opportunities to see how business models and ecosystems need to adapt, on the firm level but also among partners.

Conclusion and Recommendations for Practice

The specialisation will become even more critical in the future. Due to digital transformation, competition steadily increases. Digitalisation opens new business opportunities and business models but also brings global competition. Thus, companies must master their core competencies to remain competitive worldwide. What practical advice for staying competitive can we take from this discussion of ecosystems? Some approaches will help realise the potential of ecosystems. These include thinking in terms of value proposition (Osterwalder et al., 2014), driving business models (Gassmann et al., 2020), working with the scientific method of experimentation (Thomke, 2020), and developing connected business opportunities for the networked economy (Gassmann & Ferrandina, 2021).

To be clear, not every firm needs to orchestrate an ecosystem independently. Ecosystem orchestration requires significant effort to align diverging interests, especially in a highly dynamic field. This effort is not limited to the emergence phase, during which initial partners must be recruited and the alignment structure settled. Instead, an ecosystem must continuously evolve to remain competitive. Accordingly, a complementary strategy is needed so that many actors can integrate themselves into adjacent businesses via ecosystems. They can then use these businesses as a sales channel for their complements without bearing the burden of orchestration.

Whether they run an ecosystem themselves or act as a complementor, firms must not necessarily restrict themselves to one ecosystem. Banks, illustratively, participate in different payment ecosystems such as Apple, Google, and Samsung Pay (so-called multihoming). Also, ecosystem actors may find themselves in overlapping ecosystems, as the example of Ping An shows. The payment ecosystems and Ping An's ecosystems demonstrate that participation in an ecosystem does not exclude actors from joining others; firms can participate in multiple ecosystems.

In the following, we summarise our recommendations for increasing competitiveness in ecosystems:

1. Create a superior customer journey by walking in your customer's shoes.
2. To increase customer convenience, think about full solutions, rather than single products or services.
3. Rethink how to create and capture value based on process, product, and customer data.
4. Use IoT-based potentials to bridge the gap between the physical world and the financial world; by adding new business models like pay-per-use, performance-based contracting, and subscription models, the bridge from physical product to the finance world (and vice versa) is made.
5. Integrate businesses and orchestrate your partners towards new or superior value propositions for your customers.
6. Think, in B2B sectors, about how to make your customers' customers (and their customers) successful.
7. Create stickiness with customers, either through emotionally binding them or based on data.
8. Promote an open mindset for collaborations; partnering becomes one of the most critical capabilities.
9. Create and capture value, including across and beyond today's industry borders.
10. Think with the big picture in mind but start in small steps; use the scientific method of experimentation.

The future belongs to those players who think in ecosystems and, therefore, can leverage their and their partners' competencies towards one goal: improving the customer journey in all dimensions.

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4

Platformizers, Orchestrators, and Guardians: Three Types of B2B Platform Business Models

Paavo Ritala and Marin Jovanovic

Preface

The game-changing impact of B2B platform business models cannot be overstated as we approach the next decade. The B2B platform markets are experiencing an unprecedented surge in revenue, transactions, and participation by firms, fueled by the accelerating digitalization and automation of business processes. B2B platform business models will be an important tool for firms to connect, collaborate, and transact with one another, becoming a driver of future business growth. The

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emergence of B2B platform ecosystems and B2B marketplaces is a game-changer for many industries as they offer access to a diverse range of complementors and customers—enabling radically new types of modular and connected value propositions. Technological advancements such as Internet of Things, data analytics, and artificial intelligence, will add a new dimension to B2B platform offerings, catering to the ever-evolving customer needs. B2B platform owners are currently in the process of developing specialized ecosystems and marketplaces with the aim of strengthening their competitive position in industries such as health-care, manufacturing, and logistics. Furthermore, certain B2B platform owners are committed to creating innovative B2B platform ecosystems that surpass the boundaries of specific industries, akin to the highly successful Amazon Marketplace and Google Play models in B2C space. In light of the transformative potential of B2B platforms, it is imperative that any B2B firm striving to maintain competitiveness in the forthcoming decade can embrace the potential of such platforms.

Introduction

Digital technologies, especially digital platforms, have been the main driver of business model innovation in B2C markets for some time (Cennamo, 2021; Zhao et al., 2020). Platform business models[1] are particularly attuned to wide audiences with heterogeneous needs, such as consumers of music (Spotify), mobility (Uber), and entertainment (Netflix). The most iconic examples of platform business models are embedded in the software platform ecosystems of Google and Apple, which serve almost all types of customer needs (Karhu et al., 2020). Such platform ecosystems are characterized by a winner-take-all approach and powerful indirect and direct network effects (Cusumano et al., 2019). Overall, the literature on platforms in the B2C area has started to consolidate and mature across different disciplines (Rietveld & Schilling,

[1] Throughout this chapter, we refer to "platform business models" when discussing different types of business models that operate on a digital platform. We use this as a generic term that encompasses all B2B models that involve a platform-like feature (we distinguish the three types later in the chapter).

2021). The broad excitement around B2C platforms has, however, led to overlooking another important trend—the increasing emergence of successful platform business models in B2B markets. In fact, various types of platform business models have become of strategic importance to industrial technology providers (e.g., ABB Ability, Siemens's Mindsphere), construction equipment industry leaders (e.g., Volvo Connect), industrial software providers (e.g., AppExchange by Salesforce), maritime firms (e.g., Kongsberg's Kognifai), and in many other industries.

The potential of B2B platform business models is massive (Ziegler et al., 2022). Many industry leaders have realized that even the most successful capital-intensive and high-technology firms are no longer best operated in a vertically integrated silo-organizations (Holgersson et al., 2022; Khanagha et al., 2022). Rather, firms are looking for new ways to attract different actors beyond the typical B2B partnerships, and fundamentally "change the game" for industrial incumbents and their business models (Jacobides, 2022). The benefits of platform and ecosystem approaches are increasingly available, as digital technologies and interfaces allow B2B firms engage with larger and more varied number of external actors (Daymond et al., 2022; Gawer, 2021). For instance, many B2B firms are pursuing to emulate the success of consumer platforms such as Apple's Appstore in the attempt to attract innovative and valuable complementors to their offerings. Interestingly, this approach has started to bear fruit not only with digital-only B2B firms (such as with SaaS providers like Salesforce), but also with firms that develop and deliver tangible offerings. A typical example is a firm that has a competitive customer value proposition in the form of a product-service bundle which involves various sensors and software (Jovanovic et al., 2022b). For instance, Volvo provides construction equipment and Metso Outotec provides mining equipment to large industrial customers. Instead of capitalizing on digital capabilities of such smart products only internally, Volvo and Metso Outotec have gradually unlocked platform business models where selected complementors may connect to their platforms via APIs and provide new functionalities to their value proposition, also allowing customers to choose from those functionalities. Over time we expect that the industrial incumbents would be moving to a fully-fledged platform ecosystem model where complementors unlock innovations and the customer's value grows as their ability to use the value proposition improves.[2] Some other B2B firms, as we will discuss more in detail later in this chapter, have pursued to build platform marketplaces (Lanzolla & Frankort, 2016) that lead to the elimination of intermediaries from electronic value chains (Giaglis et al., 2002). For instance, firms such as Vestas and FLOOW2 have set up multi-sided platforms for other B2B firms to transact different types of resources and materials in an efficient manner.

Indeed, we are witnessing a surge of new B2B platform business models and the expectation is that this market will grow rapidly in the coming years. A report by Research and Markets estimates that the global business-to-business platform market size is estimated to reach USD 25.65 trillion by 2028, expanding at a CAGR of 18.7% from 2021 to 2028. However, despite the increasing interest in the area and the potential benefits that have already been identified (Anderson et al., 2022; Jovanovic et al., 2022b; Pattinson et al., 2022), the B2B platform literature is still very much in its infancy. On the one hand, the real-world emergence of platform ecosystems in the B2B context is slow (Jovanovic et al., 2022a), and industrial firms experimenting with platform business models are struggling to build full-fledged platform ecosystems and to manage related growth dynamics (Falk & Riemensperger, 2019). On the other hand, there is significant heterogeneity of B2B industrial relationships, which also implies a narrower scope of B2B platform ecosystem and platform market dynamics that go beyond the winner-take-all strategies witnessed in the B2C context (McIntyre, 2019; McIntyre et al., 2021). Indeed, building platform business models in B2B entails challenges related to the configuration of value creation, value delivery, and value capture mechanisms, both internally and in relation to the emerging platform ecosystems (Böttcher et al., 2022; Volberda et al., 2021). For instance, there are challenges regarding the role of the prospective platform owner, the ecosystem partnering strategy, platform architecture, platform governance and engagement, and success

[2] We use Volvo and Metso Outotec here an aspirational illustration of the platform trajectory of large B2B firms. However, while both Volvo and Metso Outotec have "smart connected products," neither of the firms are so far operating in full-fledged platform ecosystem model as envisioned here.

metrics (Jacobides, 2022). Further challenges include the fact that that complementary firms joining B2B platforms might have a competitive relationship or a major bargaining power in relation to the platform owner (Yrjölä et al., 2023). In general, partnerships in B2B markets are characterized by high capital intensity, heterogeneity, transaction costs, and uncertainty (Kostis & Ritala, 2020), thus reducing the possibilities for quick scaling of platform ecosystems (Jovanovic et al., 2022b). Therefore, the prospective platform owners need to address challenges on both the supply and demand sides of its platform business model that involves substantial amounts of complexity and uncertainty (Bonina et al., 2021; Lanzolla & Markides, 2021).

B2B firms do not often create platforms from the scratch, but build those within or on top of their existing offerings. In other words, "platformization" is taking place in B2B markets with firms engaging in the development of platform-based meta-organizations and other novel organizing forms (Gulati et al., 2012; Kretschmer et al., 2022). Yet, we still know little about how the process of platformization unfolds for B2B firms (Jacobides, 2022). Platformization challenges B2B firms to undertake novel reconfigurations across value creation, value delivery, and value capture (Snihur & Eisenhardt, 2022), leading to multiple and often conflicting business models (Visnjic et al., 2022). Furthermore, it has been shown in practice that B2B platforms are not a "winner-takes-all" game, but rather fragmented, heterogeneous, and organically developing field (Ziegler et al., 2022). Therefore, applying a holistic and evolutionary perspective of B2B platform business models is a major untapped opportunity (Hanelt et al., 2021), given the potential generativity and growth benefits available in the platform markets (Thomas & Tee, 2022).

This chapter develops a framework supported by examples of three types of B2B platform business models with gradually increasing levels of platformization. First, we identify the *product-service platformizer*. This business model involves a platform-like logic on the supply side of the B2B firm, in which different complementors may contribute to the core of the platform owner's product-service offering (cf. contributors, Bonina et al., 2021). However, this business model does not yet unlock the customer side (e.g., demand side) of a platform market, so the integration of complementors remains the duty of the platform owner firm. An example of a product-service platformizer is the way many industrial firms approach collaboration with complementors. For instance, KONE has an ecosystem model in which complementors can experiment with KONE APIs (Application Programming Interfaces) and work with KONE to find the most feasible solutions that can be offered to the customer base[3] (Huikkola et al., 2022). Similarly, Volvo Connect allows Volvo to add complementors[4] like drone manufacturers to improve the functionality of Volvo's construction equipment in difficult environments like mining and machine fleets optimization (Jovanovic et al., 2022b; Saadatmand et al., 2019). Second, we identify the *platform ecosystem orchestrator* business model, which resembles the archetypal logic used in B2C markets. Here, the incumbent firm opens a platform ecosystem of peripheral complementors by allowing the customer to select from those complementors (Bonina et al., 2021). For instance, Kongsberg's Kognifai platform helps users of maritime fleets acquire value-added digital complementors like engine propulsion analytics or other vessel and fleet operation management applications. Another example from the software industry is Salesforce AppExchange, which allows users of the Salesforce platform to choose additional applications to complement the core Salesforce B2B software offering. Third, we identify the *platform market guardian* business model, in which the firm creates a separate marketplace in which other B2B can transact (de la Boulaye et al., 2019), and that can involve some products, services, or technologies from the focal firm to support the creation and maintenance of the marketplace. For instance, FLOOW2[5] provides sharing marketplaces for matching the supply of and demand for industrial resources (Blackburn et al., 2022).

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3 https://dev.kone.com/api-portal/inspiration/ecosystem.

4 Following the typical conceptualization in the platform literature, we refer to "complements" when discussing the productive inputs to a platform (e.g., software applications or drones), and to "complementors" when discussing the firms providing those complements.

5 https://www.floow2.com/about-us.html.

Our chapter contributes to the nascent B2B platform scholarship and practice. First, we identify different types of B2B platform business models that have fundamentally different logics of value creation and capture, as well as how the platform markets are organized and governed. These results add to the ongoing discussion on value creation and value capture in the business model innovation (Sjödin et al., 2020a) and platform business models (Zhao et al., 2020) in B2B markets by unpacking the evolutionary trajectory of B2B platform development (Bonina et al., 2021). Second, we identify the key differences between B2B and B2C platforms (Jovanovic et al., 2022b), and use these differences to elaborate on how B2B firms—and especially industrial incumbent firms—can extend their existing resources and capabilities to create new types of platform business models. Relatedly, we also provide insights into the emerging literature on generativity that has mostly focused on B2C context (Thomas & Tee, 2022) by distilling the key generativity components at different stages of platform development in B2B markets. Third, in practical terms, the chapter will help B2B firms and platform orchestrators make choices about platform design (Tura et al., 2018), platform market structure (Cennamo, 2021), and the investments they make on the supply and demand sides of platform business model innovation (Bonina et al., 2021; Lanzolla & Markides, 2021).

Platforms, Ecosystems, and Business Model Innovation in B2B Markets

Digital transformation touches on organizational processes and structures and enables setting up platforms and ecosystems that reconfigure value creation and capture opportunities (Dąbrowska et al., 2022). The emergence of platforms and ecosystems has resulted in the expansion and dissolution of previously well-delineated supply chain activities, opening up the realm of digital competition (Jacobides, 2022) and expanding B2B collaborations across industry boundaries (Aarikka-Stenroos & Ritala, 2017). Ecosystems and platforms create a loosely coupled logic in which participants are simultaneously interdependent and independent and that challenges existing ideas about what is the best way to organize (Jacobides et al., 2018).

Thus far, the literature on platforms and platform business models has been dominated by B2C examples, so the main theoretical arguments fit best with B2C contexts (Cennamo, 2021; Rietveld & Schilling, 2021). B2B platforms are likely to include some similar features acknowledged in the existing platform literature, such as the existence of network effects in relation to the quality and heterogeneity of complementors (Boudreau et al., 2022; McIntyre & Srinivasan, 2017), the distinctive role of a platform owner (or orchestrator) (Thomas & Ritala, 2022), and the generative value of the B2B platform and associated ecosystem (Thomas & Tee, 2022). However, there are also major differences between the two contexts. First, the platform architecture in B2B markets is often built gradually as B2B actors are well aware of the captive power of the focal platform, which subsequently involves resource-intensive orchestration by the platform owner that includes dyadic contracting with a limited number of complementors (Ceccagnoli et al., 2012; Jovanovic et al., 2022b) with potentially large bargaining powers and variety of competitive positions (Yrjölä et al., 2023). Consequently, both direct and indirect network effects are significantly weaker in B2B markets, implying that the rapid platform market growth and winner-take-all platform strategy used in B2C markets are unlikely to occur (McIntyre, 2019; Ziegler et al., 2022). Second, B2B markets often include tangible assets like industrial machinery, industrial sites, and a variety of raw materials and components. As the number of these assets is high and their nature is often capital intensive, they are usually controlled by a few industry-specific players making their mobility less dynamic than in B2C markets. Still, the potential upside is the emergence of sensors and Internet of Things (IoT) technology, which allows for greater connectivity to industrial assets and opens the door to the creation of platform ecosystems in B2B markets (Karttunen et al., 2021; Pushpananthan & Elmquist, 2022).

One unifying foundation that portrays both B2C and B2B platforms is the recognition that digital platforms are essentially meta-organizations (Blackburn et al., 2022; Chen et al., 2022; Kretschmer et al., 2022)—that is, organizations comprised of autonomous organizations (Gulati et al., 2012). A meta-organizational structure means that platform owners need to build incentive structures, technological interfaces, and other governance mechanisms to organize the inputs from different complementary actors (Blackburn et al., 2022). In B2B markets, this requires iterative multilateral negotiations, contracting, and a variety of trials to set up platform ecosystems with valuable complementors. This development can lead to platform ecosystems, in which industrial firms gradually evolve into meta-organizations that "(1) federate and coordinate constitutive agents who can innovate and compete, (2) create value by generating and harnessing economies of scope in supply or/and in demand, and (3) entail a modular technological architecture composed of a core and a periphery" (Gawer, 2014, p. 1240).

The early contributions to B2B platform research provide evidence of how platformization transforms B2B business models in different ways (Benbya et al., 2020). Emerging evidence also shows that B2B firms are struggling to create and scale workable platforms and platform ecosystems (Falk & Riemensperger, 2019). Given the relative novelty of the phenomenon, and the emergent nature of B2B platforms on top of existing businesses, research has often focused on early phases of B2B platform development or to organizational transformations toward platform logics. For instance, the processes of platform and ecosystem emergence, transition, and evolution have garnered significant scholarly attention (Daymond et al., 2022). For instance, Sandberg et al. (2020) conducted a longitudinal case study of digital transition phases at ABB and argued that different stages have inherently different platform organizing logic, while Jovanovic et al. (2022b) demonstrated in a multiple case study that industrial firms move from product platforms toward full-fledged platform ecosystems. Pushpananthan and Elmquist (2022) describe a case where Volvo autonomous driving technology platform started to gradually involve platform ecosystem features. Jääskeläinen et al. (2021) analyzed a longitudinal case in the media industry where an established news agency opened a platform market for one of its products, thus transforming a legacy business model into a platform business model. Khanagha et al. (2022) explored how Cisco simultaneously participated as complementors in the Cloud platform and a platform owner in the Fog platform. Similarly, Tian et al. (2022) present a sequential and simultaneous business model adaptation path for developing a platform business model. Overall, the emerging evidence in the B2B platform literature points out different levels of platformization, a notion that serves as the starting point for the remainder of this chapter, in which we identify different types of B2B platform business models.

Three Types of B2B Platform Business Models

The aforementioned foundations related to meta-organizational features of B2B platforms, specifically platform architecture and platform governance, and the trajectory of platformization, help us to characterize different platform business models in B2B markets. We identify different platform business models in relation to various evolutionary stages of platform ecosystem development (Gawer, 2009, p. 59). Using a number of empirical examples, we expect that many B2B platforms are first trialed as core platform architecture development with various complementors on the production side that is tightly coupled with the platform owner's value proposition. We call this phase the *product-service platformizer*. The second stage is the *platform ecosystem orchestrator*, in which customers can select peripheral complementors to platform owner's ecosystem value proposition, orchestrated by the platform owner. Finally, the third stage, the *platform market guardian*, creates a marketplace for B2B firms that is operated by the platform owner, but the added value is generated through the exchange of supply and demand with other firms in the marketplace, with the focal firm playing a variety of roles. Table 4.1 summarizes these types; we discuss and provide examples of each in greater detail below.

Product-Service Platformizer

First, the product-service platformizer describes a model in which a firm focuses on the production-side partnerships of the platform business model. Often, this relates to the building of platform-based smart solutions that augment its products and services (Kohtamäki et al., 2022;

Table 4.1 Platform business model archetypes in B2B markets

	Product-service platformizer	Platform ecosystem orchestrator	Platform market guardian
Platform business model transformation	Opening access for complementors to co-create a joint platform value proposition that is tightly coupled by the platform owner	Opening a multi-sided platform with two ecosystem value propositions: one for complementors and one for customers	Creating an open or semi-open marketplace for B2B actors' transactions, partially or completely disconnected from the platform owner's operations
Platform business model			
Value creation	Improved focal firm's B2B offering by integrating core complementors' inputs to existing product-service bundles (e.g., specialized platform services)	Generative ecosystem with peripheral complementary inputs that add to the platform owner's ecosystem offering (e.g., advanced optimization and autonomous solutions)	Open or semi-open marketplace for industry-level competition and collaboration (e.g., an industry materials exchange platform that is neutral and accessible to all participants)
Value capture	Bundling complementary products and services into an integrated B2B offering with different pricing schemes (e.g., tiered pricing, usage-based pricing, dynamic pricing)	Capturing the focal part of ecosystem value via profit split among B2B partners or increasing customer willingness-to-pay for the overall ecosystem value proposition	Charging a fee for the platform marketplace transactions and/or platform use Indirect benefits via future market growth or serving existing business model by bringing in new customers

(continued)

Table 4.1 (continued)

	Product-service platformizer	Platform ecosystem orchestrator	Platform market guardian
Platform ecosystem			
Platform architecture	Core platform architecture Leveraging modularity (e.g., APIs and interfaces)	Core and peripheral platform architecture Open APIs and interfaces Data aggregation (e.g., different complementors' data contributions)	Core, peripheral, and distributed or decentralized platform architecture Ensuring platform data neutrality in relation to efficient search and matchmaking
Platform governance	Accumulating innovative and specialized complementors on the production side and securing or contracting intellectual property rights aligned with the proprietary platform	Accumulating a wide range of complementors while ensuring that platform governance is based on value-adding data-driven contributions	Market-based governance that balance the supply and demand sides of the platform market with additional contractual and relational governance when needed

Raff et al., 2020). In the literature, the production- or supply-side partners have been called contributors (Bonina et al., 2021) or complementors (Adner, 2017), with the common feature being that they add value to the focal firm's value proposition in the eyes of the customer.

The product-service platformizer business model typically emerges by increasing possibilities to engage with digital partnerships (Sjödin et al., 2022) on the production side of incumbent firms (Subramaniam, 2022). This development is in line with the more general and well-known multilateral B2B partner engagement process (Reinartz & Berkmann, 2018; Vivek et al., 2022) that includes establishing unique partnerships among different B2B actors in relation to the focal firm's business model (Pauli et al., 2021). In the product-service platformizer business model, the B2B partnerships are plugged in via digital interfaces that resemble the functionality of a platform while retaining the focal firm's governance and control over partner selection and the substance of the collaboration, an approach that is similar to classic B2B partnerships.

Value creation frequently starts with the installation of a wide range of sensors (e.g., motion, environmental, level, optical, etc.) that allow the connectivity of industrial assets to the platform (Subramaniam, 2022). Through such sensors, monitoring and visualizing different product- and service-related processes unlock the initial complementary features to existing B2B offerings. As they become more digitally mature, firms often combine different streams of data and identify patterns that allow higher-order value creation to their customers, such as industrial optimization services. The concept of value capture refers to the ability of firms to generate revenue from its products or services. One way that firms can capture additional value is by bundling existing products and services with new offerings. Another strategy for value capture is to offer new services for free, but with the expectation that customers will eventually purchase other products or services from the firm (e.g., free trials). Finally, firms may adopt a subscription-based pricing model for their products and services. In this model, customers pay a recurring fee for access to a product or service over a set period of time (e.g., monthly or annually). By extending the contract timeframe in this way, firms can capture additional value from their customers and build predictable revenue streams (Visnjic et al., 2018).

While it is possible to build a platform architecture from scratch, it is often challenging for a focal firm to develop adequate digital capabilities internally. More frequently, firms seek a partnership among large software providers (such as Microsoft or Amazon cloud services) or specialized technology providers to develop the required level of platform architecture. In either case, the platform architecture focuses on enabling modularity and related scalability (Holgersson et al., 2022) to the core product-service value proposition. In terms of platform governance, the product-service platformizer archetype often emerges as a proprietary platform (closed) where intellectual property rights are carefully guarded (Eisenmann, 2008). Therefore, a relationship with production-side complementors is often set up under strict non-disclosure and collaboration agreements. Finally, the complementor visibility to customers is limited due to tight coupling with the focal firm's product-service bundles.

A good example of a product-service platformizer is Volvo Connect, a bundle of connected B2B services and technologies offered by Volvo. It allows the firm's customers to access a range of services and dashboards through the Volvo On Call app, including real-time traffic status, remote start, climate control, and the ability to locate and lock a vehicle. The Volvo Connect also includes services for fleet management, such as fuel tracking and maintenance alerts. Moreover, Volvo is engaging with drone manufacturers in mining for a variety of purposes, such as conducting inspections, surveying mine sites, and even remote operation of equipment. Additionally, drones can provide a safer and more efficient way to perform certain tasks in the mining industry. For instance, they can be used in the development of tunnels in mines and in the analysis of conditions and security prior to sending in personnel. By tightly coupling core complementors into the Volvo Connect product-service bundle, the firm is able to effectively use the platform-like complementarities in its value proposition while keeping a close watch on the overall business model and the quality of its products and services.

Platform Ecosystem Orchestrator

Second, the platform ecosystem orchestrator archetype establishes a platform ecosystem (Kretschmer et al., 2022) via multilateral B2B partnerships (Jovanovic et al., 2022b). Like in the first type, complementor engagement represents a critical activity for the success for the focal firm (Saadatmand et al., 2019). However, here the focal firm uses open APIs or other interfaces to allow peripheral complementors to innovate on top of its existing value proposition; it thus represents the classic understanding of a modular ecosystem (Adner, 2017; Jacobides et al., 2018).

The key value creation challenge for platform ecosystem orchestrators is to establish a double ecosystem value proposition that creates value for customers and for ecosystem complementors (Jacobides, 2022; Jarvi et al., 2010). In B2B markets, the offering is often complex, such as 5G connectivity solutions for various applications, improving the efficiency of people flow, optimizing multi-vendor fleet management, or maximizing materials extraction in mining. In those cases, complementors are specialized industrial or software firms that are certified and visible to customers (Ceccagnoli et al., 2012). Therefore, a complex solution is underpinned by a platform ecosystem. More importantly, expanding the platform ecosystem value to peripheral complementors is as relevant as for customers as the focal solution represents a clear win-win-win for the platform owner, complementors, and customers. The value capture is often resolved as a revenue split between the focal firm and the complementors. However, B2B actors are often aware that their role may change from one project to another, requiring a readjustment of the value capture mechanism for each project (Lingens et al., 2021). Thus, in B2B platforms the value capture logic may not be as standardized as in B2C platforms (such as the typical 30% revenue share model popularized by the Apple app store).

The platform architecture represents a data aggregation from both supply- and demand-side participants that requires a more open platform than the product-service platformizer. Data aggregation includes increased data volume and data variety that may be utilized for developing innovative services (Jovanovic et al., 2022b). Additionally, the focal firm needs to guide and train complementors and customers to integrate specific APIs and co-create platform services. As a result, an agile software engineering approach has become more prominent when developing B2B digital solutions (Sjödin et al., 2020b). Platform governance is extremely important for this archetype, as the focal firm needs the support of a broader range of complementors. Moreover, the focal firm often needs to seek and onboard global or digital-native complementors that may have no connection with the focal firm's experience and knowledge base, requiring the development of mechanisms for knowledge sharing and for contractual and relational governance (Oinonen et al., 2018). Finally, customers often consume products and services from a wide range of vendors, which requires interoperability between and the combination of different platform ecosystems, sometimes involving also coopetition dynamics (Ritala et al., 2014; Yrjölä et al., 2023).

The platform ecosystem orchestrator archetype is exemplified by Kognifai, an open platform ecosystem developed by Kongsberg, a maritime firm. The purpose of Kognifai is to assist companies in various industries, including maritime, oil and gas, and renewable energy, in collecting, analyzing, and sharing data to enhance their operations and decision-making processes. The platform ecosystem comprises a variety of tools and services for data management, analytics, and collaboration, as well as access to a community of complementors that can assist the platform owner and customers in implementing and realizing the benefits of Kognifai. The Kognifai platform ecosystem operates on top of different vessels and fleets, creating value for a broad range of maritime B2B firms and their customers.

A second example is ABB Ability, which is offered by ABB, a leading technology firm that operates in the fields of energy, automation, and transportation. While ABB Ability represents a proprietary platform (e.g., product-service platformizer), the ABB Ability Building Ecosystem is an open platform ecosystem and is focused on solutions for the building industry, including products and services for building automation, energy management, and other building-related applications. The ABB Ability Building Ecosystem is designed to help building owners and operators improve the performance, efficiency, and sustainability of their buildings by leveraging various complementary applications from the ecosystem.

Finally, B2B software vendors are also increasingly building platform ecosystems on top of their software offerings. Salesforce AppExchange is a typical example of such a model. While Salesforce's enterprise customers enjoy the core software offering, a customer relationship management tool that empowers the support, sales, and marketing teams' operations, AppExchange enables Salesforce to extend its offerings with a large number of complementary applications that enterprise customers can purchase from a dedicated app store. Effectively, Salesforce has turned itself from a software-as-a-service firm into a full-fledged platform ecosystem orchestrator.

Platform Market Guardian

Finally, the platform market guardian refers to a separate platform market structure (such as a marketplace or decentralized data platform) set up by a focal firm who may be the platform's owner to serve the needs of a whole industry or industry segments (Blackburn et al., 2022; Jovanovic et al., 2022a). In the B2B context, firms are often reluctant to share any sensitive information, especially through technology suggested by a platform owner that may be a potential rival. For instance, due to data security concerns, a centralized database may not be the best approach to building an industry platform. Therefore, we are witnessing an increasing amount of B2B platform marketplaces that are effectively separated from the platform owner that established them (thus the "guardian" reference) or loosely connected to the platform owner's core technologies, products, or services.

Value creation and value capture are derived from the typical two-sided platform economics comprised of buyers and sellers (Parker et al., 2016). Buyers and sellers gain access to one marketplace, where ideally the products and services are accessible—and neutral in terms of competitive tensions—to an entire industry or beyond. Such platforms increase transparency around terms, products, and services and enhance efficiency across product and services transactions. Value capture is achieved by charging a fixed fee, earning commissions from buyers and sellers on the market, or adopting the "generative appropriability" approach (Ahuja et al., 2013), in which future profits and opportunities for the platform market guardian come indirectly. Examples of such future benefits include increased support for the platform owner's technologies and product-service portfolios or attracting in new customers.

Platform architecture and governance are determined by the platform market guardian, often in collaboration and coordination with other industry players (e.g., consortium). Ensuring platform owner neutrality is the critical aspect and often involves advisory boards representing the major players on such platforms (Jovanovic et al., 2022a). In fact, given the heterogeneity of B2B markets, platform market guardians often need to adopt additional contractual and relational governance processes to ensure the smooth adoption of a platform market and effective matchmaking, which goes well beyond the typical B2C multi-sided platforms. Additionally, platform regulation, standardization, and interoperability may enhance the adoption of such platforms (Cusumano et al., 2021; Jacobides & Lianos, 2021).

The aftermarket of the renewable energy sector, comprising of spare parts, components, and consumables, is often fragmented across different vendors and technologies. One recent and interesting platform initiative (which was discontinued in 2023) was Vestas Covento platform. Vestas Covento aimed to address this issue by providing a two-sided platform that facilitated connections and collaborations between buyers and sellers within the renewable energy landscape. The platform aimed to increase transparency and efficiency in transactions related to parts and services. By providing a single platform for buyers and sellers, search costs are significantly reduced. Additionally, such platform has the potential to expand to other segments of the renewable energy industry such as solar, storage, and power-to-x technologies, ultimately contributing to the growth of the sustainable energy sector as a whole. It is worth noting that while Vestas initiated the development of the Covento platform, it also participated as both a buyer and a seller on the platform. This serves as an example of how a B2B company can create a platform marketplace in which it also participates as a customer itself.

In the context of a circular economy, many interesting B2B platform marketplaces are emerging (Blackburn et al., 2022). For instance, FLOOW2 involves B2B firms exchanging their industrial (often excess) resources in a platform marketplace that matches supply and demand. Such B2B platforms require substantial amounts of work from platform market guardians and core platform users, given the initially underdeveloped markets for exchange of highly specific industrial resources and materials.

An interesting example is the recently discontinued TradeLens, a global shipping platform developed by IBM and Maersk, aimed to improve the efficiency and transparency of the global supply chain through the integration of blockchain technology (Jovanovic et al., 2022a). The platform sought to digitize and standardize the exchange of shipping data between various stakeholders, including information regarding vessel schedules, among other logistics data. The incorporation of blockchain technology was intended to provide a secure and transparent method for managing and sharing this information. However, despite its ambition to increase collaboration across the global supply chain, the platform faced challenges with regard to industry-wide adoption and trust, ultimately leading to its discontinuation in November 2022. This example highlights the difficulties associated with implementing a winner-take-all approach to B2B platform design, particularly in terms of concerns surrounding open marketplace neutrality and the potential for captive power within a single platform.

Implications for Research

Evolutionary Model of Platform Business Model Innovation in B2B Markets

A key question for B2B firms is whether to consider a platform business model in the first place; after that, which type of a platform business model to choose is also important, given that this selection will resonate at the different evolutionary stages of the platform ecosystem development (Gawer, 2009, p. 59). In this chapter, we have demonstrated how

B2B firms can transform their business models from classical value chains into product-service platformizers, platform ecosystems, and finally, platform marketplaces. The business model transformations required at each step are different and revolve mainly around the structure of a platform market, as well as the production- (e.g., supply-) and demand-side choices regarding the platform governance and platform architecture (Jacobides et al., 2018). At each step, the platform and ecosystem logic can be unlocked to different degrees (Jääskeläinen et al., 2021). The trajectory and the key choices along the way are depicted in Fig. 4.1.

The product-service platformizer model necessitates the provision of access to production-side complementors. However, this modification alone does not comprise a platform ecosystem, as the various components of the product-service offering are consolidated by the platform owner, and the complementors do not function autonomously (Williamson & De Meyer, 2012). However, the platform owner exhibits characteristics akin to a platform ecosystem in its approach toward engaging with its complementors. The utilization of open and connected APIs, as demonstrated by car manufacturers like Volvo (Pushpananthan & Elmquist, 2022), allows for industrial firms to engage with various complementors and facilitate collaboration, effectively mimicking the production-side complementary innovation commonly observed within platform ecosystems. Next, the platform ecosystem orchestrator model subsequently enables the multi-sided platform ecosystem paradigm, allowing the platform owner's customers to independently select and curate from the various complementors offered within the platform ecosystem. This customer-driven complement selection feature also differentiates ecosystems from traditional value chains (Autio, 2022). Finally, the platform market guardian establishes a marketplace in which the supply and demand are matched and coordinated. In this scenario, an autonomous or semi-autonomous platform market is unlocked. In some cases, the marketplace may be overseen by a guardian who assesses the functionality of the market but does not necessarily intervene in transactions or incorporate them within its own business model.

The evolutionary model also provides insights into the emerging literature on generativity by distilling the key generativity components at

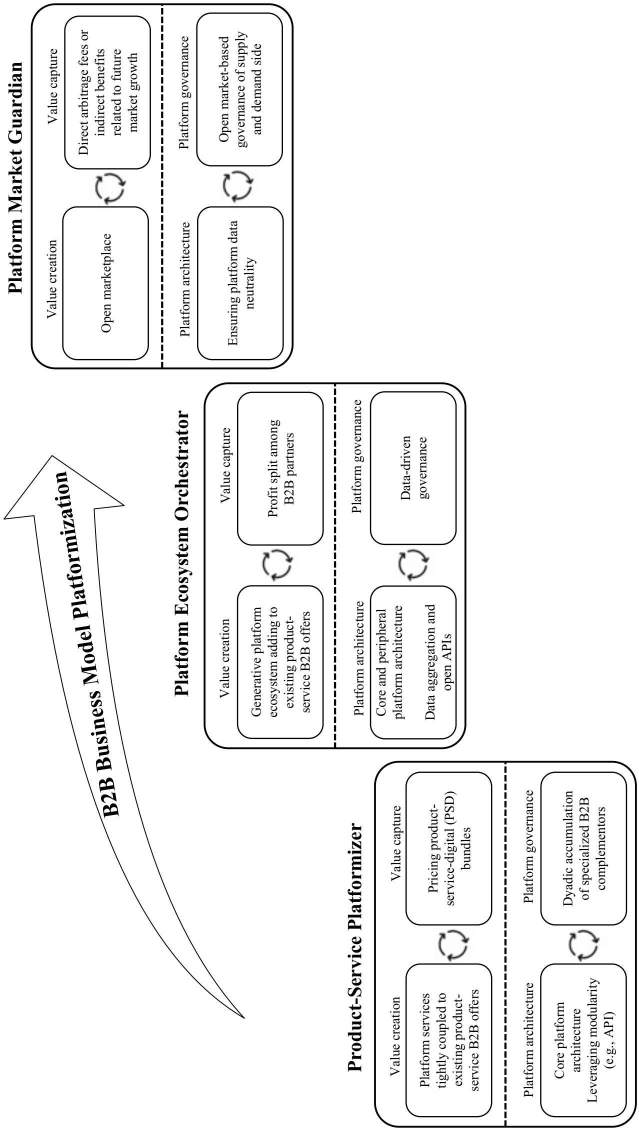

Fig. 4.1 Evolutionary model of platform business model innovation

different stages of platform development in B2B markets (Thomas & Tee, 2022). In particular, we demonstrate the layered nature of generativity in B2B platform business models, including generative architecture, generative community, and generative governance. Initially, B2B firms may rely on the generative architecture of platforms in which the platform owner actively engages with various complementors that aid in the advancement of the platform core and product-service bundles. Herein, the generative governance in relation to the design of the boundary resource is rather securing than resourcing (Ghazawneh & Henfridsson, 2013). Therefore, the choice to open the platform architecture to carefully selected complementors does not necessarily indicate the establishment of a platform ecosystem. More likely, many industrial firms leverage generative governance to invite complementors via APIs and other interfaces, and subsequently collaborate with the most promising complementors to assimilate new components into their product-service offerings, as exemplified in the case of Volvo Connect. We also pinpoint that B2B firms can extend into broader layers of generativity by using the generative community to attract heterogeneous complementors and establish a multi-sided platform ecosystem. This form of generativity is known to optimize customer choice and diversity within platform markets (Cennamo & Santaló, 2019) and is achievable for many B2B firms to different degrees. The concept of generative community is exemplified in its purest form in software firms such as Salesforce and SAP, which have been demonstrated their ability to serve their customers by opening their own app stores. In other, more asset-heavy B2B settings, establishing a generative community is also possible, as discussed with the example of Kongsberg's Kognifai. Finally, the generative community can extend into an autonomous platform marketplace, where the B2B transactions are not necessarily bounded to the product and service offerings of the focal firm, as we demonstrated using the example of FLOOW2.

Implications to B2B Platform Literature

In this chapter, we aim to contribute to the emerging body of literature on B2B platforms by highlighting the distinct characteristics of

B2B platforms in comparison with B2C platforms. We have demonstrated that platforms in industrial markets are primarily connected to a set of industrial resources, assets, and capabilities, which serve as the foundation for the platform's business model. Given the capital-intensive nature of these operations, B2B platforms tend to have a smaller number of actors, involve more negotiations and contracting, and exhibit slower growth rates than their B2C counterparts.

An interesting and notable characteristic of B2B platforms is that they often incorporate elements from both innovation and transaction platforms (Cusumano et al., 2019; McIntyre et al., 2021). B2B platforms enable interfirm collaboration and complementary innovations in variety of ways that escape simplistic definitions and categories. Indeed, B2B platforms tend to be highly specialized and make use of advanced technologies and methods to attain maximum levels of innovation (thus resembling innovation platforms). On the other hand, they also possess characteristics commonly found in transaction platforms. These "hybrid features" provide the potential for B2B platforms to minimize transaction and search costs, and ideally, maximize innovation and generativity. First, the transaction cost reduction by B2B platforms is potentially meaningful; for instance, by utilizing APIs, firms like Volvo and KONE have significantly reduced integration costs and enabled seamless data sharing. It should be noted, however, that in the context of B2B firms, a greater degree of negotiation, quality assurance, and contracting is typically required when integrating complementary innovations into product-service bundles, in comparison with B2C platform ecosystems. Second, the search costs for both providers and customers of products and services may be diminished within the context of B2B platform ecosystems and marketplaces. For instance, FLOOW2 intermediates industrial resources (Blackburn et al., 2022) and thus reduces search costs for firms trying to obtain (or get rid of) a particular type of material. However, it is expected that the market size will be relatively smaller in the B2B context, thus reducing the advantage of lower search costs for B2B platforms. Third, and as mentioned in the previous section, B2B platforms have the potential to facilitate generative contributions from the platform ecosystem participants, and in some cases, support the build-up of a "generative community" (Thomas & Tee, 2022). The aspect of generativity, however, is yet to show its full potential. Beyond many relatively simple B2B marketplaces and B2B software-as-a-service app stores, generative communities of complementors are rather rare to come by. However, we expect that in the future B2B firms will develop new and more flexible ways to reduce search and transaction costs and increase generativity via their platform business models.

Platform architecture and platform governance (Rietveld & Schilling, 2021) are essential aspects of B2B platforms. Platform architecture determines the underlying design of the platform. A well-designed platform architecture can enhance security, trust, seamless integration between different actors, which are crucial factors for prospective participants in the B2B markets. Furthermore, the utilization of a platform architecture enables scalability and flexibility, as B2B platforms frequently entail complex and high-volume transactions. Platform governance is also a key feature of B2B platforms but also an extremely complex task. Effective platform governance is crucial in ensuring the smooth operation and efficiency of the platform, its ability to adapt to variations with the number of different complementors' solutions, the establishment of trust among actors, and fair and non-discriminatory practices.

Given the specific characteristics of B2B platform markets, including the presence of contractual and relational governance challenges, the high capital intensity of economic exchanges, and the limited scope, it is probable that these markets will not exhibit the winner-takes-all dynamics commonly observed in other platform markets (McIntyre, 2019; Ziegler et al., 2022). Furthermore, these markets may be more susceptible to fully similar competitive strategies and tactics employed by B2C firms (Karhu & Ritala, 2021; Karhu et al., 2020). However, further research is necessary to operationalize and examine the various types of B2B platform business models and strategies in greater detail.

Managerial Implications

B2B firms are grappling with the question of whether to adopt a platform mindset and open their boundaries to complementary players. One potential strategy is to establish a platform ecosystem model, in which customers can choose from a selection of complementary modules and functionalities. Alternatively, firms may choose to establish their own platform marketplace, which serves the needs of the entire industry or even beyond. These questions are both lucrative and challenging, and it is important for firms to carefully consider their options, opportunities, and challenges before making a decision to invest in platform business models.

Not all industrial firms are well-suited for a platform business model. For instance, firms that specialize in highly specialized technology components, which are always integrated and tailored to the customer's systems, may not draw substantial benefit from a platform model. Instead, these firms may be better suited to adopt a "component strategy" (Hannah & Eisenhardt, 2018) and focus on superior modular innovation with high technological novelty (Habib et al., 2020). However, even in these cases, the offerings may still become embedded in other actors' product-service platforms, making the platformization of the B2B landscape relevant even for component-focused players. In such cases, firms may focus on developing a strong complementor position within established platform ecosystems (Jacobides, 2022).

Firms that operate products that have embedded software or sensors, often referred to as "smart connected products" (Porter & Heppelmann, 2014; Raff et al., 2020), are particularly fitting for developing a platform business model. The data generated by these products is a valuable resource for complementary innovations and functionalities that can be provided by various complementors. These firms may include other technology firms, but more often than not, complementors from other industries such as large software firms or specialized software firms. A good way to start the platformization journey is to experiment with APIs and "sandboxes" that allow complementors and, for example, individual app developers to test the functionalities of their add-ons on the product portfolio. Depending on the need for quality control, firms may choose to keep a tight leash on which apps and complementors are allowed on the platform (Rietveld et al., 2019), or alternatively, move toward an app store model, where customers have a greater degree of freedom in choosing from a growing number of ecosystem-based "apps."

Finally, setting up a B2B marketplace is a complex task, but may be a worthwhile endeavor. B2B markets are often quite heterogeneous, and there is likely to be a great deal of variation among potential customers and providers. As such, there is a great deal of "fieldwork" that a platform market guardian must do. Additionally, as some recent major failure cases have shown (such as the closures of Vestas Covento and Maersk TradeLens), building and maintaining industry-wide B2B platforms can face significant competitive and operational hurdles. The less risky marketplaces may be those that can be operated on sufficiently standardized items, goods, materials, or resources, and which are sufficiently neutral to the marketplace participants' competitive strategies.

Conclusion

In this chapter, we have presented a typology that aims to convey the choices that B2B firms make when establishing a platform. The typology is based on the platform market structure and differentiates between product-service platformizers, platform ecosystem orchestrators, and platform market guardians. The three types involve distinct logics for creating and capturing value, as well as crafting platform governance and architecture. Our framework is a valuable contribution to the literature on digital business models and business model innovation, as it illustrates how B2B firms can transform and reconfigure their business models using digital platforms. Additionally, our work makes a significant contribution to the nascent field of B2B platforms, which has thus far been highly idiosyncratic and fragmented. We anticipate that future research will reveal additional types and forms of B2B platforms, beyond those we have described in this chapter. Nevertheless, we believe that our conceptualization provides useful initial steps for understanding how B2B firms can innovate and implement platform business models.

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5

The Catalytic Role of Sustainability Transitions for Business Models

Florian Lüdeke-Freund, Peter Wells, and Annabeth Aagaard

Introduction

This chapter examines the co-evolution of sustainability transitions and business models, highlighting how each can both promote and hinder change processes. It underscores the call for further research into the nexus of sustainability transitions and business models by various scholars (e.g. Bidmon & Knab, 2018; Boons et al., 2013; Köhler et al., 2019; Markard et al., 2020).

Socio-technical transitions is the analysis of the permeation and use of technologies in society, nowadays often stimulated by sustainability challenges, such as climate change, in a process whereby radical innovations

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emerge and conflict with existing paradigms and system characteristics (Markard et al., 2020). The subsequent discourse on sustainability transitions emphasizes a holistic, multifaceted, and system-wide approach to integrating environmental, social, and economic considerations, thereby challenging businesses to rethink their operations, business models, and stakeholder engagement strategies as well as their role in society. Thus, authors such as Schaltegger and colleagues (2016a) or Pinkse and colleagues (2023) argue that business models for sustainability require a paradigm shift in how businesses conceptualise and implement innovation processes, prioritising long-term resilience and adaptability over short-term gains. Consequently, sustainability transitions necessitate a continuous reconfiguration of business strategies, business models, and business operations. Embracing concepts and principles such as corporate social responsibility, resource efficiency, circular economy, regenerative business, or stakeholder capitalism may help put businesses on the right pathway or trajectory, but this is a journey that must be achieved at pace and ultimately may require alignment with an organisation of society and economy without economic and material growth as it is currently understood (e.g. Wells, 2016).

Bidmon and Knap (2018) highlight the multifaceted impact of business models on transition dynamics, illustrating their role as both facilitators and barriers to change within the socio-technical landscape. Firstly, they can reinforce the existing socio-technical regime, hindering transitions by bolstering current stability. Secondly, by acting as intermediaries, business models expedite transitions by aiding in the stabilisation and breakthrough of technological innovations. Lastly, as non-technological niche innovations, new business models contribute significantly to the emergence of new regimes, independent of technological advances.

Recently, there has been a growing interest in merging these two strands of research to explore how business models can serve as a catalyst for holistic, system-wide sustainability transitions (e.g. Bolton & Hannon, 2016; Foxon et al., 2015; Hannon, 2012; Hannon et al., 2013; Hernández-Chea et al, 2021; Loorbach et al., 2009; Wells, 2013). Traditionally rooted in distinct and diverse traditions, these realms of research and policy now find an opportunity to cross-pollinate and enrich each other (Aagaard et al., 2021). The goal is to foster a positive and mutually beneficial convergence of ideas, contributing in an exploratory manner to both the acceleration of sustainable transitions and the co-evolution of robust business models for sustainability. In practical terms, numerous companies actively explore strategies to effectively learn from and manage sustainability transitions by investigating the capabilities of emerging technologies, new business models, and new forms of collaboration. The goal is to secure and influence their competitive standing for the future (Berggren et al., 2015).

The significance of regenerative and circular business models, which extend product life cycles, optimise resource use, and minimise waste, aligns closely with business models designed for sustainability transitions (Konietzko et al., 2023). This congruence is critical for promoting practices that surpass mere sustainability in terms of doing less harm or maintaining the status quo, aiming instead for the restoration and rejuvenation of ecological and social systems (Hahn & Tampe, 2021). Moreover, the needed transition towards more ambitious goals in terms of regenerative or strong sustainability is accelerating the shift from linear value chains to value networks and multi-sided platforms, wherein collaboration among diverse stakeholders, including suppliers, customers, communities, NGOs, and even competitors, becomes a cornerstone for future viability (e.g. Blackburn et al., 2023). This perspective encourages businesses to leverage the collective capabilities and insights of their stakeholders to develop solutions that are not only economically viable but also socially equitable and environmentally benign (Pedersen et al., 2021).

In summary, this chapter aims to provide a comprehensive understanding of the mechanisms through which sustainability transitions are driving business model evolution and vice versa, offering insights into the strategies that pioneers in this field are employing to navigate the complexities of sustainable development. In this chapter we are guided by the overarching question of whether sustainability transitions at a societal level can spur the emergence of fundamentally different benign and adaptable business models (Aagaard et al., 2021; Geels & Ayoub, 2023), when the need to accelerate processes of change is paramount (Roberts & Geels, 2019). Conversely, this chapter also recognises that business models may, at times, contribute to transition failure, and influences from societal and systemic levels may hinder the development of more sustainable business models (Bidmon & Knab, 2018; Markard et al., 2023). While acknowledging the critical roles of customers, citizens, and users in collaborative value co-creation for sustainable business models (Pedersen et al., 2021), the chapter maintains a focus on sustainability transitions within a market and business context.

The chapter proceeds to explore sustainability transitions and business models as follows. First, the wider socio-technical transitions framework is explored, as it provides the overarching context within which sustainable transitions have emerged, utilising key concepts such as the Multi-Level Perspective and transition pathways. This is followed by a bridging section that has a focus on the significance of business for so-called deep transitions (Schot & Kanger, 2018) and multi-system confluence (Wells, 2023). Next, an account of business model innovation is presented where the "fit" to socio-technical transitions is considered. Here, it is argued that the key challenge in the analysis and design of business models is to determine whether they contribute to the acceleration of change, and to a significant extent of change, as implied in deep transitions. Three illustrations of business models "catalysed" by sustainability transitions are presented, which is followed by eight tentative principles to guide our thinking about how to approach business models in the context of sustainability from the perspective of business model design. A brief outlook on future research topics rounds up the chapter.

Socio-Technical Transitions: Multi-level Perspective and Transition Pathways

Sustainability transitions are a subset of socio-technical transitions research which acknowledges the profound, systemic, and enduring nature of more systemic changes of economy and society. This body of work traditionally focuses on the emergence and functionality of socio-technical systems, which may be considered as systems of provision for society, as evidenced, for example, by Bergek et al. (2008).

Building on this work, Markard et al. (2012) delineated four key frameworks for examining or guiding sustainability transitions: Multi-Level Perspective (MLP), Transition Management (TM), Strategic Niche Management (SNM), and Technological Innovation Systems (TIS). Specifically, the MLP is utilised to understand the dynamics of socio-technical transitions through the interplay among three levels: niches, regimes, and landscapes (Geels, 2002). The regime level is the core of the socio-technical system, comprised of inter-locking and co-evolutionary system elements including technologies, firms, markets, and institutionalised behaviours and practices. Below this regime level, niches may emerge in which non-mainstream innovations are initiated, for example in technologies, behaviours, or firms. Such niches may or may not eventually come to displace existing regime structures. At the level above the regime is the landscape which acts as a structuring force on multiple regimes. Landscape-level pressures may accumulate slowly over time or be experienced as sudden shocks. The MLP frames transitions as the result of synergies among developments across various strata, offering a comprehensive lens through which to analyse and categorise the complex dynamics of sustainability transitions (Geels, 2002, 2019). Thus, the MLP seeks to elucidate and theorise the mechanisms through which diverse constellations of stakeholders, resources, institutional frameworks, and regulatory norms concurrently engage across various strata to catalyse systemic transformations.

In the Multi-Level Perspective on transitions, four condensed pathways or trajectories can be summarised based on Geels and Schot (2007) and Geels (2019):

- *Dynamic equilibrium* where regime change is minimal, despite niche innovations. Established regime actors resist restructuring efforts from niche innovations, often reflecting a high degree of lock-in or path dependency.
- *Convergence* where niche experiments unify around a leading design, prompting systemic and regulatory shifts as this design gains acceptance among actors.

- *Disruption* where a significant innovation challenges the status quo, driven by external pressures and internal regime tensions, opening avenues for substantial change.
- *Transformation* where a new regime emerges, gradually phasing out the old system and establishing a fresh equilibrium, underpinned by the gradual buildup of pressures and the active involvement of regime members in adapting to or fostering competitive and socio-technical changes.

While these are regarded as the four main pathways of change, the transitions literature has little to say about the end point of change within any one system. Moreover, previously distinct socio-technical systems may converge, thereby creating the conditions for experimentation and innovation across the boundaries of these systems.

Sustainability Transitions, Deep Transitions, and Multi-system Confluence

Sustainability Transitions

Socio-technical transitions are not necessarily concerned with sustainability. Much of the early research in this area looked at historical cases where the transition has often been underpinned by fossil fuels and thus been profoundly unsustainable. However, the persistent challenges faced by contemporary societies highlight the need for an equally profound shift towards sustainability. More recently, research on transitions has predominantly focused on the prolonged transformation of socio-technical systems towards sustainability, aiming to meet fundamental human needs such as food, heating, and access to water (Markard et al., 2012; Smith et al., 2010). Accordingly, we define sustainability transitions, as "… fundamental changes in socio-technical systems … to address grand challenges in a way that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Markard et al., 2020, p. 1). Köhler et al. (2019)

underscore three key aspects of sustainability transitions. First, they highlight that transitions are multi-dimensional and co-evolutionary, citing complex interactions across technology, culture, policy, and markets that render these processes non-linear and interdependent. Second, they contend that the involvement of diverse social groups, including business, adds to this complexity, with each contributing unique resources and perspectives. Finally, research focuses on the balance between innovative practices like renewable energy provision and the persistence of established practices like fossil fuel use, illustrating the ongoing dynamics between change and stability.

Deep Transitions

An emergent thread of transitions research has been to delineate very enduring landscape features that act like meta-system rules of accepted behaviour and practice (Schot & Kanger, 2018). In the policy sphere, such landscape practices may emerge as institutional framings, such as the post-1945 funding of R&D by governments to stimulate economic growth, or the post-2000s emergence of sustainability as a legitimate goal for governments to pursue (Schot & Steinmueller, 2018). In this perspective, sustainability is comprised of multiple and not necessarily coherent elements acting to enable the societal embedding of new technologies and practices around themes such as zero carbon and circular economy. However, the ultimate deep transition would be the transformation of capitalism itself via something like degrowth principles. It follows that the ways in which economies are organised, businesses behave, and technologies are used contribute to and are shaped by deep transitions for sustainability.

Multi-system Confluence

Two key technology themes underpin the responses of business to sustainability pressures: electrification and digitisation (Björkdahl, 2020). In turn, these themes are also blurring previously distinct sector boundaries that used to form the core of socio-technical regimes via transformational business models (Ohlendorf et al., 2023). That is, there is a process of socio-technical system confluence (Wells, 2023), with businesses developing new ways of working within complex ecosystems of stakeholders (Andersen & Geels, 2023). In this respect, transformational business models, whether by new entrants or by incumbents—or indeed in combination—act to disrupt existing markets and create new ones (Chirumalla et al., 2024).

Just as these changes in the ways companies do business may be enacted to resolve existing sustainability challenges, as for example done by sustainability entrepreneurs (Sheldon & Lüdeke-Freund, 2023), they may also result in new contradictions that must be addressed in the future. The processes of sustainability transitions and business model evolution enabling such transitions are never complete, even where there is continuous improvement in an operational efficiency sense (Geels et al., 2023). Hence, there is a requirement for multiple phases of business model evolution both in response to competitors and to meet (new) sustainability challenges. Dynamic capability is therefore a central organisational competence arising out of the need to cope with sustainability transitions, which is then realised in concrete form as (sequential) business model evolution (Teece, 2007; van Loon et al., 2022).

Business Models in Socio-Technical Transitions

Recent scholarship, such as that by Köhler et al. (2019), has begun to recognise the significance of business models within the context of sustainability transitions. However, the critical question regarding how firms can derive benefit from engaging with and learning from business model evolution remains largely unanswered, as highlighted by Sengers et al. (2019).

The urgency of addressing global sustainability challenges, such as climate change, resource depletion, and social inequality, has catalysed the need for business models for sustainability transitions (BMfST) as a critical area of research and practice (Aagaard et al., 2021). However, the deep transitions perspective suggests that the measures of eco-efficiency widely adopted by business, while beneficial in the short term and from a single business perspective, may not achieve the required acceleration of the pace of change or be sufficiently radical. Multi-system confluence is similar to the sustainability deep transition in that it provides new opportunities for business, and business is potentially key in achieving confluence, but may fall short of radical or fundamental change. The key question is therefore *how do we know that the business models we observe today are on a pathway to radical and rapid socio-technical system change, i.e. that they are transformational?*

Business Models for Sustainability Transitions

In recent decades, considerable attention from both scholars and practitioners has been devoted to researching business models. Taking a business model perspective provides comprehensive insights into how organisations create, propose, deliver, and capture value, i.e. in the context of commercial organisations, they shed light on the business logic or the logic of value creation applied by companies (Massa et al., 2017; Wirtz et al., 2016; Zott et al., 2011). The subset of so-called sustainable business models (SBM), respectively business models for sustainability (BMfS), is distinctly different in concept and scope (e.g. Lüdeke-Freund & Dembek, 2017; Lüdeke-Freund et al., 2018; Schaltegger et al., 2016a, 2016b; Schneider & Clauß, 2020). Sustainable business models are designed to substantially enhance positive impacts or notably diminish negative impacts on the environment and society. This is typically achieved by altering how the company and its value network create, propose, deliver, and capture value, or by transforming their value propositions (Geissdoerfer et al., 2017). The focus of corresponding business models and their development (including processes of business model design, innovation, and evolution) can be on internal and external organisational structures and processes and/or offerings, i.e. products and services, with positive impacts on the natural environment, society, and economic outcomes (Kaipainen & Aarikka-Stenroos, 2022; Pinkse et al., 2023; Sheldon & Lüdeke-Freund, 2023).

While the currently most established lines of research on SBMs acknowledge the importance of going beyond a purely business-centric view and considering system-level impacts (e.g. Dembek et al., 2023; Lüdeke-Freund & Dembek, 2017), the focus remains largely on the level of single companies and sometimes networks (e.g. Aagaard, 2019; Aagaard & Ritzén, 2019; Bocken & Geradts, 2020; Mignon & Bankel, 2023). Business models for sustainability transitions are much wider in scope and emphasise industries and society at large with a focus on solving societal needs through sustainable production and consumption systems (Aagaard et al., 2021). Consequently, BMfST are seen as encompassing enduring, multifaceted, and essential processes of change, during which entrenched socio-technical systems evolve towards modes of production and consumption that are more sustainable (Markard et al., 2012). The current quest for business models for sustainability transitions is a response to currently dissatisfying developments in terms of globally increasing unsustainability, calling for fundamental changes at all levels and increased transition and transformation dynamics to significantly move beyond business-as-usual (Markard et al., 2020). This quest integrates two rapidly growing, but often disconnected fields of research: research on sustainable business models—which aims to advance sustainable modes of organisational value creation—and research on socio-technical and sustainability transitions—which aims to advance system-level changes and system-level sustainability (Aagaard et al., 2021; Bidmon & Knab, 2018).

Contemporary scholarly discourse highlights the pivotal role of companies and their business models in catalysing transitions towards sustainability (Köhler et al., 2019; Sarasini & Linder, 2018). Notwithstanding this acknowledgement, there is a noted deficiency in conceptual development at the micro-macro intersection. Specifically, there is a scarcity of studies concentrating on niche innovations and niche actors such as single firms and their partners, with the aim of comprehensively understanding the myriad of dynamic (inter)organisational activities (Binz & Truffer, 2017; Pinkse et al., 2023). This indicates important gaps in common theoretical frameworks regarding firms, particularly a lack of analysis from the macro-perspective provided by sustainability transitions (Bidmon & Knab, 2018). The intrinsic systemic characteristics of transitions towards sustainability necessitate the shaping of markets via engagements among diverse stakeholders, encompassing entities both within and external to established organisations and networks (Bankvall et al., 2017). Contrary to merely leveraging current technologies through innovative applications (e.g. Palo & Tähtinen, 2013), these transitions are propelled by significant innovations that possess the potential to exert long-term and disruptive impacts on prevailing socio-technical frameworks (Köhler et al., 2019). To foster in the development of BMfST, it is essential to take into account the contextual elements within production and consumption domains (Aagaard et al., 2021). As noted by Huijben et al. (2016) and Wesseling et al. (2020), these contextual factors exert a substantial impact on the potential for innovation on the level of single actors, companies, and business models. Furthermore, Massa et al. (2018) emphasise the importance of acknowledging the complex dynamics of subsystems within the overarching business model framework, particularly when adopting a sustainability transitions approach.

As discussed above, it is commonly recognised that transition processes encompass diverse pathways, frequently elucidated through singular case studies (e.g. Geels, 2019; Geels & Schot, 2007). Each act of business model design, innovation, and evolution constitutes an incremental data point within the broader context of socio-technical transitions, serving as a nuanced element within this complex narrative. These instances of change can either facilitate the emergence of new transition pathways or contribute to the perpetuation of existing structures, enabling incumbent entities to resist transformative change (Bidmon & Knab, 2018). Transition pathways thus emerge as environments that foster or are fostered by innovative and transformational business models, driven by disruptive technological advances, regulatory changes, and shifts in market dynamics. This reciprocal relationship illustrates how transition processes and business models are mutually constitutive, each shaping the opportunities and constraints of the other as indicated by the "spiral framework" in Fig. 5.1.

To enhance comprehension of the mechanisms behind propelling business models for sustainability transitions, we originally introduced the "spiral framework" (Aagaard et al., 2021). This framework was

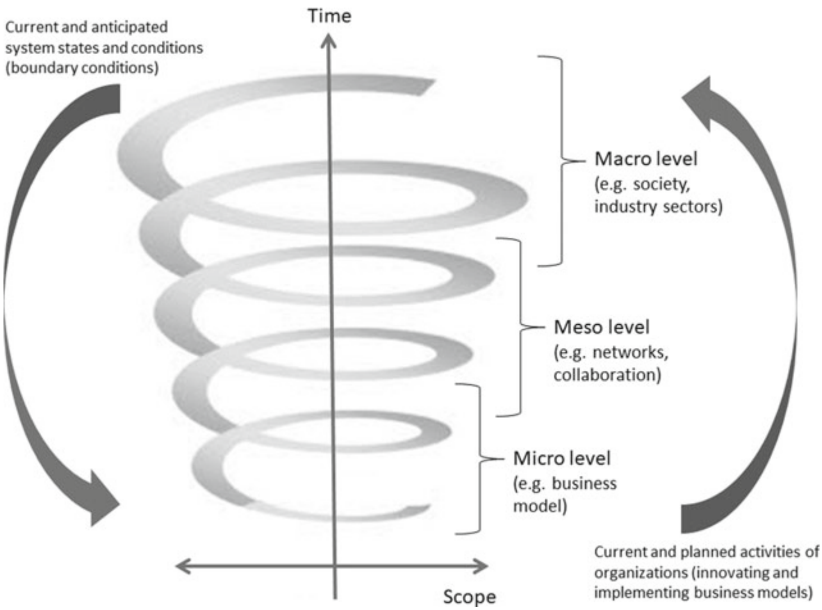

Fig. 5.1 The "spiral framework" connecting business models to sustainability transitions (*Source* Aagaard et al. [2021])

conceived in response to the complexities inherent in scrutinising business models within sustainability transitions. It integrates micro-, meso-, and macro-levels, accounts for temporal dynamics, investigates the scope of business activities, acknowledges the duality inherent in system structures and patterns of action, and it considers the influence and constraints associated with both business models and system-level conditions. In the following, we extend the "spiral framework" by illustrating some potential BMfST examples as well as the implications of facilitating business model design in sustainability transitions.

Three Illustrations of Business Models "Catalysed" by Sustainability Transitions

To begin our exploration of potential business models for sustainability transitions, we present some examples that represent three major categories of business models commonly discussed in the SBM field. These include so-called circular business models, platform business models, and service-oriented business models. These three categories are coming from a longer list of so-called sustainable business model patterns that were identified in prior research (Lüdeke-Freund et al., 2018, 2022, 2024). The following illustrations, adapted from Lüdeke-Freund et al. (2022), were chosen to illustrate that BMfST result from and bring about various changes across the micro-, meso-, and macro-levels as indicated by the "spiral framework".

Circular Business Models

Rizhao Economic and Technology Development Area (Yu et al., 2015)

Since its establishment in 1991, the Rizhao Economic and Technology Development Area (REDA) has been at the forefront of advancing the concept of a circular economy in China. Initially focused on achieving economic benefits through reductions in waste management costs and taxes, the initiative has since progressed to encompass the exchange of by-products and the utilisation of shared infrastructure. Recognised by the Chinese government as a model eco-industrial park for circular economy practices in the Rizhao region, REDA accommodates industrial companies spanning automotive and parts, pulp paper and printing, packaging, and cereal and oil food processing sectors. These companies actively participate in dozens of inter-firm by-product exchanges.

Kalundborg Symbiosis (Ecology Center, 2019)

In Denmark's Kalundborg, a renowned example of industrial symbiosis emerged in 1972. Originating from a desire among local industries to profit from exchanging by-products and adhering to new regulations, the network has expanded to include several private and public companies. Among them are Asnaes power station, Statoil A/S oil refinery, Gyproc Nordic East plasterboard producer, Novo Nordisk A/S pharmaceutical plant, the municipality, and waste company Kara/Noveren I/S. This collaborative effort involves around 20 material, water, waste, and energy exchanges, yielding ecological benefits by reducing raw material usage and waste while generating economic advantages through cost reduction in inputs and waste management.

Platform Business Models

Turo (Turo, 2021)

An exemplary instance of a platform that facilitates peer-to-peer (P2P) car-sharing is Turo (previously RelayRides). Through Turo's online platform, private car owners have the opportunity to rent out their vehicles, thus enhancing vehicle utilisation and generating income. Turo ensures insurance coverage for car owners and deducts a portion of their earnings for each rental.

FLOOW2 (FLOOW2, 2024)

The startup FLOOW2 operates a business-to-business (B2B) sharing marketplace catering to various industries. Companies can make use of FLOOW2's platform services to initiate sharing, swapping, renting out, or selling of their underutilised assets, materials, and services. FLOOW2 facilitates different types of sharing marketplaces. For instance, Dutch PharmaSwap serves as a specialised B2B sharing platform for pharmacists. It aids in redistributing pharmaceuticals nearing expiration among pharmacists, thereby preventing wastage and reducing costs for the Dutch healthcare system.

Service-Oriented Business Models

Tesla Solar Roof (Tesla, 2021)

Tesla, the US-based automobile manufacturer, not only specialises in electric vehicles but also aims to promote the adoption of solar photovoltaic (PV) systems among homeowners. This initiative aligns with their approach to charging electric cars. Their Solar Roof services include several enticing features: removal of old roofing, installation of a seamless solar PV roof, Over-the-Air updates for Tesla's solar converter, and a self-service app for energy monitoring. While customers may initially hesitate due to uncertainties about solar PV, Tesla assures a financially beneficial solution with reduced electricity costs and enhanced convenience through various services. Moreover, Tesla's energy storage technology, including the Powerwall, enables customers to establish a fully integrated energy infrastructure, encompassing their power needs, including vehicle charging.

Philips' "Pay-per-lux" (Ellen MacArthur Foundation, 2017)

Philips' "Pay-per-lux" model offers customers high-quality lighting solutions for large office buildings without the need for ownership or maintenance. Instead, Philips manages the entire lighting system lifecycle, from installation to disposal. This innovative service-oriented approach sells light as a service rather than a product, with businesses paying a regular fee for the light provided. This shift away from selling lightbulbs emphasises efficiency as Philips is incentivised to minimise resource usage in its lighting systems. The model follows principles of sustainable product design, while additional services such as take-back management and product upgrading further enhance resource efficiency.

Eight Tentative Principles of Designing Business Models for Sustainability Transitions

Sustainability transitions represent a new imperative that extends beyond individual organisational change and encompasses various types of micro-, meso-, and macro-level transformations. This approach advocates systemically scrutinising and realigning socio-technical modes of production and consumption, where sustainability principles catalyse structural shifts across entire economic systems. Sustainability transitions challenge businesses not only to adapt and innovate within their operations but also to drive and respond to shifts in market dynamics, regulatory landscapes, and societal expectations on a broader scale. By applying a multi-level perspective, sustainability transitions emphasise the interconnectedness of businesses within wider socio-technical systems, advocating for collaborative efforts that extend beyond traditional activity systems and industry boundaries to foster sustainable development on a systems level. This perspective is critical for achieving comprehensive and enduring impacts on sustainability, highlighting the role of business models in (re)shaping and adapting to the evolving contours of sustainability transition pathways.

The academic discourse surrounding BMfST is still premature but evolving, with scholars such as Stubbs (2017) and Bohnsack et al. (2021) providing critical insights into the complexity of redesigning business models. These transitions are recognised not only for their potential to mitigate environmental impacts but also for their capacity to foster economic and social value. The eight tentative principles of designing BMfST proposed below are meant to reflect and generalise some insights that can be found in this newly emerging field of research.

For instance, the call for systemic thinking and strategic vision is echoed in the works of Geels (2011) and Massa et al. (2018), who discuss the significance of applying a multi-level perspective in understanding socio-technical transitions on the one hand, and the systemic nature of business models on the other hand. And authors such as Waddock (2017) and Pedersen et al. (2021) add to this by emphasising cross-sector collaboration and partnerships and their transformative potential.

The role of innovation ecosystems and open innovation in driving business models for sustainability is a central theme in the works of Chesbrough and Bogers (2014), who advocate for the dismantling of traditional innovation silos in favour of more collaborative and open approaches. The necessity for long-term investments and innovative financing models is further elucidated by Clark et al. (2018), who explore the role of sustainable finance in supporting transitions towards sustainability.

The strategy of policy engagement and institutional change finds resonance in the contributions of Meadowcroft (2009), who examines the dynamics of political processes in enabling sustainability transitions. Societal engagement and transparency are fundamental to building the public trust necessary for sustainability transitions, a theme explored by Owen et al. (2012) in their analysis of responsible innovation practices as well as Norris (2024) from the perspective of dealing with information asymmetries between stakeholders and the importance of sustainable value communication.

Adaptive leadership and organisational agility are discussed as being crucial for navigating the uncertainties inherent in sustainability transitions. This theme is addressed by authors such as Uhl-Bien and Arena (2017), who propose a framework for adaptive leadership in complex environments. Lastly, the importance of sustainability metrics and impact assessment is highlighted by Dembek et al. (2023) and Fichter et al. (2023), who advocate for comprehensive frameworks to evaluate the sustainability effects of organisations, also with a view to the importance of time, respectively impact forecasting.

Taken together, these themes underscore the multifaceted and interconnected nature of the challenges and opportunities associated with sustainability transitions and corresponding business models. We have summarised these aspects as eight tentative principles which are nothing but a first attempt to structure our thinking about how to approach BMfST from the perspective of business model design.

1. Systemic thinking and strategic vision

Business model designers must adopt systemic thinking to understand and influence the complex interactions within socio-technical systems. This involves developing a strategic vision that aligns business objectives with societal sustainability goals, recognising the role of business in driving system-level change. Models that support new energy systems against incumbent systems, such as in the case of solar power services, are instances of such an approach.

2. Cross-sector collaboration and partnerships

The development of BMfST requires collaboration across industries, sectors, and disciplines to co-create solutions for sustainability transitions, as illustrated by the circular collaboration models in the REDA and Kolundborg cases. Business model designers should seek and foster partnerships across sectoral boundaries, for example with governments, NGOs, academia, or other industries to leverage collective resources, knowledge, and political influence.

3. Innovation ecosystems and open innovation for sustainability transitions

To accelerate sustainability transitions, business model designers should engage in and contribute to innovation ecosystems. This involves embracing open innovation approaches, sharing knowledge, and co-developing solutions with external partners, including startups, research institutions, and communities. Setting up ecosystems of diverse stakeholders that co-develop new models such as FLOOW2's open approach to developing multi-stakeholder illustrate this principle.

4. Long-term financing and revenue models

Financing BMfST necessitates long-term investment strategies that prioritise long-term system-level impact over immediate financial returns. Business model designers should explore and develop innovative financing models, such as impact investing, green bonds, crowdfunding, and public-private partnerships to secure the necessary capital for transformative projects. Alternative revenue models, such as service fees or time-based subscriptions as in the Philips case, can replace product sales-based revenues.

5. Policy engagement and institutional change

Actively engaging with policymakers and advocating for supportive regulatory frameworks is essential for enabling sustainability transitions. Business model designers have a role to play in lobbying for and even shaping policies that encourage transformational innovation and remove systemic barriers, contributing to institutional change. Although corporate lobbyism typically aims to block more challenging requirements, the political support for the right to repair shows that change in favour of alternative business models is possible.

6. Societal engagement and transparency

Building public trust and societal support for sustainability transitions requires transparent communication and active engagement with the wider community. Business model designers should communicate the societal benefits of their BMfST, involve citizens in co-creation processes, and demonstrate accountability in their sustainability efforts to build acceptance and legitimacy for their alternative ways of doing business. Current research deals with the importance particularly of transparency and communication about companies' ways of creating value.

7. Adaptive leadership and organisational agility

Leading the development, implementation, and continuous adjustment of BMfST requires adaptive leadership capable of navigating uncertainty as well as fostering an organisational culture of agility, resilience, and continuous learning. Business model designers must empower teams, encourage experimentation, and be prepared to pivot their strategies in response to emerging sustainability challenges and opportunities as well as changes in political and public support.

8. Sustainability metrics and impact assessment

To guide and evaluate the progress of sustainability transitions, business model designers must develop and utilise comprehensive sustainability metrics and impact assessment tools. These should measure not only environmental and social impacts but also the contribution to systemic change and the achievement of sustainability goals at the societal level. Crucial is the ability to assess company-level performance and outputs, stakeholder-level outcomes and value creation, and system-level impacts as well as to anticipate future effects of present business model designs.

These tentative principles are meant to point to the need for a transformative approach to business model design, emphasising systemic change, cross-sectoral collaboration, and a deep commitment to societal sustainability goals. Business model developers can play a pivotal role in steering their companies and industries towards a more sustainable future, requiring a profound rethinking of traditional business practices, the meaning of value and value creation, and a dedicated effort to drive and govern the complex processes of sustainability transitions (Aagaard et al., 2021). In summary, driving and governing business models for sustainability transitions demands a holistic approach that integrates sustainability deeply into strategic planning, operational practices, and organisational culture. Business model developers play a crucial role in leading these transformations, requiring a blend of visionary leadership, strategic foresight, and operational excellence to navigate the complexities of following and supporting sustainability transition pathways.

Outlook

The field of business models for sustainability transitions (BMfST) has witnessed initial growth, yet critical gaps persist, impeding a comprehensive understanding and implementation of transformative business practices. We briefly outline a future research agenda and delineate key areas for academic inquiry to advance our understanding of BMfST. Through sector-specific analyses, exploration of the role of digital technology, investigation into systemic sustainability transitions, and examination of socio-political dimensions, this agenda seeks to deepen scholarly insights and inform practical strategies for fostering sustainability transitions.

1. *Sector-specific dynamics:* While existing research offers a broad understanding of BMfST, there is a dearth of sector-specific studies that account for unique industry challenges, opportunities, and regulatory landscapes. Investigating these nuances can provide actionable insights for practitioners and policymakers seeking to foster sustainability transitions within specific sectors.
2. *Role of digital technologies:* Digitalisation holds immense potential to support sustainable business practices, yet comprehensive research on the specific technologies enabling BMfST is lacking. By examining how technologies such as blockchain, IoT, and AI can facilitate sustainable business model design, implementation, and scaling, scholars can uncover opportunities and challenges in leveraging digital tools for sustainability.
3. *Interplay between business model design and systemic transitions:* While business models play a pivotal role in driving systemic sustainability transitions, the mechanisms through which micro-level innovations aggregate to influence macro-level outcomes remain poorly understood. Investigating this interplay can inform the development of theories elucidating the relationship between business model design and systemic sustainability transitions.
4. *Socio-political dimensions:* The socio-political context profoundly influences the development and adoption of sustainable business models, yet this dimension is often overlooked in existing literature. Understanding how power dynamics, institutional structures, and policy frameworks shape the landscape of BMfST is crucial for crafting effective strategies to overcome barriers to sustainability transitions.

Addressing these research agendas requires interdisciplinary approaches and collaboration across various fields. By delving into sector-specific dynamics, exploring the role of digital technologies, understanding the interplay between business model design and systemic transitions, and considering socio-political dimensions, scholars can contribute to a deeper, more nuanced understanding of BMfST, ultimately advancing sustainability goals and informing practical interventions.

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6

Effective Mission Integration: A Triple Bottom Line Canvas for Impact Business Model Innovation

Erkko Autio and Llewellyn D. W. Thomas

Introduction

Firms increasingly seek to deliver a social and environmental impact in addition to pursuing financial performance (Bocken et al., 2014; Geissdoerfer et al., 2018; Lüdeke-Freund et al., 2018). For instance, Lego, the world's largest toy manufacturer, has invested $150 million to develop sustainable materials for its products and packaging, aiming to replace plastic by 2030. While this focus can seem idealistic where purpose is prioritized over profit, it has been shown by both experience and research that firms can 'do well by doing good' (Kramer & Pfitzer, 2022; McNulty, 2013). For instance, IKEA, the world's largest furniture retailer, has launched a buy-back scheme that allows customers to

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sell their old furniture back to the company, which then resells or recycles it. Similarly, Adidas, the global sportswear brand, has partnered with Parley for the Oceans to create shoes and apparel from recycled plastic waste collected from the oceans. Both these examples have been highly successful both from a financial and social and environmental impact perspectives.

Integral to 'doing well by doing good' are *impact business models* which enable firms to 'incorporate a triple bottom line approach and consider a wide range of stakeholder interests, including environment and society' (Bocken et al., 2014, p. 42). We follow Geissdoerfer et al. (2018, p. 407) and define an *impact business model innovation* as the 'conceptualisation and implementation of an impact business model'. There are a wide range of potential impact business model innovations given the scale of the environmental and social challenges (Ferasso et al., 2020), although they all feature the ability to deliver superior customer value propositions while resolving resource issues and combatting the dominant linear 'take-make-dispose' business model (Bocken et al., 2016). Bocken et al. (2014) have identified eight major types of impact business model innovations: those that maximize material and energy efficiency; create value from 'waste'; substitute with renewables and natural processes; deliver functionality rather than ownership; adopt a stewardship role; encourage sufficiency; re-purpose the business for society and the environment; and develop scale-up solutions.

While such impact business model innovations are valuable, most impact business models still exhibit relatively low levels of ambition, merely seeking to 'do less harm' rather than deliver a lasting positive impact by 'building a better future'. To 'build a better future', firms need to be encouraged to integrate more ambitious social and environmental impact missions into their profit missions, and easy-to-use and compelling tools are required to facilitate the explicit definition and integration of social and environmental impact missions with the firm's profit mission. Perhaps the best-known business model design tool is that of Osterwalder and Pigneur (2010). Known as the 'Business Model Canvas' (hereafter BMC), this canvas is composed of nine components that collectively describe the creation and delivery of the firm's value proposition and the capture of value from this process. However, the

BMC was developed for for-profit businesses, with no consideration for the social or environmental impact.

Some scholars have introduced business model canvases that integrate environmental and social aspects (Joyce & Paquin, 2016; Upward, 2013; Wit & Pylak, 2020). For example, Upward (2013) explored sustainable business models through a systemic design science approach, and identified what is required for a meaningful sustainable business model canvas. Joyce and Paquin (2016) and Wit and Pylak (2020) developed sustainable business model canvases that layered social and environmental aspects onto the original BMC, focusing on the customer, functional, and social value delivered. In doing so these canvases introduced important social and environmental components to the BMC, but did not provide a systemic means of integrating the social and environmental mission with the profit mission beyond a subsequent vertical coherence analysis.

This is an important gap, since both research and practice have shown that firms can find it difficult to integrate environmental and social impact missions with their profit mission, with the discouraging outcome that the adoption of impact missions tends to suppress firm financial performance (Santos et al., 2015). For instance, H&M, the global fashion retailer, has faced challenges in implementing circular initiatives, such as collecting and recycling used garments, as the firm's core business model contradicts its circular ambitions, resulting in increased costs and reduced profit margins. Furthermore, they also face the risk of reputational damage due to accusations of 'greenwashing' and 'social washing' (de Freitas Netto et al., 2020; Du, 2015; Yang et al., 2020). As another example, Wheat Thins, the American snack brand, was mocked for launching a campaign to support the fight against Lyme disease, as this move was interpreted as a cynical attempt to exploit a social cause and divert attention from the negative health impacts of its products.

Examples such as H&M and Wheat Thins illustrate the difficulty of reconciling environmental and social sustainability missions with the firm's profit mission—a dilemma elaborated by Santos et al. (2015). Yet, the only truly sustainable business model is one where the impact and profit missions live in harmony and reinforce one another instead of cannibalizing one another. To help facilitate the design of truly sustainable business models, we introduce and illustrate a tool developed for this purpose, the 'Triple Bottom Line Canvas' (TBLC). By providing an effective tool that assists firms in integrating their social and environmental missions with their profit mission, we believe that our TBLC canvas has the potential to be a game changer by assisting and supporting firms both to 'do less harm' as well as 'build a better future' (see Fig. 6.1).

The Triple Bottom Line Canvas

Designed by the first author, the Triple Bottom Line Canvas (TBLC) builds upon and extends the original BMC of Osterwalder and Pigneur (2010) and has drawn inspiration from many sources, including Anthony Upward's Flourishing Business Canvas.[1] The TBLC differs from previous canvases (e.g., Joyce & Paquin, 2016; Wit & Pylak, 2020) by adopting an explicit design approach that emphasizes mission integration and synergy creation across profit and impact missions, rather than enabling independent analyses of social, environmental, and profit business models. Instead, the TBLC was designed to support the articulation of explicit social and environmental impact missions in the firm's business model and facilitate their integration with the firm's profit mission. This means that the three missions can be considered simultaneously on the same canvas, rather than through a later analysis that moves between different layers (cf. Joyce & Paquin, 2016; Wit & Pylak, 2020).

As such, the TBLC is designed to make environmental and social impact missions explicit in the design of the firm's business model. Three general principles have guided this design. First, TBLC subscribes to the principle that given today's pressing global challenges, no business can afford to focus purely on its profit mission without any consideration of its environmental or social footprint. Planning tools are required that support the shift from an exclusive shareholder profit maximizing approach toward a stakeholder approach that includes also social

[1] See https://flourishingbusiness.org/download-flourishing-business-canvas/.

Key Partners (Profit) Who do you work with to deliver your customer value proposition? What activities and resources do they deliver?	**Key Activities (Profit)** What core activities do you perform yourself to create and deliver the value proposition? **Key Resources (Profit)** What resources do our value propositions require?	**Customer Value Proposition** What jobs do you perform for your customers? What pains do you alleviate? What gains do you contribute?	**Customer Relationships** What kind of relationship do you establish with each customer group? **Customer Channels** How do you reach your customers?	**Customer Groups** Which customer groups do you service?
Key Partners (Social) Who are your social mission partners?	**Key Activities (Social)** Which activities do you perform to deliver your social impact mission? These can overlap with the key activities for our profit mission. **Key Resources (Social)** What internal resources are required for your social impact mission? List resources that are extra to your profit mission!	**Social Impact Mission** What is your social impact mission? How do you improve people's lives and the general societal well-being beyond your profit mission?	**Community Relationships** What relationships do you maintain with the beneficiaries of your social impact mission? **Social Impact Channels** What are the channels and activities through which you deliver your social impact mission?	**Community Stakeholders** Who benefits from your social impact mission? Note that your business may have direct beneficiaries and secondary ones.
Key Partners (Environmental) Who are your partners for your environmental impact mission?	**Key Activities (Environmental)** Which activities do you perform to deliver your environmental impact mission? **Key Resources (Environmental)** What internal resources are required for your environmental impact mission? List resources that are extra to your profit mission!	**Environmental Impact Mission** What is your environmental impact mission? How do you deliver a positive impact on the natural environment?	**Ecosystem Relationships** What relationships do you maintain with your ecosystem stakeholders? **Ecosystem Impact Channels** Through which channels and mechanisms do you deliver your ecological impact?	**Ecosystem Beneficiaries** Who are your ecosystem beneficiaries?

Cost Structure What is the cost structure of your business? Also elaborate costs associated with your social and environmental impact missions.	**Mission Integration** How do you ensure mission integration and prevent mission drift?	**Surplus Streams** How do you generate surpluses to support your social and ecological impact missions?	**Revenue Streams** How does your business generate revenue?

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Fig. 6.1 Triple Bottom Line Canvas

and environmental stakeholders among the stakeholder groups that the business seeks to benefit (Freeman & Velamuri, 2021).

Second, TBLC subscribes to the principle that the firm's impact missions do not necessarily need to conflict with its profit mission. On the contrary, by making these missions and their delivery mechanisms explicit, we hope that the TBLC will support the design of strongly sustainable business models where the social and environmental impact missions are well integrated with the firm's profit mission (Santos et al., 2015). This way, the TBLC should help maximize synergies between the three missions and convert the impact missions from profit drags (where the impact missions suppress profit margins) into profit drivers (where the impact missions help drive profit margins).

Third, we adhere to the principle that to be truly sustainable environmentally and socially, the business must make a profit. Only a profitable operation can deliver its social and environmental impact missions on a long-term basis. Although there are many businesses whose continuity is guaranteed by charitable donations, for such businesses to scale their impact, they first need to secure further donations, a requirement which inevitably constrains their ability to scale. In contrast, if the business succeeds in converting its impact missions into profit drivers, this constraint is removed, and the impact missions become automatically scalable. Therefore, we conjecture that to create a truly sustainable and scalable impact, impact entrepreneurs must pay particularly close attention to their profit mission.

To integrate the social and environmental missions with the profit mission, the TBLC adds four elements to the conventional BMC of Osterwalder and Pigneur (2010) (see Fig. 6.1). First, it adds an *Environmental Impact Mission* to complement the for-profit mission of the business. This mission defines how the business reduces the environmental footprint of its own operations or that of its industry, and how the business helps repair damage caused by others. Like BMC, TBLC defines key partners to its environmental impact mission, its key activities, key resources, ecosystem beneficiaries, ecosystem relationships, and ecosystem impact channels.

Second, it adds a *Social Impact Mission* that defines how the business helps improve people's lives and how it contributes to different social and societal stakeholders and the communities they operate in. For this mission, too, TBLC defines key partners for the social impact mission, key activities, key resources, community stakeholders, community relationships, and social impact channels.

Third, the TBL canvas adds *Surplus Streams*, which defines how the business creates surpluses to support its environmental and social impact missions. Surplus streams may be financial, such as extra profit margins made possible by higher customer willingness-to-pay (WTP) for environmentally sustainable products, and non-financial, such as recovered raw materials for recycling or repaired used products for reuse.

Finally, the TBLC adds *Mission Integration*, which describes how the company ensures continued focus on its environmental and social impact missions alongside with its profit mission. This component consists of the governance structures and procedures that ensure that these impact propositions are appropriately incorporated in the corporate decision-making processes. Mission integration mechanisms include, for example, dedicated seats in the company board earmarked for representatives of environmental and social stakeholders, incentive structures rewarding social and environmental impact generation, corporate status enshrining social and environmental impact missions, and recruitment practices that emphasize commitment to social and environmental impact generation.

To illustrate our TBLC, we use two cases.[2] The first is Patagonia, a well-known outdoors apparel and garment company that produces high-quality environmentally friendly garments that command a significant price premium over competition (see Fig. 6.2). Patagonia's environmental impact mission not only entails donating to environmental causes and reducing the impact of its own production through sustainable and circular initiatives, as Patagonia is also seeking to facilitate an industry-wide impact by openly sharing sustainable practices, technologies, and materials it has developed to promote sustainable practices within the

[2] Creating these case examples, we have used case studies, newspaper articles, YouTube videos, and other publicly available sources to collect information describing the sustainability practices of Patagonia and Riversimple. As the case materials date back to different years, our case illustrations do not necessarily accurately reflect the companies' current practice. Therefore, the case studies should be taken as exemplary only, designed to illustrate the TBLC framework rather than the companies' current business practice.

garment industry more widely. Patagonia's strong reputation as an environmental sustainability leader is synergistic with its profit mission, as it increases customer willingness-to-pay and enables Patagonia to maintain substantially larger profit margins than its competitors, thereby allowing the company to keep developing and investing in sustainable technologies, practices, and raw materials. Thus, Patagonia provides an example of a company where the environmental and social impact missions operate as profit drivers and not as profit drags.

Riversimple, our second case, was founded in 2001 by Hugo Spowers (see Fig. 6.3). Riversimple designs and manufactures hydrogen-powered fuel cell electric vehicles. Riversimple's environmental mission is to reduce the environmental impact of personal transport, by promoting hydrogen as the primary energy source powering automobiles. Riversimple does this by developing a hydrogen-powered card and its supporting (fueling) infrastructure to demonstrate the viability of the concept and the superiority of hydrogen-powered cars over electric vehicles from an environmental sustainability perspective. Its entire business model has been optimized for minimizing negative environmental and social externality, under a 'whole system design' philosophy. Under this philosophy, Riversimple does not sell its cars but leases them, retaining ownership of the vehicle and associated end-of-life responsibilities. It also uses innovative 'materials as a service' model, under which many parts of the car, such as the hydrogen fuel cells, are similarly leased by Riversimple from the fuel cell manufacturer, who retains ownership. To ensure that Riversimple does not lose sight of its environmental impact mission, it has implemented a governance structure that features six 'custodians' to represent the interests of Riversimple's various stakeholders including the local community and the natural environment.

Value Offering

In the original BMC, the value offering section describes the key resources, activities, and partnerships that the company leverages to create its value proposition (Osterwalder & Pigneur, 2010). In addition

Key Partners (Profit) Gore-Tex R&D collaborations Sustainable brands Beyond Surface Technologies	**Key Activities (Profit)** Apparel design, manufacturing, sales R&D Marketing, branding **Key Resources (Profit)** Minimalist, durable product designs Utility patents, design patents, brand Dedicated & committed workforce	**Customer Value Proposition** We supply well-designed garments and apparel for outdoor activities adhering to triple bottom line principles.	**Customer Relationships** Customer commitment End-to-end approach to product life Extended relationship beyond transaction to a lifecycle approach **Customer Channels** Outlets, online retail, re-use program	**Customer Groups** Outdoors enthusiasts Environmentally, socially conscious High income, educated, liberal City dweller 25 — 55 years old
Key Partners (Social) Fair Trade Fair Factories Clearinghouse Fair Labor Association	**Key Activities (Social)** Supplier check-ups & advisory, social campaigns, good employer practices **Key Resources (Social)** Environmental, social activism knowledge base 1% for the planet commitment	**Social Impact Mission** We promote fair trade practices, pioneer good employer practices, train our suppliers, and adopt a social stakeholder perspective in our business governance	**Community Relationships** Active participation in supplier communities, supplier training **Social Impact Channels** Fair Trade (worker empowerment, living wages, fair trade sewing) Employee activism, campaigns	**Social Impact Beneficiaries** Suppliers Employees Suppliers' employees Targeted communities
Key Partners (Environmental) Sustainable Apparel Coalition OIA ECO working group The Conservation Alliance Textile Exchange Influencer partnerships	**Key Activities (Environmental)** Reduce, repair, reuse, recycle, rematerialize Sustainability R&D, product design Marketing campaigns **Key Resources (Environmental)** Utility patents, sustainablity knowhow, repair centers, brand reputation	**Environmental Impact Mission** We develop and apply sustainable practices in our products and operations. We help transform the apparel industry by acting as a role model and developing and sharing sustainable practices and technologies with our peers	**Ecosystem Relationships** Active contact with targeted regions and ecosystems Environmental campaigning **Ecosystem Impact Channels** Ecosystem campaigns Supply chain activities (closed loop) Sustainable industry practices	**Ecosystem Beneficiaries** Targeted ecosystems Biophysical resource stocks Water Land Atmosphere
Cost Structure Higher costs from R&D, materials, field testing, supplier vetting and training, smaller mftg patches, sustainable fabrics, social and environmental campaigns Savings from marketing, low employee turnover	**Mission Integration** Company values, hiring practices Alliance memberships Campagning sabbaticals, bail funds Patagonia 'owned' by the Planet	**Surplus Streams** 1% for the Planet Impact missions drive brand value, helping generate surplus for environmental and social missions	**Revenue Streams** Patagonia price premium some 20% relative to similar peers	

Fig. 6.2 Triple Bottom Line Canvas for Patagonia

Key Partners (Profit) JSR Micro, SDC Design ,KS Composites, Hydrogenics ,Cadonix, Svcon, Embed, Sagelok, Vectayn, Michelin, Printed Motor Works, Innovate UK, Manchester University, Welsh Automotive Forum, Sharein	**Key Activities (Profit)** R&D, collaborative R&D to develop a hydrogen-powered car concept Open source development & design **Key Resources (Profit)** Utility patents, design patents Human resources Brand, reputation Customer sign-ups	**Customer Value Proposition** Hydrogen powered personal mobility service at zero cost to the planet within a 30-mile radius	**Customer Relationships** Mobility as a service Interaction with customers through car interface or web Aftersales care and support **Customer Channels** Crowdfunding Word of mouth Publicity Website	**Customer Groups** Green car buyers and users Local authorities Small commercial fleets Car clubs
Key Partners (Social) No dedicated partners for social impact mission	**Key Activities (Social)** No additional activities required for social impact mission **Key Resources (Social)** No additional resources required for social impact mission	**Social Impact Mission** Elimination of the environmental impact of personal transport	**Community Relationships** Through Custodians **Social Impact Channels** Improved livability in localities	**Community Stakeholders** Local communities (cities) Users Neighbors Staff
Key Partners (Environmental) No dedicated partners for environmental impact mission	**Key Activities (Environmental)** No additional activities required for environmental impact mission **Key Resources (Environmental)** No additional activities required for environmental impact mission	**Environmental Impact Mission** Mobility at zero cost to the Planet Make hydrogen car design available as open source for others to adopt	**Ecosystem Relationships** Through Custodians **Ecosystem Impact Channels** Reduced resource consumption Shift away from fossil fuels	**Ecosystem Beneficiaries** Ecosphere Atmosphere Biophysical stocks

Cost Structure R&D, testing, demonstrations Materials as service fees Manufacturing Servicing	**Mission Integration** Board of custodians (environment, users, neighbors, staff, investors, commercial partners)	**Surplus Streams** Enhanced customer willingness-to-pay Government grants, subsidies	**Revenue Streams** Current: Grants, crowdfunding Envisioned: MaaS service fees (cover car, fuel, service) Sale of service model (not sale of car)

Fig. 6.3 Triple Bottom Line Canvas for Riversimple

to the profit mission, the TBLC adds to this section the key activities, resources, and partnerships the company harnesses for its social and environmental impact missions. The degree to which these are separate depends upon the overlap between the company's profit mission and its impact mission(s) (Santos et al., 2015). If the company's profit mission directly drives its social and environmental impact, in the sense that the company's customers are also impact beneficiaries and no extra activities are usually required for the impact to materialize, no additional activities, resources, and partnerships are required for impact delivery. This would be the case of Riversimple, for example.

However, if the intended impact does not materialize automatically (say, when Patagonia needs to collect used garment for repair, reuse, and recycling), then the firm needs to harness additional resources, activities, and partnerships. Similarly, if the customers of the business are not the same as impact beneficiaries (as would be the case for the natural ecosystems targeted by Patagonia's environmental campaigns), additional activities, resources, and partnerships may be required. The more additional activities and resources are required for the impact missions, the more complex the governance challenge tends to become, and the closer attention needs to be paid to the generation of surplus streams and mission integration.

Customer Value Proposition

The customer value proposition component builds upon the Jobs-to-be-Done framework by Christensen et al. (2016). In this approach, the 'job' is shorthand for what the customer seeks to 'get done', to accomplish in any given circumstance. As per Osterwalder et al.'s value proposition canvas (2014), the value proposition is defined on the basis of the job itself and related 'pains' and 'gains'. Here, 'pains' relate to alternative, existing ways of getting the customer job done. For example, Uber's personal mobility value proposition would compare against inconveniences and difficulties in using alternative mobility services such as public transport, conventional taxi services, or, say, cycling. A 'pain' in personal mobility service could be, for example, slow and infrequent public transport service or an unreliable taxi service. 'Gains', on the other hand, would describe features of the company's value proposition that the customer did not necessarily set out to accomplish at the outset, but which nevertheless add value to the customer experience. An example would be the 'estimated time of arrival' (ETA) feature of the Uber application, which allows the user to send an ETA estimate of their travel. Although such a feature is not part of the core job to be done, it will delight the user nevertheless.

The pains and gains depend on the context where the job is to be done. The gains are never simply about function, as they can have powerful social and emotional dimensions. An important aspect of the 'job' is that it is solution agnostic, and it is important to understand what makes the focal value proposition distinctive relative to others. In the case of Patagonia, the value proposition is focused on well-designed garments and apparel for outdoor activities produced in a socially and environmentally sustainable fashion and adhering to triple bottom line principles (Reinhardt et al., 2010). Patagonia's product offerings are distinguished by their responsible, life-cycle approach and their commitment to repair and recycle products no longer used by the customer. In contrast, Riversimple's value proposition is focused on an ecologically sustainable personal transport as an all-inclusive service (hydrogen-powered car, fuel, and service) under which Riversimple assumes end-of-life responsibilities for its cars and their constituent components (Wells, 2018).

In both cases, the environmentally conscious value offerings enable the firms to charge a price premium over similar offerings that do not emphasize environmental and social sustainability. In the case of Patagonia, this price premium can be up to one-third relative to similar brands that do not emphasize sustainability. In the case of Riversimple, it has a long waiting list of prospective customers who want to subscribe to a sustainable personal mobility solution. This price premium allows both companies to continue advancing environmentally and socially sustainable practices without sacrificing profit.

Social Impact Mission

This component considers the social impact mission of the business and describes how the organization intends to make the world a better place for its social and societal stakeholders. Such stakeholders may be both external and independent of the business (e.g., socially disadvantaged demographics and communities) and internal ones (e.g., employees and suppliers). As part of documenting the social impact mission, it is necessary to understand how the firm demonstrates good citizenship, contributes to the local community, and improves people's lives and the general societal well-being beyond the core business mission. In the case of Patagonia, they advance socially sustainable business by promoting fair trade practices and applying a social stakeholder perspective in their business governance. Internally, Patagonia has been a pioneer in introducing socially beneficial employer practices such as subsidized healthcare at or near its office location and generous maternity and paternity leave (Reinhardt et al., 2010). Patagonia has also pioneered practices to improve the well-being of its suppliers through various certification arrangements. In the case of Riversimple, social impact is mainly delivered at the level of local communities and flows directly from its business mission, as its personal mobility solution helps reduce pollution and noise caused by conventional automobiles (Wells, 2018).

Environmental Impact Mission

The environmental impact mission describes how the business delivers a positive impact on the natural environment, either by reducing negative footprint or by helping restore and regenerate environmental damage already caused. An environmental impact can be delivered in many ways: first, by reducing negative externality caused by the firm's internal operations (e.g., materials use, energy use, and so on); second, by helping reduce the negative externality generated by industry participants more widely (e.g., through the introduction and dissemination of environmentally more sustainable raw materials and practices); and third, by helping reduce and repair damage already caused through non-business activities such as campaigns, restoration projects, charitable donations, tree planting, and similar. Patagonia actively seeks to mitigate the environmental footprint of its own operations, to minimize the negative footprint caused by its products, to influence garment industry practices more widely, and to conduct environmental campaigns that seek to ameliorate the state of specific targeted ecosystems. Examples of Patagonia activities include investing in R&D to develop more environmentally friendly materials and chemicals (e.g., dyes, organic cotton) and openly sharing these with competitors to promote the adoption of sustainable solutions within the garment industry (Reinhardt et al., 2010). Patagonia also conducts active marketing campaigns to promote environmental awareness in specific ecosystems and also more widely. It has also set up a foundation to donate grants for environmental causes, and it offers its employees leave to participate in environmental campaigns. In the case of Riversimple, its profit mission directly supports its environmental mission of providing mobility at zero cost to the planet.

Key Partners (Profit Mission)

The key partners component describes who the business works with to create and deliver its value proposition. As noted above, the extent to which extra partners are required for the social and environmental impact missions depends on how closely the firm's profit mission drives its social and environmental impact missions. For the profit mission, Patagonia partners or has partnered with numerous stakeholders, mostly for R&D purposes. Patagonia's technology partners include Gore-Tex and Beyond Surface Technologies. In comparison, Riversimple's profit mission partnerships are considerably more extensive. This is because Riversimple's mission is to help develop, in essence, a new paradigm of personal mobility that is powered by hydrogen. This being a technology-intensive mission that requires the development of hydrogen-based power sources for vehicles, as well as supporting infrastructure, Riversimple has maintained an extensive network of technology partners, with composite materials developers, fuel cell developers, tire manufacturers, and more (Anonymous, 2016).

Key Activities (Profit Mission)

The key activities for the profit mission component is essentially the same as the BMC and describes what the business does by itself to deliver the customer value proposition. For Patagonia, this involves apparel design, apparel manufacturing, R&D, sales, and marketing and branding activities. For Riversimple, for-profit activities include R&D, R&D collaborations, component outsourcing, assembly, and servicing activities.

Key Resources (Profit Mission)

The key resources component for the profit mission is also the same as the BMC equivalent component, and it describes the tangible, intangible, and financial resources the business draws upon to deliver the value proposition. For Patagonia, key resources include Patagonia relies upon their minimalist durable product design capabilities, their business premises including retail outlets and offices, their intellectual property, and their dedicated and committed workforce (Reinhardt et al., 2010). For Riversimple, their key resources include their intellectual property, their car designs and brand, their R&D center and their customer sign-ups, as they have a waiting list of customers waiting for regional releases of the vehicle (Wells, 2018).

Key Partners (Social Mission)

The key partners for social impact mission box describes any additional partners required to create and deliver the social impact. Extra partners may be required particularly if the company's profit mission does not directly drive social impact for its customer groups. In the case of Patagonia, social impact is materialized mainly among its own and its suppliers' employees and local communities. To create and deliver social impact, Patagonia has chosen to work with certification, training, and social advocacy organizations such as Fair Trade, Fair Factories Clearinghouse, and Fair Labor Association (Reinhardt et al., 2010). For its part, Riversimple does not partner with external organizations for social impact delivery, as its social impact is directly driven by its profit mission.

Key Activities (Social Mission)

The key activities for the social mission list any activities that the company undertakes, above and beyond its profit mission, to deliver its social impact mission. Additional activities may be required when the beneficiaries of the company's social mission are different from the customers of its profit mission, or when the company's profit mission does not directly deliver its social impact, or both. In the case of Patagonia, such activities include supplier check-ups for their labor practices, advisory and training activities to help suppliers upgrade their labor practices, social impact campaigns, and the adoption of pioneering employer practices to set an example for others (Reinhardt et al., 2010). All these activities help amplify the social impact of Patagonia's business activities but are not, as such, strictly required for its profit mission. As for Riversimple, the social impact of its operations is a direct outcome of its profit mission—namely, elimination of the environmental impact of personal transport in local communities.

Key Resources (Social Mission)

The key resources for social mission list resources that the company harnesses to help materialize its social impact in situations where the key resources for the company's profit mission alone do not suffice. In the case of Patagonia, key resources supporting its social impact mission are its knowledge base for environmental and social activism and its commitment to donate 1% of its profits to the planet (Reinhardt et al., 2010). This commitment supports Patagonia's fund that provides grants to support social and environmental campaigns. For Riversimple, no separate resources are required for its social impact mission delivery, as its profit mission directly drives its social impact.

Key Partners (Environmental Mission)

The key partners for environmental mission box describes any additional partners required to create and deliver the environmental impact of the business. Patagonia's environmental impact mission is delivered both through internal operations (reduced footprint) and externally oriented activity (consumer and industry influencing, ecosystem campaigns). Accordingly, Patagonia has partnered and partners with numerous environmental advocacy organizations such as the Sustainable Apparel Coalition, the OIA ECO working group, The Conservation Alliance, B Lab, Textile Exchange, and social influencer partnerships (O'Rourke & Strand, 2016). As Riversimple's environmental impact is driven by its profit mission, no additional partnerships are required for the environmental impact mission.

Key Activities (Environmental Mission)

The key activities for environmental mission describe any additional activities required to deliver the desired environmental impact. For Patagonia, this entails numerous activities due to the breadth of its environmental impact goals. The most important of these are Patagonia's '5R' activities to enhance circularity in its business model: Reduce, Repair, Reuse, Recycle, and Rematerialize. Other key environmental activities include sustainability-oriented R&D, product design emphasizing simplicity, durability, and multi-purpose use, and sustainability-oriented marketing campaigns and environmental campaigns (Reinhardt et al., 2010). For Riversimple, no extra activities are required to deliver its environmental impact.

Key Resources (Environmental Mission)

The key resources for environmental mission box describes additional resources required to deliver the environmental impact. For Patagonia, these include IP for environmentally sustainable raw materials such as more sustainable dyes and de-odorants and similar. Consistent with its mission to change industry practices, Patagonia does not use its IP to impose exclusivity rights, but instead openly shares its sustainability-related IP to encourage the adoption of more sustainable raw materials by its peers (O'Rourke & Strand, 2016; Reinhardt et al., 2010). Other key resources for the environmental mission include recycle and repair centers, energy-efficient buildings, the environmental activism knowledge base, Patagonia brand reputation, and its Footprint Chronicles. For Riversimple, no extra resources are required for the environmental impact mission.

Value Delivery

The value delivery section of the BMC defines how the business delivers value and to whom. In the basic BMC, value delivery is described in terms of customer groups, customer relationships, and customer channels. The TBLC adds corresponding boxes to describe social and environmental impact delivery. For the social mission, the TBLC describes social impact beneficiaries, community relationships, and social impact channels. For the environmental impact mission, the TBLC describes ecosystem beneficiaries, ecosystem relationships, and ecosystem impact channels.

Customer Groups

For the profit mission, customer groups describe the specific market segments the company delivers value for. While this is mostly straightforward, for multi-sided business models there may be many different customers (which is why we call it 'groups' rather than 'segments'). It is sometimes also necessary to distinguish between 'users' (e.g., Facebook users—who would also be their key resource) and paying customers (e.g., advertisers). For instance, Patagonia's customer groups are outdoor enthusiasts, those who are environmentally and socially conscious, well-off, politically liberal, and educated city dwellers, typically 25–55 years old (Reinhardt et al., 2010). For Riversimple, the customer groups include environmentally conscious local commuters who commute within a 30-mile radius (Anonymous, 2016). This definition derives from Riversimple's business model, which envisions the gradual build-up of hydrogen gas station infrastructure and the use of the car primarily for local personal commute.

Customer Relationships

The customer relationships component describes the nature of the relationship the business maintains with its different customers. These can include transactional relationships, long-term relationships, personal relationships, automated self-service, and community nurturing, for example. In the case of Patagonia, their customer relationships tend to be long-term and personal, and Patagonia actively cultivates its customer communities. It has adopted an end-to-end approach over the product life cycle from garment purchase to its eventual return for repair and recycling (Reinhardt et al., 2010). Riversimple envisions a subscription relationship under which the customer subscribes to hydrogen-powered personal mobility as a service (Wells, 2018). Here, the subscription customer gets exclusive use of the car, the ownership of which remains with Riversimple. The subscription agreement also includes the hydrogen fuel and car maintenance service.

Customer Channels

The customer channel component describes how the business reaches its customers, including a possible multi-channel strategy. However, beyond marketing communications, this component also describes how the business integrates with customer routines. For instance, Patagonia reaches its customers through physical retail outlets that are mostly owned by Patagonia, as well as through their online retail. Patagonia's retail outlets invite customers to spend time in the shop, thereby extending its customer engagement (Reinhardt et al., 2010). Patagonia's Footprint Chronicles constitute an important channel, since they describe Patagonia's sustainability actions and thus bolster the credibility of its sustainability claims. Riversimple uses crowdfunding campaigns, word of mouth, publicity, and social media to spread the word about their missions and invite interested customers to join the waiting list for its service.[3]

Social Impact Beneficiaries

The social impact beneficiaries box describes the beneficiaries of the social impact mission. This analysis may surface both direct beneficiaries and secondary beneficiaries who experience secondary benefits such as greater prosperity, lower unemployment, and reduced crime rate. For instance, Patagonia's community stakeholders include their employees, suppliers, the employees of suppliers, as well as the targeted communities (Reinhardt et al., 2010). Patagonia's social impact is mainly delivered through improved employment practices and as direct and secondary community benefits that are created by its ecosystem campaigns. For Riversimple, its social impact is mainly delivered as an indirect benefit through the reduction of the negative footprint of personal commute in localities.

Community Relationships

The community relationships box describes the relationships the business maintains with the local communities where it operates or conducts campaigning activity. For Patagonia, this means active participation in supplier communities, where the social impact is delivered through enhanced working conditions for supplier employees. For Riversimple, community relationships are maintained through its custodian structure,

[3] www.riversimple.com.

as described below in the Mission Integration segment (Anonymous, 2016).

Social Impact Channels

The social impact channels box describes the channels through which the social impact mission is delivered. For Patagonia, its social impact is partly delivered through its partnerships such as the Fair Trade partnership, which advocates worker empowerment, living wage practices, and trade-specific practices such as fair trade sewing (Reinhardt et al., 2010). Another key channel is created by Patagonia-initiated and Patagonia-sponsored campaigning activity, which is more temporal and campaign-specific in nature. For Riversimple, the channel for social impact would simply be the reduction of the footprint from personal mobility. Riversimple also cites its ambition to bring job creation to regional communities by distributing its manufacturing activities.[4]

Ecosystem Beneficiaries

The ecosystem beneficiaries box describes the beneficiaries of the environmental impact mission. These can be living things, such as targeted ecosystems and biophysical resource stocks, and non-living ones, such as ecosystem resources like air, land, water, and minerals. In the case of Patagonia, the ecosystem beneficiaries include targeted ecosystems, the environment generally, biophysical resource stocks, water, and land. Riversimple's ecosystem beneficiaries would be regional ecosystems benefiting from reduced stress due to personal mobility.

Ecosystem Impact Channels

The ecosystem impact channels box describes the channels and mechanisms through which the business delivers its impact on the ecosystem beneficiaries. Many of these can be internal, particularly for circular

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[4] www.riversimple.com.

business models that include recycling, repairing, and dematerialization. However, others can also be external in that they involve participation in specific ecosystem initiatives. In the case of Patagonia, they maintain, as best they can, a closed-loop supply chain, and they are also actively involved in campaigns supporting the environment. Riversimple delivers its ecological impact through reduced resource consumption because of MaaS model, as well as the resultant shift away from the use of fossil fuels. There is also a reinforcement effect if a wider adoption of hydrogen fuel cell designs is achieved, which would amplify these impacts.

Value Capture

The value capture section of the BMCs describes the cost structure and the revenue streams of the business. The TBLC adds two additional boxes to consider. One is *Surplus Streams*, which describes funding streams that the business channels to impact missions, and also, how it creates value from its impact activities. The other is *Mission Integration*, which describes how the company ensures that it does not 'drop the ball', or experience mission drift away from its impact missions during challenging times.

Revenue Streams

The revenue streams box addresses how the business generates revenue. This box can describe, e.g., revenue models (say, product sales or a subscription model), pricing models, and primary and any secondary sources of revenue such as the monetization of data resources accumulated during primary operations. In the TBLC canvas, it is also important to consider the ways, if any, the company's impact missions help drive revenue. In the case of Patagonia, their primary revenue stream is from retail sales of their outdoor garments and apparel. It is also important to observe that Patagonia can generate a roughly 20% price premium over comparable peers (Reinhardt et al., 2010). It can charge this premium because of its strong brand reputation as a sustainability leader, which increases customer willingness-to-pay. Increased customer willingness-to-pay is usually the primary mechanism through which sustainable business models convert their impact missions from profit drags into profit drivers. In the case of Patagonia, available estimates suggest that even after accounting for extra costs due to its impact missions, Patagonia net extra margin over comparable peers may be in the region of 10–15%. Riversimple currently has no revenue from its profit mission, and it funds its operations mainly with government grants and crowdfunding. Its envisioned revenue model would take the form of subscription revenue, as customers sign up for its hydrogen-powered Mobility as a Service (MaaS) service (Anonymous, 2016).

Cost Structure

The cost structure box describes both the direct costs of the company's profit mission plus any additional costs caused by the company's impact missions. For example, in addition to normal business costs caused by the sourcing of materials and supplies and by its for-profit activities (apparel design, manufacturing and sales, R&D, and marketing and branding), Patagonia carries extra costs due to its impact missions. Relative to its peers, Patagonia carries significantly higher R&D expenditure due to its mission to develop more sustainable raw materials such as fabrics and chemicals. It also experiences higher field-testing costs and extra expenditures due to supplier vetting and training, smaller manufacturing patches, and the higher cost of sustainable fabrics and raw materials relative to non-sustainable ones. It also incurs higher costs due to its funding of environmental campaigns (Reinhardt et al., 2010).

On the other hand, Patagonia also experiences significant savings due to its prominent impact missions. For example, Patagonia's personnel turnover is significantly lower than that of its competitors, as its reputation as a sustainability leader and a great employer has allowed it to hire highly committed workers who stay with Patagonia for longer and are more productive in their work (Reinhardt et al., 2010). Low turnover rate means that employee hiring and training costs are substantially lower for Patagonia. Patagonia is also benefiting of its brand reputation in the form of free publicity and positive press, which both boosts its brand strength and allows it to generate significant savings in marketing expenditure—a significant cost item for its peers. Overall, such savings, combined with higher customer WTP, allow Patagonia to enjoy a more profitable operation than its peers.

Surplus Streams

The surplus streams box elaborates how the business generates specific surpluses that support its social and ecological impact missions. These can be donations by customers, or the share of profit allocated to social and environmental goals. In the case of Patagonia, they donate 1% of their profit for environmental activism under their "1% for the Planet" commitment (Reinhardt et al., 2010). This money is allocated to Patagonia's environmental activity fund, which provides grant funding to support specific impact projects. Patagonia also generates surplus streams because of greater customer willingness-to-pay, as described above, which allows Patagonia to charge higher prices for comparable garments relative to peers. Note that this aspect is intimately connected to Patagonia's customer focus, which is well-educated, high-income, environmentally, and socially conscious outdoor enthusiasts, who are willing to pay more for products that are proven to be environmentally sustainable. Although this focus inevitably limits the direct environmental impact Patagonia is able to generate through its own product sales, the higher profit margins allow Patagonia to invest in R&D for sustainable raw materials, the IP related to which Patagonia openly shares with its peers, thereby facilitating an industry-wide impact through peer adoption of more sustainable practices (Reinhardt et al., 2010). As for Riversimple, the likely surplus mechanism will also be higher profit margins due to increased customer willingness-to-pay, once it starts generating steady-state revenue.

Mission Integration

The mission integration box describes how the company ensures consistent focus on its impact missions alongside with its profit mission and thus prevents 'mission drift'. Thus, this box describes any governance structures and procedures that ensure that these impact propositions are appropriately incorporated in the corporate decision-making processes. This can be achieved both through formal and informal governance devices.

In the case of Patagonia, they have a strong company ethos and culture, which is reinforced by their highly selective hiring practices and HR policies such as allowing leave for environmental campaigning and surf breaks when the tides are good. Patagonia even maintained a bail fund to bail out employees who might have been arrested while campaigning for environmental causes (Reinhardt et al., 2010). Patagonia's participation in environmental sustainability initiatives and alliances also help reinforce its sustainability commitments. For several decades, Patagonia was able to resist quarterly reporting pressures due to its status as a privately held company. More recently, Patagonia sealed its mission integration structure by transferring its ownership into a dedicated non-profit foundation whose charter is to regenerate environmental damage caused by harmful industry practices (Gelles, 2022). This foundation structure means that Patagonia is now 'owned' by the Planet and ensures Patagonia's mission integration for the foreseeable future. For its part, Riversimple integrates its mission through a board of 'custodians' that comprises environmental activists, users, neighbors, staff, investors, and commercial partners. Their mission integration structure also features a 'steward' that represents the custodians in the company's executive board (Wells, 2018).

From Profit Drags to Profit Drivers: Using the Triple Bottom Line Canvas

We now discuss how to best use the TBLC to maximize synergies between the company's profit mission and its impact missions, thereby increasing the chance that the company's impact missions can be turned from profit drags to profit drivers. As noted in the introduction, to be truly sustainable, a business needs to make a profit. Because impact missions may require resources and activities that are additional to those required by the company's profit mission, tension is often created between the missions. This tension leads to a coordination challenge between profit and impact missions that tends to grow stronger as a function of, first, the amount of non-profit activities and resources required to generate the desired impact, and second, the degree of separation between the intended beneficiaries of the impact missions and the company's customers (Santos et al., 2015). These two aspects are therefore defining for the mission integration challenge.

As the TBLC was designed to help recognize, pre-empt, and proactively resolve such tensions and ensure true business sustainability, the following heuristic applies to the implementation of the TBLC exercise, both for new and existing businesses. For new businesses, the TBLC can be used as a good starting point to identify alternative approaches for organizing different elements of the business model, identify potential synergies, and thus inform the assumption identification, experimentation, and validation roadmap. In particular, it provides a method for start-ups to not simply focus on 'do less harm', but instead be able to seek to craft more radical sustainable business models that are 'building a better future'. For existing businesses, the TBLC can be used as a useful device to move beyond 'do less harm' sustainable business models, and articulate their social and environmental missions and identify potential synergies with the profit mission. In doing so, the TBLC will enable mature businesses to strengthen the overall cohesion of their business models and be better equipped to 'build a better future'.

As a first step, it is necessary to describe the company's customer value proposition and its social and environmental impact missions. If this exercise is done for a new start-up, it is important to perform at least some experiments to validate the intended customer value proposition before proceeding further. Once the customer value proposition has been validated, it is useful to assess the mission integration challenge: who are the intended beneficiaries of the impact missions, and do they overlap with envisioned customer groups for the profit mission?

Building from an understanding of the degree of separation between impact beneficiaries and customer groups, the next step is to list the key elements of the value creation section of the profit mission: key partners, key activities, and key resources. Who is the business going to be working with, what are they going to do themselves, and what resources do they require to perform those key activities? This step provides important grounding for the next step, which helps further crystallize the mission integration challenge.

The next step in the process is mapping the key partners, activities, and resources for the social and environmental impact missions. Is there a need for additional activities for the impacts to materialize? And do these additional activities require additional resources? The more extensive additional activities and resources are required, the more important it becomes to think through mission integration devices and how the business is going to create the surplus streams to support the additional activities and resources.

Once the impact value creation side of the TBLC is complete, the next step is to complete the value delivery side of the canvas, notably, customer relationships and channels and impact relationships and channels. Usually, this section carries fewer mission integration challenges than does the value creation side of the canvas, so this step should be relatively straightforward in most cases. It is important to think through these elements, since if not well thought through, they may undermine the cohesion and integrity of the business model.

As a final step, it is necessary to consider surplus streams and mission integration, in conjunction with the cost structure and revenue streams.[5] By this step, there is usually quite a lot of detail to help assess the mission integration challenge and how much additional cost pressure the impact

[5] We skip the discussion of cost structures and revenue models because they are standard elements of the conventional BMC.

missions are likely to create. The key to achieving true sustainability is harnessing the social and environmental impact missions such that they help generate surplus that funds those missions and even adds to overall profitability. In many cases, such as those of Patagonia and Riversimple, the conversion loop operates through increased customer WTP due to the positive impact of sustainability missions on brand reputation. This helped Patagonia ultimately create 10–15% extra profit margin after the additional cost of its impact missions was taken into account. Also, Riversimple's vision is to ultimately generate healthy profit margins to recover the sunk cost of R&D. Another way to achieve the same could be to collect unwanted products or convert waste into raw materials so that they can be sold for profit. The best way to generate surplus streams depends on the nature of the firm's profit and impact missions. The same applies to mission integration. Here, the general rule is that the more complex the mission integration challenge is, the larger the number and the greater the formality of the mission integration devices should be.

Benefits of the Approach

Impact business models are not only beneficial for society and environment but can also make a good business case. First, people have grown more aware of environmental aspects and increasingly take environmental issues into account when making consumption and employment choices. For instance, a survey by Deloitte UK found that 73% of consumers are more likely to buy from brands that are transparent about their environmental and social impact, and 43% are willing to pay a premium for sustainable products.[6] Similarly, a survey by IBM found that 71% of employees are more likely to apply for and accept jobs from companies that have a strong sustainability agenda, and 44% are willing to take a pay cut to work for such companies.[7] These findings suggest that consumers and employees are increasingly demanding

[6] See https://www2.deloitte.com/uk/en/pages/consumer-business/articles/sustainable-consumer.html; retrieved 21 December 2023.

[7] See https://www.ibm.com/thought-leadership/institute-business-value/en-us/report/2022-sustainability-consumer-research; retrieved 21 December 2023.

and rewarding sustainability from businesses, creating opportunities for differentiation and customer and employee loyalty.

Furthermore, our TBLC enables businesses to move beyond shareholder thinking to a more comprehensive stakeholder thinking approach. Not only does this drive the identification of social and environmental stakeholders, but it also means that businesses can start to move beyond the competitive context to thoroughly and actively consider the triple-layered context (economic, social, environmental) in which they are operating. By using the TBLC, businesses can align their value proposition, value creation, value delivery, and value capture dynamics with the three dimensions of sustainability: profit, people, and planet (Hubbard, 2009; Innocent & Innocent, 2014; Wit & Pylak, 2020). It can help them identify opportunities and challenges for creating and delivering value that is not only economically viable, but also socially and environmentally responsible. Moreover, by applying the TBLC, organizations can effectively communicate their sustainability vision and strategy to their internal and external stakeholders, and pre-empt accusations of greenwashing (Yang et al., 2020).

Our TBLC also provides a means for circular, social, and environmental missions to become organic, built-in, and synergistic elements of the business model, rather than being added as afterthoughts. This enables the successful establishment of an appropriate governance system to reinforce social and environmental impact missions within the business (Bosselmann et al., 2008). A governance system for sustainability is a set of written and unwritten rules that link the values and goals of the firm with the institutions and norms of governance. It can help the firm to align its strategy and operations with the expectations and needs of its stakeholders, as well as to monitor and report on its sustainability performance and impact. One example of a governance system for sustainability is Iberdrola's Governance and Sustainability System which seeks to integrate its for-profit dimension with economic, social, environmental, and governance business activities.[8]

[8] See https://www.iberdrola.com/corporate-governance/governance-sustainability-system; retrieved 21 December 2023.

A further benefit of our TBLC is that it extends the basic systems thinking of the BMC to provide a more integrative approach that enables the nurturing of a synergistic system where the three missions reinforce one another. By applying the TBLC, businesses can nurture synergies between the economic, social, and environmental dimensions of their business models (Miller, 2020; Wit & Pylak, 2020). Patagonia has several revenue streams that support and leverage the circularity elements of their business model. For example, the service aspect of their offering (including repair shops) connects their 5Rs to their profit mission. In so doing, they have integrated their profit mission (sales of garments), their 'take-back-system' for recycling their garments, their branded repair shop, as well as partnering with eBay to launch a brand shop. This further encourages customers to sell or acquire used Patagonia gear, following the 'reuse' principle. With such mission integration, their bundling of the profit, social, and environmental value creation and value delivery activities helps amplify their ability to capture value with their impact business model (Miller, 2020; Wit & Pylak, 2020).

Finally, our examples illustrate how impact missions in themselves can operate as a source of innovation and new revenues, particularly when a suitable business model is found (Hopkinson et al., 2018). For instance, Queen of Raw, a New York-based start-up, has created an online marketplace that connects buyers and sellers of unused fabrics, reducing textile waste and saving water, energy, and carbon emissions, while creating value from waste and tapping into a new market opportunity.[9] Similarly, Mercedes-Benz Formula E, the electric racing division of the German carmaker, has leveraged its technology and expertise to develop innovative solutions for sustainable mobility, such as battery recycling, smart charging, and renewable energy integration.[10]

[9] See https://interestingengineering.com/lists/21-sustainability-listss-that-might-just-change-the-world; retrieved 21 December 2023.

[10] See https://www.forbes.com/sites/sap/2021/08/30/leading-edge-companies-create-a-more-sustainable-future-thanks-to-innovative-tech/; retrieved 21 December 2023.

Future Directions

While the TBLC can be used today, there are some future directions that research and practice can consider. A first direction is the application of the TBLC and development of additional case studies for all types of impact businesses. Particular focus should be on addressing the eight major types of impact business models of Bocken et al. (2014). While we have no doubt that the TBLC provides insight for impact business model innovation, its systematic application will help further validate its theoretical and practical value and extend its use cases.

A second direction is for scholars to continue to adopt the TBLC in their teaching and practitioner outreach activities. By introducing business students to the insight that the TBLC is able to offer, they can help drive wider adoption of the tool and the generation of radical impact business model innovations.

A third direction is focus more on the important role of mission integration in impact business model innovation. A culture of sustainability is required for the success of impact business models (Galpin et al., 2015), and while there has been research into sustainability and governance (see Naciti et al., 2022 for a review), this has mostly focused on reporting (e.g., Amran et al., 2014), governance strategies (e.g., Barnett et al., 2018), and board composition (e.g., Rao & Tilt, 2016). There is much less work into the specific formal and informal governance structures in impact business model innovation. Future research could consider, the example, the critical role of mission statements (e.g., Aris et al., 2016; Lee et al., 2013) and different types of governance structures that ensure that social and environmental impact missions are considered in corporate decision-making processes.

A related fourth direction concerns how effective mission integration shapes, and is shaped by, incremental ('do less harm') and more radical ('build a better future') impact business model innovations. Incremental and radical impact business model innovations often feature different organizational forms, with 'build better future' which is most often seen in start-ups, whereas 'do less harm' is more often applied by established companies. It may be, for instance, that 'doing less harm' has potentially a completely different managerial mindset (cf. Araujo et al., 2021) and innovative approach (cf. Keskin et al., 2013) to 'building a better future'. Future research could investigate how the nature of impact business model innovation varies by managerial mindset and the innovation approach.

Conclusion

In this chapter we have introduced the TBLC, a business model design tool that allows business practitioners to systematically design impact business models. We hope that the TBLC will prove valuable for both business practitioners and to researchers and consultants who seek to discover and facilitate more effective and innovative approaches to combining social and environmental impact missions with the profit-making mission of the business, thereby advancing the adoption of truly sustainable business practice.

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7

Circular Business Model Innovation: New Avenues and Game Changers

Nancy M. P. Bocken

Introduction

The circular economy has been put high on the policy agendas in various regions across the world. In the European Union, a Circular Economy Action Plan (CEAP) has been formulated (European Commission, 2023a), in China, Circular Economy has featured in its Circular Economy Promotion Law of the People's Republic of China (UNEP, 2023). Japan released its Circular Economy Vision 2020 (WEF, 2022b) and Chile released a circular economy roadmap in 2021 (Ellen MacArthur Foundation, 2022), to name just a few examples. In many other regions in the world policies have been developed around waste management and recycling serving as a starting point for broader circular economy policies. At the same time, cities (e.g., Ellen MacArthur Foundation, 2019) and businesses have started putting circular economy high

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on their agendas seeing this as a potential solution to tackle the 'joint crises of climate change and biodiversity loss by regenerating natural systems, keeping products and materials in circulation, and preventing waste and pollution' (PACE, 2023).Circular economy is not a niche topic anymore and is being acted upon by business.

While companies have been innovating their products to increase durability and recyclability, which may be labeled as circular innovations (e.g., Bocken et al., 2016), circular business model innovations can be even more impactful with the potential to reach a factor 10 reductions in environmental impact compared to just selling a product when designed the right way for resource efficiency (Tukker, 2004, 2015). For example, for the more service-oriented models (e.g., pay per use or performance) the environmental advantage relates to the fact that the customer receives the outcome of the service (e.g., clean laundry) but the service provider can optimize the process and reduce the cost and resource usage behind the service (Bocken, 2023; Tukker, 2004; Tukker & Tischner, 2006). The service provider is incentivized to optimize the lifetime and resource intensity of the service to optimize cost and reduce environmental impact (Tukker, 2004).

Circular business models have become a new term next to the longer-established fields of sustainable business models and service business models (Lewandowski, 2016; Tukker, 2015). Circular business models focus on delivering superior customer value propositions while slowing resource loops by providing products that last longer (e.g., through premium pricing, services), closing resource loops, by recycling materials post-multiple consumer (re)uses, narrowing the loop by using less material per product and in manufacturing processes and regenerating resources through using renewables and creating benefits for the natural environment (Bocken & Ritala, 2022; Konietzko et al., 2020). Circular and sustainable business models have become a popular topic, perhaps because of their holistic perspective on how business is done (Stubbs & Cocklin, 2008), and the link to future competitiveness in mainstream business model innovation research (Chesbrough, 2010). Some even go so far as referring to sustainable and circular business models as a hype topic (Lüdeke-Freund & Dembek, 2017), which still needs significant validation for its impact on sustainability challenges in practice (Das et al., 2022).

The most common types of circular business models relate to delivering novel product-service constellations (product-service-systems), such as products with high levels of warrantees and services, rental, subscription and lease models, reuse platforms, and pay per performance and pay per use models, each with an intentional focus on resource issues (de Costa Fernandes et al., 2020; Tukker, 2015). Examples include secondhand platforms, bike and car sharing models, and companies offering products with lifelong warrantees. In addition, various companies have started recycling, refurbishment, and remanufacturing practices next to their regular manufacturing practices (Jensen et al., 2019).

Business model innovation is either about the process of transformation from one business model to another within incumbent companies, or after mergers and acquisitions, or the creation of new business models in startups (Geissdoerfer et al., 2016). Innovative circular business models might therefore originate from startups (Henry et al., 2020), as well as existing business transforming their dominant linear business models for the circular economy (Bocken & Konietzko, 2022; Frishammar & Parida, 2019). Henry et al. (2020) identify circular startup efforts focused on circular design, waste-management, platforms, services, and nature-based solutions. In large businesses, there are also many nascent examples to challenge dominant linear business models. IKEA, for instance, launched a furniture rental initiative to slow the loop and is involved in nature regeneration, H&M started experimenting with secondhand business (Bocken & Geradts, 2022), and Patagonia has a lifetime warranty on clothing facilitated by repair services (Bocken & Geradts, 2022). Yet, several studies found circular business initiatives to be of a niche nature in how widespread and ambitious they are (Ritala et al., 2018).

The fact that these examples are so nascent shows that the Circular Economy, while high on many policy and business agendas, is still in its infancy. At the same time, circular economy is not delivering on its potential 'promises' of resource conservation (Allwood, 2014; Blomsma & Brennan, 2017). Importantly, Elhacham et al. (2020) calculated that the global human-made mass, referred to as 'anthropogenic mass' has roughly doubled every 20 years and will soon surpass all global living mass. Shockingly, for each person globally, on average 'anthropogenic mass equal to more than his or her bodyweight is produced every week' (Elhacham et al., 2020, p. 442). Estimates by Bianchi and Cordella (2023) show that primary resource extraction linked to economic growth is roughly four times the resources saved by circular economy initiatives (currently largely recycling initiatives), annually. This suggests that recycling cannot outpace our unsustainable consumption patterns (see also Allwood et al., 2011; Fraser et al., 2023).

It is also evident that significant environmental damage has been done. Since the 1970s, population sizes of animals like birds, mammals, reptiles, amphibians, and fish have decreased by nearly 70%, and in some areas even by over 90%, due to the detrimental effects of climate change, pollution, overexploitation, and habitat loss (WWF, 2020, 2022). The impacts of climate change are clearly felt globally, with more extreme weather patterns, heating up of the oceans and coral bleaching, and a collapse of global ice sheets (IPCC, 2022). More than 1.4bn people live in water vulnerable areas and over 25% of the global population live in food insecurity (UN, 2020; UNICEF, 2021). Several authors and reports therefore conclude that a much more radical change is needed to the way we produce and consume to address these pressing challenges (Bianchi & Cordella, 2023; Fraser et al., 2023; IPCC, 2022).

The 'circularity' of resources in the global economy has even dropped (between the years of measurement, 2019 and 2022) suggesting the circular economy should be rolled out with greater speed and higher levels of ambition, while normalizing strategies higher up in the waste hierarchy like waste avoidance, and product reuse (Fraser et al., 2023). Based on their study on resource extraction, Bianchi and Cordella (2023, p. 1) conclude that '*the circularity of economic systems should be approached from a systemic perspective that includes both production and consumption as well as waste management. In particular, complementary measures addressing behavioural consumption are needed if we want to achieve a sustainable development*'. Incremental technological change is thus not the solution and more radical changes to consumption and production patterns are needed.

The circular business model perspective has the potential to bring together new sustainable production and consumption perspectives through the lens of business practices (Hofstetter et al., 2021; Tukker, 2015). This chapter addresses the following research question: what are new avenues and game changers for circular business model innovation? First, the topic of circular business model innovation as a game changer is discussed. This is followed by new avenues and game changers, including: the twin transition of digital and circular economies, the focus on slowing the loop and regeneration, collaborative business models, impact assessment and tools and methods, and finally concluding remarks on future research and practice.

Circular Business Model Innovation as a Game Changer

Business model innovation can be an important success factor for companies (Chesbrough, 2007), but also provide a key leverage point for achieving sustainability ambitions in companies (Geissdoerfer et al., 2016). A circular and sustainable business model is about taking a holistic perspective on the way business is done in relation to its stakeholders, explicitly including the society and the natural environment as key stakeholders (Stubbs & Cocklin, 2008). Business models can be a key driver for sustainability transitions, e.g., by normalizing practices like shared mobility, secondhand platforms, or refillable product offerings (e.g., Aagaard et al., 2021a; Boons & Lüdeke-Freund, 2013; Sarasini & Linder, 2018).

When pursuing a circular business model, the business purpose is focused on circular economy issues, and performance measurement is focused on measuring the impact of the activities (Stubbs & Cocklin, 2008). A circular business model conceptually brings together the circular value proposition *(is it desirable?)*, value creation and delivery activities to create and deliver this circular value *(is it feasible?)*, and value capture mechanisms to understand how a business might capture financial and other forms of value *(is it viable and adding other value?)* (Fig. 7.1). Importantly, the *circularity* of the circular business model should be an integral part of the full business model design: to what extent does the business model contribute to slowing, closing, narrowing, or regenerating resource loops? Slowing the loop refers to supporting longer product lifetimes, closing the loop is about post-consumer use recycling, narrowing is about using less resources per product, and regeneration is about improving the natural environment (Bocken & Geradts, 2022; Konietzko et al., 2020). See also Fig. 7.1 which brings the business model elements and circularity focus together within a circular business model canvas.

Circular business models have become a powerful concept in business and research, perhaps because of their holistic focus on how business is done (Stubbs & Cocklin, 2008), more so than a product or technology innovation in isolation (Chesbrough, 2010). The business model itself may not only be a convener of new technology or products like electric cars but might also drive new practices in themselves like sharing or reusing products over time (Sarasini & Linder, 2018; Zvolska et al., 2019). In mainstream business strategy literature, it has been recognized that a successful business model can make or break a new technology or product, so business model innovation is a key source of future competitiveness (Chesbrough, 2010). But most importantly, ongoing research in the field of sustainability has suggested that tenfold environmental impact reductions are possible, in a sustainable or circular business model compared to just selling a product, in particular in the field of *service-driven* circular business models (e.g., rental, lease, pay per use or performance) (Tukker, 2004, 2015). The reason is that when the company retains the ownership of a product and is responsible for its product life cycle cost (repair, maintenance, energy use), the company is incentivized to reduce the product life cycle cost and impact (Tukker, 2004, 2015). Sustainable behavior may also be driven through new circular propositions when set up in the right way (Chamberlin & Boks, 2018).

There are many other business cases for sustainable and circular business models that might convince a company to pursue such business models (e.g., Schaltegger et al., 2011, 2012) but by far the most important case to pursue circular business models is 'the planet'. Quoting conservationist David Brower and appearing on a plaque on the outdoor

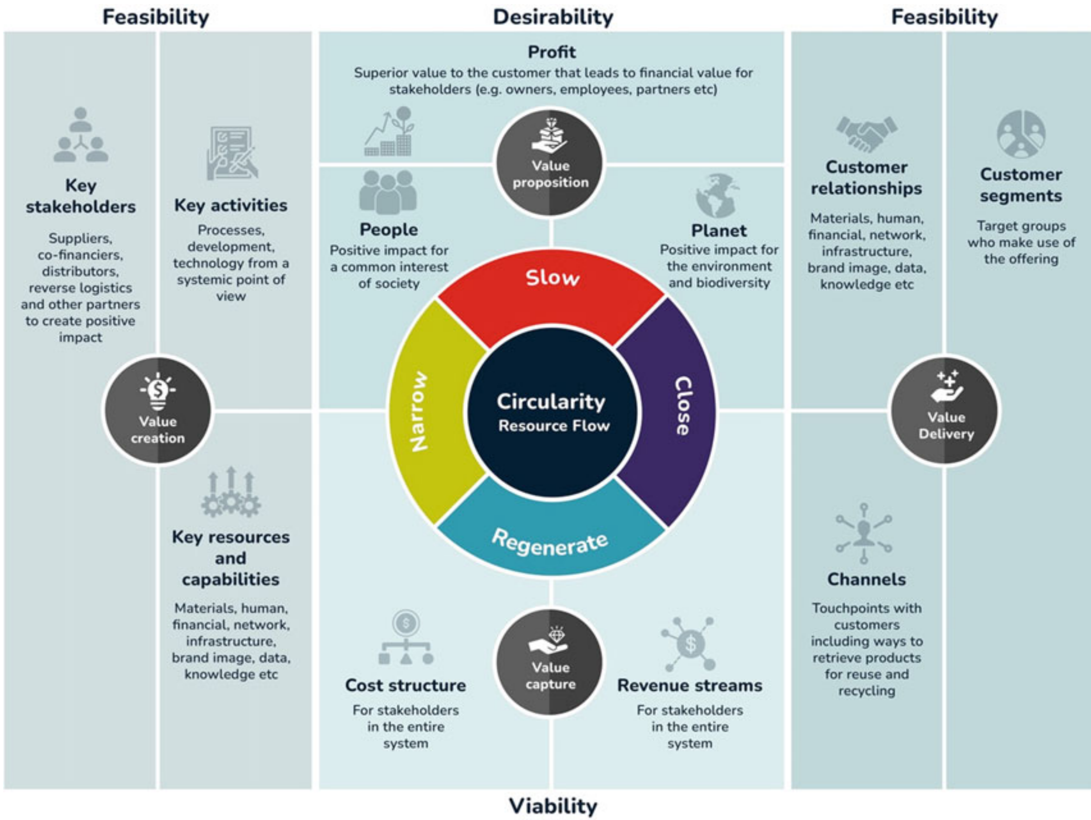

Fig. 7.1 Circular business model canvas. Developed from Osterwalder and Pigneur (2010), Bocken et al. (2018), Bocken and Geradts (2022) and Konietzko et al. (2020)

company Patagonia's head offices as a daily reminder: 'There is no business to be done on a dead planet'. Table 7.1 includes several examples of circular business model 'business cases' building on the work by Schaltegger et al. (2011). It should be noted that some of the business cases are mutually reinforcing, e.g., good reputation would also improve the attractiveness as an employer or as a collaboration partner.

New Avenues and Game Changers

This section discusses new avenues and game changers for research and practice in the field of circular business model innovation, including: creating a twin transition of digital and circular economies, the focus on slowing the loop and regeneration, collaborative business models, tools, methods, and impact assessment in particular.

Creating a Twin Transition of Digital and Circular Economies

The original concept and use of the business model term has been linked to the advent of the Internet and technology-heavy companies (Osterwalder et al., 2005). Business model choices for managers increased substantially based on 'cheap and available information technology' (Osterwalder et al., 2005, p. 4). For example, Apple was able to create the iPod which allowed for digital music streaming using their iTunes platform (Osterwalder et al., 2005), and now digital streaming services are commonplace. So, while the business model concept is thought to have emerged already in the 1970s, it gained wider popularity in the 1990s following the surge of information and communication technology (Kanda et al., 2021).

It is also evident that many successful *circular* business models like rental platforms or bike sharing would not have been scaled to the extent they have done now without digitalization, enabled by apps accessible through a smartphone (Tunn et al., 2020, 2021). For example, whereas car sharing between individuals has existed for a long time, and

Table 7.1 Circular business model 'business cases'. Developed from Schaltegger et al. (2011)

Circular business cases	Examples of value propositions
Resource conservation and nature regeneration	Products and services branded for resource conservation or regeneration Products and services enable customer's resource conservation practices (e.g., biodiversity regeneration)
Cost reduction	Products and services with lower energy or maintenance costs for customers Products and services with a reduced price because of material savings by the company (e.g., take-back model with discount)
Sales and profit margin, new revenue streams	Environmentally and socially superior products and services with a modified value proposition to appeal to the 'sustainable/ circular-economy minded' customer
Risk and risk reduction	Lowering societal risks through products and services can create value to certain customer segments Hedge against future price shocks through an 'as a service' model Raw material access through an 'as a service' model
Reputation and brand value	Circular Economy as distinctive element of good corporate and brand reputation
Attractiveness as employer	Companies' circular offerings and value propositions allowing for personal identification and motivation to attract and retain employees

(continued)

Table 7.1 (continued)

Circular business cases	Examples of value propositions
Source of innovativeness and collaboration	Pursuing the full sustainability-potential of innovations enables modified or new circular value propositions A circularity focus in a company's vision and goals can lead to the company being perceived as an attractive collaboration partner for joint circular innovation
Long-term competitiveness, being ahead of competition and legislation	Unique products filling gaps in the market, being ahead of circular economy competition and legislation (e.g., products with lifelong warrantees, availability of spare-parts and repair services)

neighborhood cooperatives have existed since the 1980s (Bocken et al., 2020), digitalization has enabled new business models to help scale up sharing and make it more accessible to the masses (Sarasini & Langeland, 2017). However, in more traditional sectors like the built environment, examples of digitalized circular business models are nascent but not yet common place (see Çetin et al., 2021).

Although the link between technology and business models has been there from the start of the business model concept, many important developments around circular economy and the digital transformation are occurring in parallel, and more synergies need to be sought by research and practice to address pressing global challenges. The European Commission (2023b) has described this (missed) potential as a 'twin transition' where the sustainability transition and the digital transition cannot succeed without one another.

Researchers have started to explore the linkages between circular business model innovation and digitalization (Çetin et al., 2021; Neligan et al., 2023). As noted by Tunn et al. (2021) digital innovations like smartphones and the wide availability of the Internet have paved the way for new circular business models to quickly emerge, also by startups with often limited resources. However, the strategic usage of digitalization by aspiring circular startups deserves further scrutinization. For example: how can startups pushing innovative circular business models best leverage digital technology to develop successful circular business models (Henry et al., 2020)? How can digital technology optimize the resource circularity of new business models? Important future research questions may also be formulated to address this topic in established organizations (see, e.g., Bocken et al., 2023; Bressanelli et al., 2022). As large-established businesses need to remain competitive while addressing resource challenges, they will need to think more strategically about the twin transition. How can digital technology help accelerate established organizations' internal circular economy transition? How can digitalization help overcome barriers like the traceability of raw materials, or the quick testing of the desirability, feasibility, viability, and circularity of circular business models (see, e.g., Baldassarre et al., 2020)?

Furthermore, research in circular economy has been criticized for focusing on the Global North, largely ignoring the need for a circular economy transition in the Global South (e.g., Hofstetter et al., 2021). This is essential as research has suggested that circular economy could deliver clear economic, environmental, and social benefits in the Global South (Valencia et al., 2023). Digitalization might support 'circular economy leapfrogging', just like innovations such as mobile money service M-Pesa did creating an entire mobile banking industry and surpassing the need for traditional banks in Africa (Cilliers & Cilliers, 2021). This raises various research questions: How can digitalization enable 'circular economy leapfrogging' and accelerate the circular economy transition particularly in the Global South (see, e.g., Hofstetter et al., 2021; Muchangos, 2022)? What circular business models could be developed that leverage digital technology in the Global South (Cilliers & Cilliers, 2021)? Which new circular economy industries could emerge in the Global South, enabled by digitalization? Vice versa, how could these developments be leveraged again in the Global North?

Finally, it should be noted that digitalization has unintended consequences such as significant amounts of energy use (Bohnsack et al., 2022; European Commission, 2023b). Yet, the WEF (2022a) also estimates that, if brought to scale, digital technologies could reduce emissions by 20% by 2050 in some of the highest-emission sectors: energy, mobility, and materials. It is therefore important to accelerate the twin transition which may be supported by answering important research questions. On a sector-by-sector basis, where should digital technology be an enabler of the circular economy? Where should digitalization be avoided to prevent negative consequences for nature and society in the circular economy transition (see, e.g., Bressanelli et al., 2022)?

Slowing the Loop, Sufficiency, and Regeneration

We cannot recycle ourselves out of the environmental crisis (Allwood, 2014). Despite circular economy interest in business and policy, the global state of resource circularity is in decline (Fraser et al., 2023). This is mainly the case because recycling efforts cannot outpace the sheer amount of consumption of goods and the energy and materials needed for this (Allwood, 2014; Fraser et al., 2023). At present, 'circular products' are not widespread, and they do not always offer a direct alternative yet for their 'linear counterparts' adding to the total number of products being manufactured rather than replacing unsustainable varieties (Zink & Geyer, 2017). At the same time, significant environmental damage has been done (WWF, 2022) and societies are starting to feel the effects of climate change (IPCC, 2022). This means that a regenerative approach to business is urgently needed where companies do more 'net good' rather than 'less harm' (Hahn & Tampe, 2021; Konietzko et al., 2023; Polman & Winston, 2021).

Given these challenges and the fact that the circular economy is the future target in many country and regional policies such as the Circular Economy package by the European Union (European Commission, 2023a), it is evident that such a circular economy must be positioned as a comprehensive and ambitious concept, going beyond material efficiency and recycling. Figure 7.2 shows a broader perspective on the circular economy, where the focus might be on sufficiency and making do with less and consuming different to tackle unsustainable consumption (Alexander, 2012; Bocken et al., 2022) and net positive as well as a flourishing perspective to put environmental and societal well-being above a profit orientation (Ehrenfeld & Hoffman, 2013; Raworth, 2017; Upward & Jones, 2016). Next, future research areas for sufficiency and

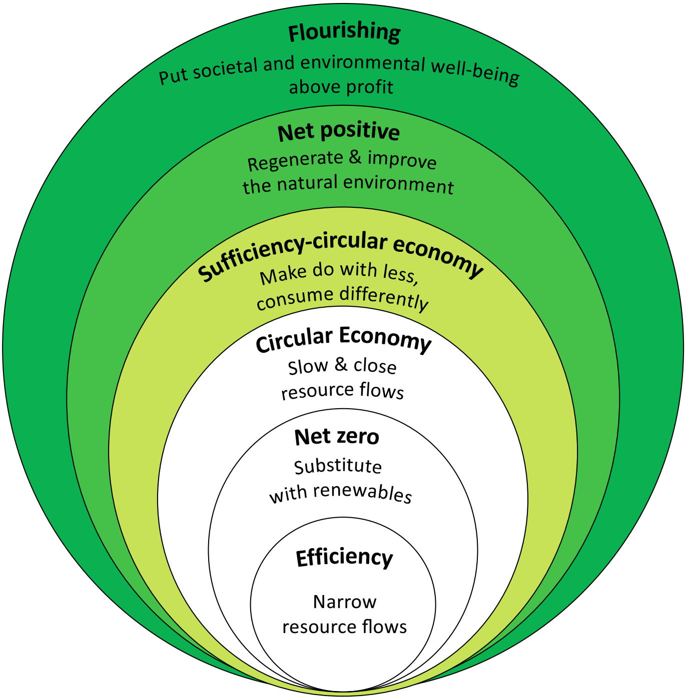

Fig. 7.2 Toward a sufficiency-oriented and flourishing circular economy. Developed from Bocken et al. (2022)

regenerative business models are described fitting these higher levels of ambitions in the circular economy.

Sufficiency Business Models

Sufficiency business models 'aim to moderate overall resource consumption by curbing demand through education and consumer engagement, making products that last longer and avoiding built-in obsolescence, focusing on satisfying "needs" rather than promoting "wants" and fast-fashion, conscious sales and marketing techniques, new revenue models, or innovative technology solutions' (Bocken & Short, 2016, p. 41).

Sufficiency-oriented businesses have developed a business rationale centered around moderate consumer demand which may be enabled through business models involving premium pricing, service models, and resale (secondhand marketplaces) (Bocken & Short, 2016). From a design perspective this would require product design for longevity, design for upgrading (e.g., dis- and re-assembly, software upgrading), design for multiple life cycles, and simpler classic design (Bocken et al., 2016). By integrating sufficiency into their business models, businesses may act as agents of change to transform unsustainable practices along the entire supply chain (Beyeler & Jaeger-Erben, 2022).

The concept of sufficiency in business is mainly operationalized as a key concept in affluent societies where generally, people have more than enough (Fuchs et al., 2021; Niessen & Bocken, 2021), whereas in emerging countries like Thailand sufficiency has been part of the economic and societal development agenda to ensure there is 'enough' available for everyone (Bocken & Short, 2016). Sufficiency may be relevant for all types of businesses (Niessen & Bocken, 2021) but is most commonly associated with durable goods that are at present largely replaced prematurely (before the end of their technical life cycle) like clothing and electronics (Beyeler & Jaeger-Erben, 2022).

Businesses pursuing sufficiency typically identify the continuous growth imperative and affluent consumption as the main drivers for environmental destruction and social injustice (Beyeler & Jaeger-Erben, 2022). They display a desire to break through path dependencies of abundance of consumption, exponential growth, in a quest for less materialistic, slower, and more local forms of production and consumption (Beyeler & Jaeger-Erben, 2022). In addition, outside the business context, initiatives to encourage free peer-to-peer exchange and to support do-it-yourself are examples of sufficiency practices that require deeper attention in research (Beyeler & Jaeger-Erben, 2022; Niessen & Bocken, 2021). It is the question what organizational forms and structures (e.g., family business, non-profit) are best suited to encourage sufficiency and engender the greatest reduction in material dependencies (Beyeler & Jaeger-Erben, 2022).

To operationalize sufficiency, Fuchs et al. (2021) describe the need for the definition of consumption corridors across sectors: the space between the lower limits of consumption that ensure minimal needs satisfaction for all and the upper limits to consumption above which others' essential freedoms are being challenged. Having consumption corridors established in policy for the main products and services consumed like mobility, energy and even food (e.g., meat consumption) would lead to innovative sufficiency-business models to support sustainable behavior. Indeed, there could be important learnings between the fields of sustainable consumption and sustainable business. For example: How can companies operationalize the concept of 'consumption corridors' in their business practices to develop sufficiency-oriented business models (Fuchs et al., 2021)? Also: How can policies based on concepts like consumption corridors provide sector pathways for sufficiency-oriented business models?

More generally, as sufficiency in business is still a niche topic, there are still ample future research questions to help accelerate this topic in practice. How can companies in different sectors drive sustainable consumption through their business models (see Bocken & Short, 2016)? How can companies help *normalize* sufficiency through innovative business models and marketing practices? Degrowth is still a contested topic in particular in the business context where growth is the dominant paradigm (see, e.g., Khmara & Kronenberg, 2018). Hence: how might companies counteract affluent consumption and the dominant growth paradigm through novel sufficiency-oriented business models (see Beyeler & Jaeger-Erben, 2022)? How can the in-depth knowledge about marketing practices and psychology be used for successful sufficiency-oriented business models (see Chamberlin, & Boks, 2018)?

Finally, it may be the case that certain organizational forms are better suited for sufficiency practices, like family businesses, considering the next generations as part of their business practices, as well as benefit corporations, structured to cater for societal and environmental benefits (see, e.g., Beyeler & Jaeger-Erben, 2022). This still deserves ample future research as new organizational forms are still emerging: What organizational forms and structures are best suited to support sufficiency-oriented business models? What are the barriers to sufficiency in the most common organizational structures and how can these be overcome?

Lastly, as sufficiency is not a typical manifestation originating from business, Beyeler and Jaeger-Erben (2022) suggest an exploration of the following: How might sufficiency be operationalized outside traditional market structures in other novel organizational, citizen, or stakeholder models?

Regenerative Business Models

Regenerative business models 'focus on planetary health and societal wellbeing. They create and deliver value at multiple stakeholder levels—including nature, societies, customers, suppliers and partners, shareholders and investors, and employees—through activities promoting regenerative leadership, co-creative partnerships with nature, and justice and fairness. Capturing value through multi-capital accounting, they aim for a net positive impact across all stakeholder levels' (Konietzko et al., 2023, p. 375).

The area of regenerative business models is rather new (e.g., Hahn & Tampe, 2021), and is related to topics like creating a 'net positive business' that aims to do more 'net good' rather than 'less harm' (Polman & Winston, 2021) and the concept of 'doughnut economics' that recognizes that business and the economy depend on society and which both need to operate within nature's boundaries (Raworth, 2017). Perhaps unsurprisingly, the concept of regenerative business models is also closely linked to circular and sustainable business models but the focus in regenerative business models is mostly about planetary and societal health at the center of the business models (Konietzko et al., 2023).

Regeneration asks companies to look beyond minimizing harm toward thinking about areas of positive contributions to society and the natural environment (Polman & Winston, 2021). Questions companies may ask themselves are: Is the world a better place because our business is in it? Who should we collaborate with to achieve our regeneration goals (see Polman & Winston, 2021)?

For regenerative business, there are still several open *future research and practice questions, as this is such a new field. For example:* What does regeneration mean for a business? What areas of regenerative practice should companies in different sectors be strategically involved in to make it an integral part of the business (see, e.g., Polman & Winston, 2021)? Many circular economy issues, and in particular, regeneration, also go beyond individual company boundaries as noted by Konietzko et al. (2023). Hence, they require strategic decision-making about collaborations as noted in circular economy literature more generally (Brown et al., 2020; Velter et al., 2020). This raises questions like: What would strategic partnerships or open innovation processes for regeneration look like (Bocken & Ritala, 2022)? Which organizations or stakeholders should organizations collaborate with to achieve regeneration goals (Konietzko et al., 2023)?

Finally, connected to the digitalization research gaps, there are plenty of open questions. Çetin et al. (2021) and Nußholz et al. (2023), for instance, investigated the building sector and identified several cases of regeneration that could be supported by digital technology. This raises the following question: How can digitalization be used strategically by business to develop regenerative business model strategies? How can digitalization and the advent of new technology best support regenerative business models in different sectors?

Collaborative Business Models and Circular Ecosystems

The circular business model innovation process involves the development of new value propositions, value creation and delivery networks, and value capture mechanisms (Velter et al., 2020) to support strategies of product reuse, refurbishment, material recycling, and nature regeneration in the circular economy (Geissdoerfer et al., 2017; Konietzko et al., 2020). Many of the activities integral to circular business model innovation like recycling, refurbishment, remanufacturing, and nature regeneration, are not (yet) within the core capabilities of most still largely 'linearly organized' companies and their business models (Bocken & Konietzko, 2022; Frishammar & Parida, 2019). Furthermore, other stakeholders like the (local) government, NGOs, customers, or suppliers, might share similar goals of resource preservation or nature regeneration, or, they might have better competences to take on these activities. Hence, circular business model innovation often means that companies take a broad network perspective on innovation where they engage with a wide set of actors, including their customers, suppliers and partners, NGOs, and the government (Boons & Lüdeke-Freund, 2013; Brown et al., 2019; Velter et al., 2020).

The field of circular business model innovation has also been quite naturally linked to the field of open and closed innovation in academia (Brown et al., 2020). This link is not surprising seen the many strategic decisions a company would need to make on which activities to develop internally, and which ones to collaborate on in order to pursue circular business model innovation. For example, a company starting a rental service next to direct sales of its products would need to decide whether to handle the logistics and servicing of such a service themselves or with partners. Bocken and Ritala (2022) created a conceptual framework to support insight in these decisions by linking resource strategies (narrow, close, and slow the loop) in the circular economy to the open innovation strategies (open and closed; Chesbrough & Appleyard, 2007). An example of 'closed-closing' would be a company that through its own developed innovation processes, to recycle the materials used in its products. E.g., MUD Jeans (mudjeans.eu) collects used jeans through both a lease-a-jeans and a take-back model to recycle materials of the jeans. An example of 'open-slowing' would be a collaboration between a company and other stakeholders to reuse products. E.g., H&M partnered with secondhand online seller Sellpy for its new secondhand website (Bocken & Ritala, 2022). This still raises the following questions: In which cases of circular business model innovation would companies use a closed, or an open innovation process (see, e.g., Bocken & Ritala, 2022)? If organizations (e.g., business, NGOs, governments) decide to partner up to resolve circular economy problems, how can they make the right partnership choices to establish collaborative circular business models (see, e.g., the work by Brown et al., 2021 for an initial circular business model partnership tool)?

To make decisions on the future of the organization and the relevant circular economy activities, the concept of boundary work might be helpful (Velter et al., 2020; Velter et al., 2021). Circular business model innovation is about exploring and negotiating new organizational boundaries as the activities of a company and its value network of suppliers, partners, and stakeholders could drastically change when adding new activities (Velter et al., 2020, 2021). Boundary work related to circular business model innovation involves exploring, negotiating, disrupting, and realigning organizational boundaries (Velter et al., 2020), as well as boundaries related to organizational identity, power, competence, and efficiency (i.e., who might conduct which task best) (Velter et al., 2021). For example, when IBM's business was in decline in the 1990s, it started experimenting with new business models. The result was a shift from selling *technology* toward selling IT *services* (Chesbrough, 2007). This led to new competences and eventually a new identity for the business (O'Reilly et al., 2009). Similarly, in the transition to a circular business model, companies are exploring the changes in boundaries of their physical organization, identity, and how they relate to others (e.g., performed tasks and power). This raises several open research questions: How can boundary work support the development of collaborative circular business models and ecosystems (see, e.g., Velter et al., 2020)? How might companies renegotiate their boundaries with suppliers, customers, and other (new) partners including the public sector and NGOs to develop new circular supply chains and business models (see, e.g., Bocken et al., 2023)?

A related area to collaborative business models is the field of 'circular ecosystems' for which various tools, methods, and frameworks have been developed (Aarikka-Stenroos et al., 2021; Kanda et al., 2021; Talmar et al., 2020). An ecosystem is about the 'consideration of complex constellations of actors, technologies, and institutions that are bound together via loosely coupled interdependencies and co-evolutionary patterns' (Aarikka-Stenroos et al., 2021, p. 261). Ecosystems consist of multiple locally, regionally, or globally distributed entities that are not part of a single organization, involve dynamic, collaborative as well as competitive relationships, imply flows of services, data, and money, often involve complementary products, services, and capabilities, and evolve as actors constantly redefine their capabilities and relations to other actors (Konietzko et al., 2020). In ecosystems, the interdependency between actors could originate from a joint purpose, value proposition, or platform, and the ecosystem would deliver greater benefits than an individual company could do alone (Aarikka-Stenroos et al., 2021; Thomas et al., 2014). An example of a circular ecosystem is the industrial symbiosis network like the Finnish Industrial Symbiosis System where 'waste' resources are exchanged between partners and are being used as an input for others' processes (Patala et al., 2022). Areas for further work related to collaborative business models and circular ecosystems include: What could a successful business model of a circular ecosystem look like? How might novel circular ecosystems be developed or orchestrated by certain actors (see Bocken et al., 2023)? How might companies offer complementary products and services that can provide a superior and circular ecosystem value proposition (see Konietzko et al., 2020)?

Tools, Methods, and Impact Assessment

Tools and methods can broadly be categorized according to approaches for determining sustainability impacts and experimentation and scale-up tools to support organizational transformations.

First, to support the development of strongly sustainable business models that live up to the theoretical promise of a tenfold environmental impact reduction compared to just selling a product (Tukker, 2004, 2015), tools and methods to better support impact creation and assessment are needed. Research has found, for instance, that few organizations use formal methods (besides, e.g., rules of thumb) to assess the impact of their circular business model innovations (Das et al., 2022). However, it is known that circular initiatives lead to negative rebound effects (Figge & Thorpe, 2019; Zink & Geyer, 2017). For example, individuals might consume more, knowing the option is 'greener', or a seemingly sustainable business model (e.g., car sharing) might lead to unsustainable modal shifts with consumers from cycling or public transport toward driving a car (Das et al., 2023). More insight is needed to help companies develop a sustainable value proposition from the start (Manninen et al., 2018) and avoid future negative rebound effects (see Das et al., 2023 for an initial framework of rebound effects for circular business models). This leads to the following open research questions: Which tools and methods can help avoid negative rebound effects in the development of circular business model innovations in organizations, and how might positive impacts be anticipated and designed for (see, e.g., Das et al., 2023)? Which methods may be adopted to guide and measure positive impact in an organizational impact, related to the circular economy transformation (see Bocken et al., 2023)?

Second, many companies are still on a 'linear pathway' and would need to start challenging their linear business models, whereas new startups have the opportunity to start with a truly circular business model. Experimentation can be a way to support startups in developing novel circular business models (Aagaard et al., 2021b; Henry et al., 2020), and for existing businesses like small and medium-sized business and larger businesses multinationals to start challenging their existing business models (Frishammar & Parida, 2019). Research has unveiled a plethora of tools that may be used for circular and sustainable business model innovation (Pieroni et al., 2019). However, many have not been tested and iterated by business to focus on experimentation. One example of a tool tested with business is the circular economy workbench (see Bocken & Coffay, 2022), building on the popular experimentation approach lean startup (Ries, 2011) and effectual reasoning (Sarasvathy, 2001) using what resources and stakeholders might be available to support the innovation process. Moreover, tools could support scaling up of circular innovations, building on knowledge of successful circular scaling pathways (Han et al., 2023).

A deeper understanding of the tools and methods that academia could develop to support academia are needed. Although there is a plethora of circular business model tools (Pieroni et al., 2019), many have not been tested or trialed with the relevant users such as startups or incumbent businesses, which should be a tool design requirement (Bocken et al., 2019). Recognizing the differences in company sizes and needs, future research questions in this area include: Which tools, methods, and approaches can support startup companies in circular business model experimentation to develop the most sustainable circular business models? Which tools and methods can guide the corporate transition to a circular business model? Finally, knowledge on scaling up circular businesses successfully is still nascent (Han et al., 2023). Research may therefore investigate the following: Which approaches are suited to support scaling up of circular business models?

Conclusions

Pressing changes are needed to the way we produce and consume to restore the environmental and societal damage already done through unsustainable business practices, and to mitigate future negative impacts. Circular business models have the potential to bring about significant changes in the way we produce and consume.

Circular business model innovation is about innovating one's business model to create superior customer value propositions, through slowing resource loops via products that last longer, closing resource loops, by recycling materials, narrowing the loop by using less material per product and in manufacturing processes, and regenerating resource loops through using renewables and creating benefits for the natural environment. Despite their potential and excitement about the topic, the area is still nascent in practice as many products and materials are not recycled, let alone repaired, or refurbished, which could be enabled through novel circular business models.

This chapter highlighted four key topics for future research and practice. First, this chapter highlighted the importance of the twin transition of circular and digital transformations. This requires research and practice to work across disciplines and learn and build on developments in both areas. Second, this chapter pointed out the focus on 'less and more' in the circular economy: *less* with respect to sufficiency and becoming more aware of the safe consumption spaces, and *more* in relation to doing more regeneration to restore and regenerate the nature and societal damages already done. Third, this chapter spotlighted the need for collaborative models and conscious choices about how to innovate and with whom to achieve circular economy targets. Finally, this chapter spotlighted the need for tools and methods that support experimentation, scaling up, and impact assessment.

As for the managerial implications, first, to leverage the twin transition, an integration of business functions and teams would be needed. The latest knowledge on digitalization and circular economy would need to be combined to develop the most promising business models and create potential 'circular disruptions' (Neligan et al., 2023) or breakthrough circular innovations. Second, sufficiency and regeneration both take mature perspectives on the operationalization of the circular economy. While sufficiency as a business practice is moving beyond a handful of companies toward a growing number of sufficiency-conscious businesses across different sectors, each company going on this trajectory will need a radical rethink of the business model, for example from volume toward value-driven models, or banning sales of 'unnecessary products' (Bocken et al., 2022; Niessen & Bocken, 2021). It will require a rethink of the corporate vision, mindset, and business functions such as product design and marketing and sales. As for regeneration, this topic is still quite new in the business context and requires companies to reconsider how they can best contribute positively to societal problems like health, biodiversity, or food provisioning, in a way that this adds positively to society and the natural environment rather than detracting from it (Konietzko et al., 2023; Polman & Winston, 2021). This needs to be done as an integral part of the business to avoid greenwashing. Third, as noted, many of the circular business models are collaborative or at least need strategic decision-making on what new 'circular activities' to integrate or what to outsource. Questions like: 'What would our circular business ideally look like in 5- or 10-years' time?', 'Who has complementary expertise?', and 'Who shares the same (circular economy) problem?' could serve as important guiding questions (see also Bocken & Ritala, 2022). Finally, as for tools and methods, an empirical study on the circular business model innovation process in corporates showed that a mix of generic business and design thinking tools like visioning and creating minimum viable products, is currently coupled with circular economy-specific tools like guidelines and indicators (Bocken & Konietzko, 2022). Building on the generic innovation expertise and tailoring it through collaboration with circular economy and digitalization experts can help build the circular business model innovation capability in businesses.

In conclusion, circular business model innovation might provide a promising pathway to achieve significant improvement in a way a company might deliver environmental and societal value. However, significant work is still needed to transition toward a circular economy and society. In practice, this would require changes in curricula where circular economy would become an integral part of education programs across all levels, as well as collaboration across disciplines and business functions to accelerate knowledge development and advance the circular economy in practice.

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8

The Twin Advantage: Leveraging Digital for Sustainability in Business Models

Annabeth Aagaard and Wim Vanhaverbeke

Introduction

The escalating depletion of global natural resources necessitates urgent action by corporations, governmental bodies, and other institutions, emphasizing the transition towards environmentally sustainable operations to foster a greener paradigm (Aagaard, 2019; Gerli et al., 2022; Kraus et al., 2020; Montresor & Vezzani, 2023). Stakeholder pressures demand significant reductions in corporate emissions and pollution, urging firms to align their practices with the growing environmental consciousness and compliance with expanding regulatory frameworks (Yu et al., 2017). This scenario underscores the imperative for investments in sustainable practices and business model innovations, aiming not only to enhance environmental and social performance but also

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to bolster competitive positioning, performance, and reputation (Awan et al., 2021; Böttcher et al., 2023; Broccardo et al., 2023). In addition, the COVID-19 pandemic has further underlined the importance of incorporating both technology and sustainability into business strategies, compelling organizations to accelerate their dual transition efforts and the critical need for businesses to swiftly adapt (Alraja et al., 2022; Sigala, 2020). Nevertheless, digital transformation in isolation does not inherently lead to improved environmental performance; it requires integration with green solutions to be effective (Ahmadova et al., 2022).

Accordingly, and in response to the urgent need for sustainable development, the European Commission has championed the concept of twin transition (TT) or digitally enabled sustainable transition, emphasizing the role of digital technologies in driving eco-friendly transformations, while emphasizes the integral connection between sustainability and digital transitions, viewing them as co-dependent elements critical for future progress (European Commission, 2024a). In facilitation of these twin transitions, the European Commission has collaborated with ICT sector leaders to launch the European Green Digital Coalition (EGDC), focusing on fully leveraging digitalization's benefits for sustainability (European Commission, 2024b). This approach underlines the EU's strategic commitment to advancing these transitions in tandem, recognizing their mutual reinforcement as vital for achieving comprehensive and sustainable development.

The twin transition presents both a formidable challenge and a unique opportunity for business model innovation. As companies strive to integrate digital and sustainable practices, they will need to navigate a complex landscape of regulatory pressures, market demands, and technological advancements. Thus, this chapter explores the twin transition in the context of business model innovation, illustrating how the synergy between sustainability and digitalization is reshaping business landscapes. The advent of the twin transition marks a critical inflection point in the evolution of business models and we therefore present the four archetypes of twin transition business model innovation and the strategical implications hereof. Furthermore, we identify the key roles of dynamic capabilities and open innovation in twin transition business model innovation. Finally, we explore the micro-, meso-, macro-, and managerial implications of driving twin transition business model innovation and present key venues for further research.

Understanding the Concept of Twin Transition in Business Development

Despite the burgeoning discourse on the potential of digital technologies to foster green innovation at the firm level, the literature has only marginally explored the extent to which firms are capitalizing on these opportunities. Recent scholarly efforts, including those by Paiola et al. (2021), Alraja et al. (2022), Ardito (2023), Böttcher et al. (2023), and Broccardo et al. (2023) alongside contributions specifically addressing twin transitions (Chen et al., 2023; Montresor & Vezzani, 2023; Spaltini et al., 2024; Rehman et al., 2023), have begun to illuminate the nexus between firm digitalization and environmental innovation from a company perspective. However, these investigations predominantly focus on a limited array of firms, often selected by size, which inherently narrows the applicability and generalizability of their findings. This methodological limitation underscores a pressing need for more expansive research that encompasses a wider variety of firm sizes and sectors, thereby enriching our understanding of how digital technologies can be leveraged to achieve sustainability within diverse business contexts.

The journey towards a twin transition necessitates a rethinking of traditional business models and strategies, offering a pathway to competitive advantage, resilience, and long-term sustainability. Accordingly, the concept of twin transition represents a paradigm shift in business model innovation. This dual focus reflects an acknowledgment that long-term business success and resilience increasingly depend on integrating digital technologies with sustainable practices (Lichtenthaler, 2021). The twin transition not only enhances operational efficiency and creates new value propositions but also responds to growing regulatory pressures and societal expectations for sustainable development (Knudsen et al., 2021). As firms navigate the complexities of this dual transition, they are compelled to adopt a holistic perspective that encompasses environmental, social, and economic dimensions (Bocken et al., 2014; Lüdeke-Freund & Dembek, 2017) in their business development. This integration not only fosters innovation, but also aligns business practices with global regulatory trends and evolving stakeholder expectations, thereby mitigating risks and unlocking new avenues for value creation (Schaltegger et al., 2016a, 2016b). A more recent study by Guandalini (2022) explores the impact of sustainability considerations on digitalization strategies and provide contemporary insights into how firms are integrating sustainability and digital technologies. Thus, integrating digital technologies with sustainability principles opens vast opportunities for innovation in products, services, and processes. Digital tools can enhance the efficiency of resource use, reduce waste, and facilitate the development of circular economy models (Geissdoerfer et al., 2017). For example, the use of big data analytics and IoT technologies can optimize supply chain operations, reducing carbon footprints and improving transparency (Montresor & Vezzani, 2023).

Illustrative of business models propelled by twin transitions and digitally enabled sustainability are, e.g., those rooted in the sharing economy, facilitated by exchange platforms that promote the ethos of sharing resources (Laudien et al., 2023; Rojanakit et al., 2022). Additionally, circular business models, exemplified by subscription services, leverage smartphones and digital platforms to enable a more sustainable consumption pattern (Tunn et al., 2021). These models epitomize the transformative potential of digital technologies in fostering sustainable business practices and consumer behaviors. Moreover, digital platforms enable the creation of sharing economy business models, which contribute to the dematerialization of consumption and the promotion of sustainability (Täuscher & Laudien, 2018). The sharing economy is frequently considered a component of the broader circular economy with the shift towards Product-Service Systems (PSS) being a key aspect of this relationship (Henry et al., 2020). The proliferation of the sharing economy has been significantly facilitated by the rise of internet-based platforms, enabling the emergence of organizations like Airbnb and Uber. Digital technologies have similarly propelled advancements in the circular economy (Neligan et al., 2023), although, unlike the sharing economy, circular economy initiatives often operate independently of exchange platforms, focusing instead on the direct sale of recycled or remanufactured products (Boons & Bocken, 2018). Smart cities epitomize the intersection of twin transitions, blending digital innovation with sustainable urban development to address contemporary societal challenges. By harnessing advanced technologies to optimize resource use, reduce emissions, and enhance quality of life, smart cities exemplify the practical application of twin transitions principles. This integration not only underscores the potential of digitalization to propel environmental sustainability but also positions smart cities as quintessential examples of how twin transitions can manifest in tangible, transformative urban projects (Mora et al., 2023; Paiho et al., 2023; Zheng et al., 2020; see examples in Table 8.1).

Summarizing, the twin transition mandates a strategic overhaul across the nine dimensions of business models (Osterwalder & Pigneur, 2010) intricately weaving digital transformation and sustainable development into the fabric of organizational operations. This paradigm shift redefines customer engagement, targeting segments that prioritize digital convenience alongside environmental sustainability, thereby necessitating value propositions that encapsulate both technological innovation and eco-friendliness. Distribution channels evolve, embracing digital platforms to enhance efficiency and minimize ecological footprints, reflecting a broader commitment to sustainability. This transformation extends to customer relationships, where digital tools facilitate deeper connections with eco-conscious consumers, and to revenue streams, which diversify to include offerings that harmonize digital services with green practices. The recalibration of key resources towards renewable energies and digital infrastructures underpins this shift, steering key activities towards sustainable supply chain management and digital product development. Strategic partnerships with eco-friendly and tech-centric entities become pivotal, amplifying the company's capacity for innovation in the twin transition landscape. Investments in sustainability and digitalization, while initially augmenting the cost structure, promise long-term operational savings and efficiency gains. This comprehensive reconfiguration not only aligns with the evolving market demands but also positions

Table 8.1 Case examples of Twin Transition approaches

IKEA	IKEA has embarked on a journey to become a circular and climate-positive business by 2030. The company is integrating digital solutions, such as virtual reality (VR) apps for product visualization, with sustainable practices, including the use of renewable materials and the introduction of services for furniture leasing and recycling (IKEA, 2023)
Tesla	Tesla's business model exemplifies the twin transition through its combination of sustainable electric vehicles (EVs) and advanced digital technologies. Tesla's use of software updates to improve vehicle performance over time and its deployment of autonomous driving technologies are complemented by its commitment to using renewable energy in manufacturing and its investment in battery recycling technologies (Tesla, 2022)
Microsoft	Microsoft announced its ambitious goal to become carbon negative by 2030 and by 2050 to remove from the environment all the carbon the company has emitted since its founding in 1975. Microsoft is leveraging its expertise in artificial intelligence (AI) through its 'AI for Earth' program, which grants cloud and AI tools to organizations working on environmental challenges and supports projects in agriculture, water, biodiversity, and climate change, demonstrating how digital technologies can be harnessed to tackle critical sustainability issues (Microsoft, 2020)
Bosch	In 2020, Bosch declared that it had achieved carbon neutrality across its 400+ sites worldwide, becoming one of the first global industrial companies to do so. This achievement was partly facilitated by the integration of Internet of Things (IoT) technologies to optimize energy efficiency in manufacturing processes and facilities management. Bosch's IoT solutions, such as connected sensors and smart algorithms, are used for real-time monitoring and control of energy consumption, leading to significant reductions in carbon emissions. The company's commitment to sustainability is further emphasized in its development of eco-friendly products and solutions, including electric vehicle components and energy-efficient home appliances (Bosch, 2020)

companies at the forefront of the digital and sustainable transformation, ensuring resilience and competitiveness in the contemporary business ecosystem.

The Key Roles of Dynamic Capabilities and Open Innovation in Twin Transition BMI

The twin transition concept is grounded in dynamic capabilities theory and underscores the necessity for firms to adeptly navigate changes by reconfiguring competencies to maintain competitiveness (Teece, 2007). This notion is critical in adapting business models to the dual demands of digital and ecological sustainability, as highlighted by Foss and Saebi (2017). It integrates the principles of sustainable development, as defined by the Brundtland Commission (1987), with the transformative impact of digital technology, as outlined by Vial (2021), addressing the challenges and opportunities of the Fourth Industrial Revolution and the environmental crisis (Alkaraan et al., 2024; Cheng et al., 2021).

The integration of sustainable development with digital transformation, as encapsulated in the twin transition, necessitates the creation of innovative business models. This integration is effectively elucidated through dynamic capabilities theory and open innovation (OI), offering frameworks to understand and navigate the complexities of this convergence. However, twin transition necessitates a radical reimagining of business models. This imperative is grounded in the dynamic capability theory and OI framework, which collectively offer a roadmap for navigating the complexities of this dual transition. Dynamic capabilities, as defined by Teece (2007), emphasize the agility and adaptability firms must possess to thrive in rapidly changing environments. Concurrently, OI, outlined by Chesbrough et al. (2006), advocates for leveraging external knowledge and open innovation ecosystems (Adner, 2017; Holgersen et al., 2022) to accelerate digital and sustainable advancements. The integration of these theoretical frameworks addresses the pressing need for business models that are both technologically forward and sustainability focused. The dynamic capabilities theory provides the strategic underpinning for firms to continuously evolve in response to technological and environmental shifts (Alkaraan et al., 2024). In parallel, the OI paradigm underscores the importance of collaborative innovation in achieving complex sustainability goals and digital transformation objectives. In essence, the confluence of sustainable development and digital transformation through the twin transitions lens challenges firms to cultivate both internal agility and external collaborations. This strategic approach not only enhances competitiveness in the digital age but also aligns business practices with global sustainability imperatives, marking a significant pivot in business model innovation towards more resilient, inclusive, and sustainable futures. David Teece's (2020) seminal work elucidates this relationship, positing that dynamic capabilities are critically enhanced by OI practices. This enhancement manifests in several key areas as explained by Vanhaverbeke et al. (2024):

- *Sensing Capabilities*: OI augments an organization's ability to sense changes in society and opportunities in new technologies and markets by tapping into a broader spectrum of data, external knowledge and insights. This openness not only broadens the organization's perceptual field but also deepens its understanding, enabling more informed and data-driven decision-making (Usman et al., 2023).
- *Seizing Opportunities*: OI facilitates the development of new, digital, and sustainable capabilities, particularly in instances where management identifies strategic gaps. By leveraging external resources and collaborations, organizations can expedite the development of in-house capabilities, thus enhancing their capacity to seize emerging digital and sustainable business opportunities.
- *Twin Transformation*: The adoption of OI principles may aid in the twin transformation process, allowing organizations to reallocate internal resources from non-core to more strategic areas of twin transition. This strategic shift is made possible by accessing external sources for non-essential technologies, thereby optimizing the internal allocation of resources towards areas with the highest potential for sustainable value creation.

According to Teece (2020) robust dynamic capabilities are essential for transforming OI activities into sustainable competitive advantages. Thus, we pose that this reciprocal relationship underscores the interdependence between an organization's ability to adapt dynamically to the needs of twin transition and its success in implementing innovative twin transition strategies and represents a sophisticated model for achieving organizational resilience and competitive differentiation through twin transition business models aimed for rapidly evolving society and markets. Emerging technologies have the capacity to significantly disrupt existing business models and, by extension, entire industries. In this context, the imperative for business model experimentation becomes clear and underscores the necessity for established organizations to engage in OI and adaptation to remain competitive in the face of technological advancement and sustainability requirements (Aagaard et al., 2021; Bocken et al., 2019a). However, the OI literature predominantly focuses on a firm-centric view, as highlighted by Barbic et al. (2021) and Aagaard and Rezac (2022). This emphasis reveals a critical need to broaden our insight beyond just the dynamics of collaborative innovation, urging a deeper investigation into value creation and capture at an inter-organizational level (Bogers et al., 2017; Chesbrough et al., 2018). This pivot is crucial for a more nuanced understanding of how organizations across sectors and ecosystems jointly generate and seize value through dynamic capabilities and open twin transition business model innovation.

Consequently, twin transition business model innovation requires a radical reconceptualization of open innovation (OI). Traditional OI models, primarily focused on bilateral partnerships, are insufficient to meet the multifaceted challenges and opportunities presented by these dual imperatives. Instead, the complexity and scope of the twin transition necessitate a cross-disciplinary, multi-stakeholder approach to OI (MacDonald et al., 2022) emphasizing open ecosystems over isolated innovation efforts (Adner, 2017). This shift towards more inclusive and collaborative innovation ecosystems is critical for harnessing the synergies between digital advancements and sustainability goals. Cross-disciplinary OI facilitates the integration of diverse knowledge bases, technologies, and perspectives, essential for addressing the systemic challenges inherent in the twin transition. For example, Bogers et al. (2017) highlight the significance of cross-industry collaborations in fostering innovation, underscoring the value of diverse stakeholder engagement in driving technological and sustainable advancements. Furthermore, the concept of open ecosystems, as discussed by Adner (2017), emphasizes the strategic orchestration of a broader network of participants, including academia, industry, government, and civil society, to co-create value and drive systemic innovation. This expanded view of OI recognizes that the complexities of achieving sustainable and digital transformations cannot be effectively addressed through traditional, linear innovation models. Instead, they require a more holistic, networked approach that leverages the strengths and capabilities of a wide array of stakeholders. Such an approach not only accelerates innovation but also ensures that it is more resilient, adaptable, and aligned with broader societal goals. In essence, the twin transition challenges firms to move beyond conventional OI paradigms towards creating and participating in open ecosystems that foster cross-disciplinary collaboration and innovation. By doing so, organizations can better navigate the intricacies of digital and sustainable transformations, leveraging collective intelligence and resources to develop solutions that are at once innovative, inclusive, and impactful.

Archetypes of Twin Transition Business Model Innovation

Digitalization offers significant potential for enhancing sustainability by optimizing resource utilization, such as minimizing waste, and leveraging the predictive capabilities of algorithms to navigate Internet of Things (IoT) systems towards more sustainable decisions (Di Vaio et al., 2020). For instance, the adoption of Internet of Things (IoT) devices for smart energy management systems (Subramanian, 2023) has been shown to significantly reduce energy consumption and carbon footprints in manufacturing operations (Ali et al., 2021; Song et al., 2023). Similarly, blockchain technology facilitates energy transition (Montakhabi et al., 2023) and is being used to improve traceability and transparency in supply chains, ensuring ethical sourcing and reducing environmental impacts (Jan et al., 2023). Furthermore, digitization facilitates the development of intelligent solutions that lower energy use and improve the efficiency of capacity utilization and logistics networks (Tan et al., 2023) underscoring the transformative impact of digital technologies on sustainable business practices. Within the framework of circular business models, the integration of digital technologies is posited to reduce resource consumption and bolster circular processes, provided that businesses employ these technologies to use resources more efficiently, thereby also diminishing operational expenses (Neligan et al., 2023). Digitalization also facilitates the development of circular economy business models, where the value of products and materials is maintained in the economy for as long as possible. For example, platforms such as the Ellen MacArthur Foundation's Circulytics tool leverage digital data to help companies measure and enhance their circularity performance, driving innovation in product design, material recovery, and business models (Geissdoerfer et al., 2020). Thus, within the ambit of existing discourse on twin transitions, the focus shifts towards operationalizing these paradigms through business model innovation. This exploration delves into the strategic frameworks and methodologies by which companies can harness the synergies between digitalization and sustainability to foster innovation in their business models, thereby creating resilient, future-oriented enterprises. To conceptualize key archetypes in twin transition business model innovation, we employ a matrix, which juxtaposes the dimensions of digital intensity (low to high) against sustainability integration (low to high). This matrix elucidates four distinct archetypes (see Table 8.2).

Strategic Approaches for Operationalizing the Archetypes of Twin Transition BMI

Traditionalists embark on their journey towards twin transition by recognizing the imperative to gradually integrate digital technologies and sustainability practices into their core operations. The strategic focus for these entities lies in laying a foundational step through the adoption of basic digital tools—such as cloud computing and data analytics—that enhance operational efficiency and customer engagement. This is paralleled by initiating attainable sustainability goals, including waste reduction and improvements in energy efficiency. The approach for Traditionalists is characterized by a cautious yet deliberate entry into the domains of digitalization and sustainability, aiming to build a solid base from which further advancements can be made (Porter & Heppelmann,

Table 8.2 Archetypes of twin transition business model innovation

		Sustainability integration	
		Low	**High**
High digital intensity	**High**	**Digital innovators** (High Digital Intensity, Low Sustainability Integration): This archetype represents businesses that have heavily invested in digital technologies to enhance efficiency, customer experience, and innovation. However, their focus on sustainability is relatively undeveloped. While they may lead in digital transformation, their long-term viability and social license to operate could be questioned if they neglect the growing importance of environmental and social governance (ESG) criteria	**Twin Transformers** (High Digital Intensity, High Sustainability Integration): Twin Transformers are at the forefront of embracing both digital and sustainable innovations. They recognize the synergistic potential of leveraging digital technologies to drive sustainability goals and vice versa. For example, they may use big data and analytics to optimize resource use, employ digital platforms to foster circular economy models, or integrate digital sensors to enhance renewable energy management. Twin Transformers are well-positioned to lead in resilience, competitiveness, and stakeholder trust, setting new industry standards for the future
	Low	**Traditionalists** (Low Digital Intensity, Low Sustainability Integration): These are businesses that operate with minimal changes to their conventional practices. They have yet to significantly embrace digital technologies or integrate sustainability into their core operations. Traditionalists may operate in sectors where regulatory pressure or market demand for digital and sustainable practices is currently minimal. However, they face increasing risks of obsolescence or regulatory non-compliance over time	**Sustainable Pioneers** (Low Digital Intensity, High Sustainability Integration): These businesses are characterized by their strong commitment to sustainability. They integrate environmental and social considerations deeply into their business models but have not yet fully leveraged digital technologies to amplify their impact. Sustainable Pioneers often lead in corporate responsibility and sustainable innovation but may miss out on efficiency gains or new opportunities that digital transformation could offer

2014). Philips Lighting's transition to Philips Signify, focusing on LED and smart lighting solutions, demonstrates this approach, where sustainability concerns have spurred digital innovation, leading to business model development and new revenue streams (Philips, 2023).

Digital Innovators, having already established a strong foothold in digital technologies, are poised to integrate sustainability into their digital strengths. The strategic imperative for these organizations involves leveraging their digital capabilities—through advanced technologies like AI, IoT, and blockchain—to achieve better sustainability outcomes, such as enhanced energy management and greater supply chain transparency. Furthermore, innovation with sustainability in mind becomes a key focus, as these entities develop new products and services that utilize digital technologies to address environmental and social challenges, thereby embedding sustainability into their innovation processes. Rennings and Rammer (2011) highlight the concept of "eco-innovation," where digital tools enable the development of products and services that meet sustainability goals. In practice, IBM's use of AI for water management in agricultural sectors exemplifies how digital technologies can be applied to address resource scarcity, enhancing both environmental sustainability and business efficiency.

Sustainable Pioneers stand out for their deep commitment to sustainability yet face the challenge of fully harnessing digital innovations to amplify their sustainability efforts. The strategic direction for these organizations entails adopting digital technologies that can scale their impact, for instance, through precision agriculture technologies or digital platforms that promote circular economy principles. Moreover, embedding a digital mindset within the organization's culture is crucial, ensuring that digitalization efforts are aligned with and support sustainability goals, thereby facilitating a more integrated approach to achieving their environmental and social objectives. The imperative to reduce carbon footprints and achieve energy efficiency compels firms to adopt smart technologies, thereby accelerating digital innovation (Subramanian, 2023). Thus, environmental sustainability requirements are driving firms towards digital solutions, reshaping business models around the principles of the sustainable and circular economy. Furthermore, Guandalini (2022) and Ardito (2023) reveal how companies integrate sustainability concerns in their digitalization strategies and to enhance performance.

Twin Transformers represent the vanguard of integrating digital and sustainable innovations, setting new benchmarks for what is achievable in the business world. The strategic approach for these trailblazers involves developing and implementing business models where digital and sustainability principles are not just aligned but deeply intertwined, offering innovative solutions that redefine industry standards. Leading with innovation, Twin Transformers push the boundaries in both domains, adopting cutting-edge technologies and pioneering sustainable practices that not only redefine their market but also contribute significantly to addressing global challenges of sustainability and digital inclusivity (George et al., 2021). The Ellen MacArthur Foundation's CE100 network is an illustrative example, where companies, innovators, and regions collaborate to foster novel and global circular economy practices, leveraging digital tools to facilitate knowledge exchange and innovation in driving circular twin transitions.

This exploration into the strategic approaches of Traditionalists, Digital Innovators, Sustainable Pioneers, and Twin Transformers reveals the multifaceted nature of navigating the twin transitions. Each archetype represents a strategic stance on navigating the twin transitions, with varying implications for business model innovation, competitive advantage, and sustainability outcomes. The matrix serves as a tool for businesses to assess their current position, identify gaps, and strategize on moving towards the Twin Transformers quadrant, which aligns with both future-readiness and responsible business practices.

From a dynamic perspective, transitioning between the four twin transition archetypes requires deliberate strategic actions, tailored to bridge the gaps in digital intensity and sustainability integration. A concise explanation of how companies evolve from one archetype to the next would require an extensive empirical study. However, we suggest different key considerations for managers to include in making these transitions.

From Digital Innovators to Twin Transformers

Digital Innovators, characterized by high digital intensity but low sustainability integration, need to embed environmental and social governance (ESG) criteria into their core operations and strategy. Concrete actions include adopting sustainability reporting standards to measure and disclose environmental impact, integrating ESG factors into decision-making processes, and leveraging digital technologies to enhance sustainability outcomes. For instance, employing AI and big data analytics to optimize energy use in data centers or supply chains can simultaneously advance digital and sustainability goals.

From Sustainable Pioneers to Twin Transformers

Sustainable Pioneers already excel in sustainability integration but must embrace digital technologies to amplify their impact and efficiency. This transition involves investing in digital tools that complement their sustainability goals, such as precision agriculture technologies for sustainable farming enterprises or blockchain for enhancing transparency in sustainable supply chains. Furthermore, fostering partnerships with tech companies can accelerate digital adoption, ensuring that sustainability efforts are both scalable and impactful.

From Traditionalists to Twin Transformers

For Traditionalists, the leap to Twin Transformers necessitates a dual focus on ramping up digital capabilities while integrating sustainability principles. Thus, we would speculate that Traditionalists would benefit from first pursuing Digital Innovators or Sustainable Pioneer before aiming for Twin Transformers, as this massive transition in most cases would be too extensive and demanding for any organization to carry out successfully. Particularly, as making this transition would require initiating digital literacy and upskilling programs across the organization to cultivate a digital-first culture. Simultaneously, embedding sustainability into the business model—from sourcing to operations and product design, which would require adopting sustainable practices and reporting. Collaborating with digital and green start-ups may help inject innovative sustainability and circular economy thinking and targeted digital technologies into traditional operations, facilitating a smoother transition towards both digital and sustainable excellence.

Cross-Archetype Strategic Imperatives

Across all archetypes, moving towards Twin Transformers requires the fostering of an organizational culture that values continuous learning, innovation, and adaptability and a strategy that integrates digitalization for sustainability. This will entail a completely different managerial mindset and most probably also new types of leadership profiles. In addition, engaging multiple and cross-disciplinary stakeholders in the transition process and leveraging external networks and open ecosystems for knowledge exchange and collaboration can provide valuable insights and resources (MacDonald et al., 2022) facilitating the integration of digital and sustainability innovations. In conclusion, transitioning from one twin transition archetype to another is not merely about adopting new technologies or practices, but about strategically aligning digital and sustainability efforts to drive systemic change. By focusing on concrete activities tailored to their starting points, companies can navigate the complexities of this transition, positioning themselves as leaders in a future where digital innovation and sustainability are inextricably linked.

Reconfiguring Organizations to Leverage Twin Transition Business Model Innovation

The twin transition presents a critical challenge for modern businesses, necessitating a deep-seated re-evaluation of their operational and strategic approaches. This concept underscores a pivotal shift from traditional business practices to a model where digital innovation goes hand in hand with environmental and social responsibility. Such a transition does not merely add layers to existing strategies but demands a comprehensive reassessment of how businesses operate, innovate, and compete in an era marked by rapid technological advances and growing sustainability concerns. This paradigm shift transcends traditional business practices, demanding a holistic reconfiguration of how companies operate, strategize, and innovate in an increasingly interconnected and resource-constrained world.

Accordingly, this profound reconfiguration requires a holistic examination and integration of several key business dimensions. At its core, the twin transition compels organizations to rethink their strategic frameworks, ensuring that digital and sustainability principles are not peripheral elements but foundational to their business models. This strategic shift is complex, involving not just the adoption of new technologies or practices but a fundamental rethinking of sustainable/circular business value creation in the digital age. Additionally, the transition calls for a cultural shift within organizations, fostering an ethos where sustainability and digital innovation are embraced across all levels. Leadership styles and management practices must evolve to support this shift, promoting a culture of adaptability, openness, and continuous learning. In essence, the twin transition is a clarion call for businesses to adapt, innovate, and lead in a world where digital and sustainable development are intertwined. This introduction sets the stage for a deeper exploration into how businesses can navigate this transition, highlighting the need for strategic, cultural, organizational, and technological transformations to thrive in the future business landscape.

Strategic Reconfiguration

Central to navigating the twin transition is a reimagined strategic framework that places equal emphasis on digital and sustainability principles. Traditional business models, often linear and efficiency-driven, must evolve towards systems thinking, emphasizing resilience, circularity, and long-term value creation. This strategic pivot demands comprehensive sustainability and digital audits, identifying areas for significant improvement or overhaul, such as transitioning to circular economy models that reuse resources and leveraging digital platforms for greater supply chain visibility (Lacy & Rutqvist, 2016; Linder & Williander, 2017; Nidumolu et al., 2009). Strategic foresight becomes crucial, as does the alignment of digital initiatives with sustainability goals, ensuring that investments in technology also advance environmental and social objectives (Langley et al., 2023).

Cultural Evolution and Adaptive Leadership

Achieving the twin transition also hinges on cultivating a corporate culture and leadership ethos that prioritizes innovation, transparency, and inclusivity. A culture that values continuous learning and adaptability encourages employees to explore how digital tools can be used in environmentally sustainable ways. Leadership must champion this culture, promoting open strategy and inclusive decision-making processes that consider diverse stakeholder perspectives (Falcke et al., 2023; George et al., 2021). Adaptive leadership styles, characterized by a willingness to experiment and learn from failures, are vital in steering organizations through the uncertainties of the twin transition (Hautz et al., 2017; Whittington et al., 2011).

Organizational Competencies and Structural Redesign

The organizational fabric must be rewoven to integrate new competencies and adapt structures conducive to the twin transition. This involves creating interdisciplinary teams that combine digital prowess with sustainability expertise, breaking down silos to foster a holistic approach to innovation. Investing in training and development programs ensures the workforce is equipped with the necessary skills to navigate and lead in the twin transition landscape. Moreover, organizational structures must be flexible, allowing for rapid adaptation as external conditions change or new technologies emerge (Köhler et al., 2019; MacDonald et al., 2022).

Process Reengineering and Technological Synergies

Internally, business processes—from product design to operations—must be reengineered to embed sustainability and digitalization at their core. This may involve adopting lean and green manufacturing practices augmented by digital technologies like IoT for real-time monitoring and optimization of resource use. Externally, businesses must leverage digital platforms for stakeholder engagement, enhancing transparency and collaboration across the value chain. The application of technologies such as blockchain can ensure traceability and integrity in sustainable supply chains, creating trust, and accountability (Langley et al., 2023; Nidumolu et al., 2009).

Expanding Cross-Disciplinary Collaborations

The complexity of the twin transition necessitates a broadening of collaboration horizons, moving towards open ecosystems that embrace cross-disciplinary partnerships and knowledge sharing. Establishing partnerships with academic institutions, industry peers, start-ups, and NGOs can provide access to novel ideas, technologies, and methodologies that propel both digital and sustainable innovation. These collaborations should be guided by principles of open innovation, where sharing risks and rewards accelerates the development of solutions that are not only technologically advanced but also sustainable and socially responsible (Hautz et al., 2017; Whittington et al., 2011).

In essence, navigating the twin transition demands a multidimensional approach, integrating strategic, cultural, organizational, and technological transformations. By elaborating on these dimensions, organizations can develop a comprehensive roadmap for successfully integrating digital transformation and sustainable development, positioning themselves as leaders in the emerging business landscape defined by resilience, innovation, and societal value.

Advancing Twin Transition Business Model Innovation Across Micro-, Meso-, and Macro-Levels

Navigating the complex interplay between technological advancement and environmental stewardship, modern organizations are increasingly called upon to redefine their strategic imperatives. The imperative for sustainable growth, coupled with the relentless pace of digital innovation, has ushered in an era where traditional business models are being fundamentally challenged and reimagined. At the micro- and firm level, the imperative to adopt twin transitions mandates a profound re-evaluation of operational frameworks and strategic orientations. Organizations are compelled to harness digital technologies not solely for enhancing operational efficiency but as pivotal tools for advancing sustainable practices. This necessitates a paradigm shift within the corporate culture, prioritizing sustainability alongside digital innovation. Digital tools can enhance the efficiency of resource use, reduce waste, and facilitate the development of circular economy models (Geissdoerfer et al., 2017). For example, the use of big data analytics and IoT technologies can optimize supply chain operations, reducing carbon footprints and improving transparency (Paiola et al., 2021; Patil et al., 2023). Moreover, digital platforms enable the creation of sharing economy business models, which contribute to the dematerialization of consumption and the promotion of sustainability (Täuscher & Laudien, 2018). For example, digital channels and social media amplify consumers' awareness and expectations, compelling businesses to adopt more transparent and responsible practices, while ensuring win-win outcomes (Beckmann et al., 2014).

At the meso-level, the industry or sectoral perspective on twin transitions reveals a complex scenario where digital and sustainable innovations disrupt traditional value chains and market structures. Digital technologies enable more transparent, efficient, and flexible supply chains, promoting principles of the circular economy and reducing environmental footprints. This meso-level transformation encourages industries to rethink competitive strategies, moving towards collaborative models that leverage digital platforms for shared value creation. Industries become incubators for sustainable practices, driven by digital capabilities that allow for resource optimization, waste reduction, and enhanced life-cycle management of products and services. The complexities of the twin transition necessitate collaboration among a broad spectrum of stakeholders, including governments, NGOs, industry peers, and academia. Such collaborative ecosystems can accelerate the development and diffusion of sustainable and digital innovations (Altman & Nagle, 2020). For instance, public-private partnerships can facilitate the sharing of knowledge and resources, driving the co-creation of sustainable solutions (Ansell & Torfing, 2021).

Macro-Level Implications: On a broader scale, the twin transitions address critical societal and economic challenges, aligning with global sustainability goals and digital equity objectives (Nidumolu et al., 2009). The macro-perspective underscores the role of policy and regulatory frameworks in facilitating these transitions, highlighting the need for supportive infrastructures, incentives for green technology adoption, and standards for digital governance. Twin transitions have the potential to catalyze systemic changes, promoting a more sustainable and digitally inclusive economy. This encompasses not only environmental benefits but also socio-economic impacts, such as job creation in new green and digital sectors, re-skilling of the workforce, and fostering innovation ecosystems that contribute to resilient and sustainable growth for society at large and across sectors and borders.

The successful interaction across these three levels involves a dynamic interplay where micro-level organizational innovations are supported and amplified by meso-level collaborations and networks, all within an enabling macro-level environment. This open ecosystem approach ensures that innovations are not isolated but are instead integrated into a broader system of support, facilitating scalability and impact. For instance, the development of a digital platform for circular economy practices requires not only the technological capabilities and strategic vision at the micro-level but also the collaboration with supply chain partners at the meso-level and is significantly influenced by regulatory frameworks and market demands at the macro-level. In conclusion, the successful fostering of twin transition business model innovation is contingent upon a holistic understanding of the interactions across micro-, meso-, and macro-levels. By aligning internal strategies with external collaborations and operating within a supportive broader ecosystem, organizations can effectively navigate the complexities of digital and sustainable transformation, driving innovation that is both impactful and enduring.

Wanted: Visionary Leaders to Navigate the Twin Transition Challenge!

The imperative for twin transition in business model innovation (BMI) heralds a new era for leadership and management, fundamentally altering the competencies required to navigate the confluence of digitalization and sustainability. This transformative landscape necessitates a departure from conventional managerial approaches, demanding a reconfiguration of leadership styles, strategic orientation, and organizational culture to fully leverage the synergies between digital advancements and sustainability goals. Accordingly, successful navigation of twin transition BMI requires leaders who can blend adaptive leadership and visionary strategic thinking with operational pragmatism, embodying a commitment to both digital innovation, sustainability, and circular economy. This new breed of leaders must excel in strategic foresight, recognizing the long-term value and competitive advantage derived from integrating digital technologies with sustainable practices. They are tasked with transcending traditional profit-centric models, advocating for and embedding Environmental, Social, and Governance (ESG) principles and digital technologies as core elements of corporate strategy and value creation (Abebe et al., 2021; Eccles & Klimenko, 2019). In addition, adapting to the twin transition necessitates cultivating a culture that prizes adaptability, continuous learning, and cross-functional collaboration. Accordingly, leaders must foster an environment where experimentation is encouraged, and failure is viewed as a stepping stone to innovation (Aagaard et al., 2021; Bocken et al., 2019a). This involves investing in developing dynamic capabilities that allow the organization to swiftly respond to emerging technological opportunities and sustainability challenges (Teece, 2018, 2020). Furthermore, managers play a crucial role in enhancing digital literacy and sustainability awareness across the organization, recruiting, motivating, and training the necessary competencies, while ensuring alignment with twin transition objectives. Hence, leaders must balance the pursuit of disruptive innovation with the imperative of operational stability, carefully managing the risks and opportunities presented by digitalization (Broccardo et al., 2023; Nambisan, 2017; Teece, 2018), while fostering an innovation management strategy that is both agile and aligned with sustainability objectives.

The complexity of integrating digital and sustainable innovations into BMI underscores the importance of stakeholder engagement and transparency. Managers must navigate this complexity by aligning business strategies with ESG criteria, ensuring that decision-making processes are inclusive and transparent. This strategic shift towards ESG and transparency not only meets societal and market expectations but also fosters trust and strengthens the organization's social license to operate (Eccles & Klimenko, 2019; Lozano, 2020). Hence, the realization of twin transition BMI depends on the ability to develop open ecosystems and cross-sector partnerships that extend beyond traditional industry boundaries. Leaders must actively seek and cultivate relationships with technology providers, start-ups, academic institutions, policymakers, and civil society, embracing cross-disciplinary open innovation and co-creation as essential strategies for addressing the multifaceted challenges of digital and sustainable integration (Chesbrough, 2012; Cozzolino & Geiger, 2024; Pittz & Adler, 2023). In twin transformation business development, the dynamics of partnering within open ecosystems are crucial for success. These partnerships, spanning across industries, academia, start-ups,and policymakers, enable the sharing of ideas and resources, accelerating innovation in digitalization and sustainability. Managers navigating this terrain must strategically cultivate and maintain these collaborations, ensuring alignment and managing complexities such as intellectual property and cultural integration. Effective partnership management is key to unlocking the transformative potential of the twin transformation, making it essential for managers to embrace flexibility, strategic thinking, and a collaborative mindset. This requires a keen understanding of the interdependencies between digital and sustainable strategies, and the ability to integrate diverse stakeholder goals around this dual focus.

In conclusion, the twin transition in BMI not only demands a reconfiguration of business models but also necessitates a profound transformation in leadership and management. The leaders of tomorrow must be adept at navigating the intricate interplay between digital and sustainable innovations, championing a culture of adaptability, engaging with a broad array of stakeholders, and driving strategic, cultural, and technological changes. This new leadership paradigm is essential for organizations aiming to thrive in the era of digital and sustainable transformation, embodying the principles and practices that will define success in the twin transition landscape. However, integrating digital technologies into existing operations and aligning them with sustainability goals can be complex and resource intensive. Hence, managers face challenges in selecting the right technologies, ensuring interoperability, and managing the associated risks, including data security and privacy concerns (Acciarini et al., 2023; Calluzzo & Cante, 2004; Nambisan, 2017; Ogbuke et al., 2022). Moreover, navigating regulatory compliance and the evolving regulatory landscape related to sustainability and digitalization presents another challenge. Managers must stay abreast of global and local regulations, which can vary significantly across markets and sectors (George & Schillebeeckx, 2022). Additionally, the incorporation of digital technologies and sustainability concerns into new twin transition business models necessitate a thorough assessment of their social implications, including considerations related to human rights, privacy, health, and safety, and working conditions (Trittin-Ulbrich et al., 2021; West, 2019). For example, at a more fundamental level, the dynamics between digitization's influence on employment and society—whether it displaces existing jobs or creates new opportunities—remains a critical area of investigation and concern (Aubert-Tarby et al., 2018). Finally, business model innovations in twin transitions typically feature disruptive technologies that forge unprecedented pathways, leading investors into uncharted realms. This unfamiliarity can leave investors uncertain about their capacity to comprehend such innovations and, as a result, doubt their ability to derive strategic benefits from their investments, which may ultimately deter them from investing (Ansari et al., 2016; Piazza et al., 2023).

Future Research in Twin Transitions Business Model Innovation

The discourse presented in this chapter on twin transition business model innovation lays a crucial groundwork for identifying future research directions that promise to significantly enrich our academic and practical grasp of this field. The confluence of digitalization and sustainable practices, as notably advocated by the European Commission and epitomized through the European Green Digital Coalition, marks a transformative nexus in the evolution of business models. This dual integration not only aligns with contemporary environmental imperatives but also heralds a new era of business innovation that leverages digital technologies for sustainable growth.

A foremost area for forthcoming research lies in the empirical evaluation of how twin transition BMI influences organizational performance, sustainability metrics, and competitive advantage. Such an inquiry is essential to quantify the operational and strategic dividends of marrying digital initiatives with sustainability goals, thereby elucidating the nuanced balance between innovation and environmental stewardship. Further scholarly exploration is warranted into the mechanisms through which dynamic capabilities and open innovation facilitate twin transitions, especially in the context of cross-sector collaborations. This research trajectory could unveil how diverse industries can coalesce around shared sustainability and digital transformation goals, overcoming traditional barriers to innovation and fostering a culture of collective advancement.

The interplay between regulatory frameworks and the adoption of twin transition business models also demands rigorous analysis. Investigating the extent to which ESG legislation, policy, and governance structures support or impede these innovative models can offer actionable insights, potentially guiding policy adjustments to better accommodate and promote such transformative business strategies. Moreover, delving into the adoption challenges and best practices for integrating disruptive technologies within twin transition frameworks can provide vital guidance for businesses. This exploration should aim to uncover strategies for seamlessly blending digital transformations with sustainability objectives, ensuring that technological advancements contribute positively to environmental goals. Furthermore, we also need to explore how companies are navigating the ethical use of data, data privacy, and data security in leveraging digital technologies for (Acciarini et al., 2023; Calluzzo & Cante, 2004; Ogbuke et al., 2022). In addition, analyzing the impact of twin transition business models on consumer behavior and market dynamics represents another fertile ground for research. This avenue could reveal how digital and sustainable innovations reshape consumer expectations and loyalty, influencing market trends and driving competitive advantage in increasingly eco-conscious markets.

Longitudinal studies tracking the evolution of twin transition business models over time are crucial for understanding the dynamic interplay between strategy, operation, and market positioning as companies navigate this changing landscape. Such research can highlight the transformative impact of twin transitions on business practices, offering insights into long-term sustainability and digital integration. Lastly, a multi-level analysis—spanning the micro (individual organizational strategies), meso (industry and ecosystem collaborations), and macro (broader economic, societal, and policy impacts)—is indispensable for a holistic understanding of twin transitions‘. This comprehensive approach promises to dissect the complex layers influencing twin transition initiatives, paving the way for strategic and policy frameworks that support sustainable and digital business transformations.

In essence, these elaborated research directions aim to deepen our understanding of twin transition business model innovation as a pivotal game changer. By systematically addressing these areas, academic inquiry can illuminate the pathways towards integrating digital and sustainable practices within business models, steering firms towards a future that is both environmentally responsible and technologically advanced.

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9

Business Model Theory and the Becoming of New Mobile Communications Technologies

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Introduction

Mobile communications technologies have become the backbone of all digitalization. Next-generation (6G) mobile connectivity is expected to merge the human, physical, and digital worlds as a new kind of general-purpose technology platform for transactions and innovation in the 2030s (Ahokangas and Aagaard, 2024; Cusumano et al., 2019; Uusitalo et al., 2021). It will enable ubiquitous wireless intelligence services for human and machine users, bringing about radical improvements in the capabilities of users, drastically transforming cultures and societies, affecting economies at the global level—and all this with new business models (Yrjölä et al., 2021b; Yrjölä et al., 2022). However, the

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consensus ends on what 6G will become and how. Leading research organizations and companies in different countries active in developing the future 6G have presented competing visions on what it will be, how and for what purposes it will be used. These competing visions aim to influence business, technology, and regulation innovation in future mobile communications. More importantly, the visions aim to secure the global competitiveness of the presenting organizations and their respective economies. Therefore, we argue that developing and commercializing a future-proof and competitive global 6G will fundamentally be a *business model innovation problem* extended to a *business ecosystem innovation problem* where the perspectives of business, technology, and regulation converge for innovation and transactions.

This research focuses on framing and understanding business model innovation in *emerging futuristic technology contexts*, especially 6G mobile communications. More specifically, we explore the *nature and impact of technology* on future business models (BM) and business model innovation (BMI), intending to develop a *forward-looking approach to theorizing BMs and BMI*. In the BM research field, the role of the technological context and the strategic and forward-looking nature of BM and BMI concepts have long been acknowledged (Chesbrough, 2010; Morris et al., 2005). For instance, building upon cognitive approach, Martins et al. (2015) propose that business model schemas can be used to create images of future business models. Along this line of reasoning, a BM can be seen as an *ex ante* representation of possible outcomes, i.e. a device to depict what a firm plans to do in the future, thereby hoping *ex post* to create a competitive advantage for value capture (c.f. Baden-Fuller & Morgan, 2010; George & Bock, 2011). Martins et al. (2015) interpreted the dynamic, evolutionary perspective of BMI as a continuous, incremental calibration to achieve optimal fit with the environment. Yet, the extant BM and BMI literature lacks a coherent temporal perspective that shifts focus from reactive responses to external challenges towards proactive envisioning of the future (Schneckenberg et al., 2022; Vittori et al., 2022). In turn, it hinders understanding BMs and BMI within emerging futuristic technology contexts. However, deepening our knowledge of BMI in this business context requires a forward-looking approach to both BMs and BMI.

Future 6G mobile communications provide a sui/context for researching forward-looking BMI due to the systematic future orientation of the industry. Currently, the United Nations' International Telecommunication Union Radiocommunication sector (ITU-R) is working on technology trends and vision work to create a global definition for 6G, which is to be published in 2023. In the next phase, the vision will be used as a basis for deriving requirements for standardization and specifying technology releases that the 6G technology and equipment vendors and service providers will use as a basis for their solution development.

The rest of the research is structured as follows. We start by framing the theoretical starting points of the study from forward-looking technology and BMI standpoints and discuss the foundational concepts for a novel business model theory. Next, we approach and frame the envisioned 6G mobile communications context, building on the business model theory. We conclude by reflecting on our findings in our empirical context and discussing the consequences and implications of our results for theorizing BMs and BMI.

Theoretical Starting Points

Traditional BMI research has focused on single firms utilising discrete technologies that they own. Many new technologies, however, are interdependent in nature and their development requires collaboration. The concepts of enabling and general-purpose technology help understanding BMI in futuristic technology contexts. In the same vein, the traditional view of seeing BMI as adaptation needs to be reconsidered. Recent research on BMI has started to apply the BM for forward-looking prediction of future technologies. In the following, we root the role of technology advancement to BMI in the ecosystemic 6G context, thereby revealing how the concepts of BM and BMI can be used to understand and envision future technological development.

Business model innovation (BMI) and profiting from innovation (PFI) with new business models (BM) will become increasingly ecosystemic in future new technology contexts such as 6G (Yrjölä et al., 2022).

Complexities and uncertainties of emerging, converging, complementary, and interdependent technologies make it impossible for single firms to innovate, commercialize, and profit from them competitively. The next-generation mobile communications technology well exemplifies this kind of situation. The sixth generation of mobile communications (6G) will converge with other technologies such as cloud technologies, artificial intelligence (AI), and Web3 in its functions and services (Yrjölä et al., 2021a). The widely used 4G and the currently deployed 5G systems have been referred to as enabling technologies. Recent work has identified the next steps of 5G as a general-purpose technology (Bauer, 2022). The future 6G has been envisioned as an emerging general-purpose connectivity platform that will continuously change and impact stakeholders in both downstream and upstream sectors in telecommunications (Teece, 2018). The increasing dependence of modern societies on mobile communications technologies has also raised national interest and highlighted the importance of regulation and other policies, potentially adding to the complexity of BMI and bringing new uncertainties to it in the 6G context.

Role of Technology in BMI

Traditionally, patents based on *discrete technological solutions* have enabled BMI at the level of individual firms. Foss and Saebi (2017, p. 201) define BMI as "designed, novel, nontrivial changes to the key elements of a firm's business model and/or the architecture linking these elements" maintaining the focal firm perspective. Taking a system-level view, we follow Snihur and Zott (2020, p. 556) and approach BMI as the introduction of "novel business models to the market space in which the firm competes". In the mobile communications world, this means transferring proprietary technologies into a series of standards that the technology vendors use to develop their products and services. Since 1988, all major technology vendors have utilized the European Telecommunications Standards Institute ETSI to orchestrate the development and governance of the standards and license these technologies on a fair, reasonable, and non-discriminatory (FRAND) basis globally. This licensing mechanism has enabled the co-development and global adoption of technology, contributing to the mobile success and spillover effects of communications technologies (Teece, 2018). Contrary to the single-firm-owned and loosely regulated "winner-takes-it-all" platforms of the Internet, mobile connectivity platforms have developed into multilayered, multisided, and coopetitive platforms where firms can cooperate vertically on the technology side while competing horizontally on the highly regulated service side.

However, innovations in *enabling technology* (ET) change the situation for BMI. Characterized by the rapid development of subsequent derivative technologies, often in diverse fields of application, ETs allow for a radical change in the capabilities of the technology users (Gambardella et al., 2021). Teece (2018) applied the PFI framework to understand innovation in the telecommunications sector by focusing on appropriability, complementarity, standardization, and intellectual property. Yrjölä et al. (2022) extended the framework for 6G. They applied it across the different phases of technology development, from research to developing technology, products, systems, and services (Messerschmitt & Szyperski, 2003). Previously, BMI research has focused on single networked firms. In the context of ETs, the focus of BMI naturally shifts toward the ecosystem stakeholders, emphasizing learning (Yi et al., 2022), value creation, and capture processes (Burström et al., 2021), as well as complementarity in the ecosystem services (Visnjic et al., 2016) or assets (Teece, 2018), and ecosystem innovation (Snihur & Bocken, 2022). In this respect, ecosystem innovation refers to the innovation by the ecosystem participants other than the focal firm (Snihur & Zott, 2020).

Recently, extending the discussion around ETs, a new conceptualization of *general-purpose technologies or infrastructure* (GPTs) (Bekar et al., 2018; Bresnahan & Trajtenberg, 1995; Hogendorn & Frischmann, 2020) has emerged to make sense of BMI. GPTs have been seen as related or integrated technologies or infrastructures that affect the global economy and alter societies through their impact on pre-existing social and economic structures. Rather than offering complete solutions, GPTs open new opportunities—i.e. have many uses or are widely used across most of the economy—as engines of growth (Bekar et al., 2018; Bresnahan & Trajtenberg, 1995). Hogendorn and Frischmann (2020) also see a close connection between infrastructures and platforms: platforms refer to technologies whose use varies from highly specialized to very general, as is the case with future 6G. For BMI in the platform context, this has been characterized as "platformization of infrastructures" or "infrastructuralization of platforms" (c.f. Plantin et al., 2018), leading to the increased importance of openness and tethering of technologies in ecosystemic platform contexts. Tethering means that users must be virtually, physically, or contractually connected to the platform for deployment, making controlling its use feasible and more salient to different policies. Interestingly, Hogendorn and Frischmann (2020) also observed GPTs to be similar on the demand side (services) but different on the supply side (technology). The above discussion leads to the conclusion that BMI and technology development go hand in hand, wherein BMI serves not only as a sense-making tool but also as a legitimizing mechanism for the new technology in a specific regulatory context.

BMI: From Adaptation to Prediction

The idea of change and development at the technology-, business model-, or ecosystem-level of analysis is a basic tenet in BMI and technology-related research. It is often referred to as evolution (Palmié et al., 2022), transformation (Burström et al., 2021), diffusion (Cho et al., 2022), technological shift (Tongur & Engwall, 2014), or learning (Yi et al., 2022), among others. Additionally, extant research focuses on BM configurations and considers BMI as adaptation from a retrospective perspective (Foss & Saebi, 2017). A recent development in BMI research is to explicate the process nature in terms of prior causes and later effects. For example, Bhatti et al. (2021) examined the antecedents and consequences of BMI in the IT industry, arguing that absorptive capacity, organizational agility, and management mindfulness are antecedents to BMI that explain firm performance as an outcome. Similarly, Nailer and Buttriss (2020) examined BM evolution in the software industry in terms of anticipation and realization of value. Furthermore, To et al. (2020) used value proposition logics to examine business model evolution concerning industry evolution, arguing that value propositions co-evolve along with industry evolution. Moreover, Vittori et al. (2022) examined BMI between the embryonic and growth stages of industry lifecycles.

Taking a step further toward prediction, Climent and Haftor (2021) have predicted future digital technology use by what they refer to as business model theory, providing insights for predicting BMI and innovative BMs in industrial technology markets. In turn, Lind and Melander (2021) look into how new technologies can impact the future business models in the road freight transport system. Another stream of research in the technology context uses the BM concept as a device for technology foresight (e.g. Paiola et al., 2022; Şimşek et al., 2022) or futures research (Ahokangas et al., 2022). As contextually bound, this research aims to examine future opportunities or show potential pathways towards the future. Along the same lines, Snihur and Bocken (2022) emphasize an urgent need to broaden the conceptualization of innovation and look into the future consequences of BMI to be able to respond proactively to the external challenges.

The above discussion highlights two aspects, the role of technological advancement over time and the context in which the advancement takes place—the ecosystem and its interactions. Kapoor and Teece (2021) discuss the three faces of technological value creation: emerging, enabling, and embedding. Many new technologies, such as mobile communications technologies, form a trajectory through a series of breakthrough inventions introduced by a multiplicity of heterogeneous stakeholders who face the need to make substantial but uncertain investments, resulting in several variations of the technology. This trajectory is associated with the risks stemming from the emergent nature of new technology. However, publicly funded basic and generic research and its spillover effects may help advance technological progress. The enabling nature of technology corresponds to its commercialization across multiple application domains that may be costly and require development and an array of complementary assets. The need for complementary assets can lead to underinvestment, hampering the growth and adoption of the technology. Public policies and subsidies to support firms' research and development activities can potentially alleviate the situation. The embedded nature of technology refers to the business model and ecosystem within which the technology is commercialized. BMs and ecosystems are interdependent in terms of value creation and capture activities but may also raise important policy and regulatory questions.

The above discussion illustrates how BM and BMI may have explanatory and predictive power, allowing us to use BM as a tool for forward-looking theorizing. To delve deeper into the what, how, why, who, when, and where (Sutton & Staw, 1995) of BMs and BMI in futuristic technology contexts, we next propose neighbouring key concepts that could form the basis for theorizing and forming a business model theory applicable to our research context.

Towards a Business Model Theory

Theory is a key to any scientific work as it explains "why acts, events, structure, and thoughts occur" (Colquitt & Zapata-Phelan, 2007; Sutton & Staw, 1995, p. 371). Detailing the above, Whetten (1989) argues that there are four essential building blocks in any theory—the "what," "how," "why," and "who, when and where." "What" refers to constructs or concepts that should be considered for understanding how a firm organizes and transforms itself. "How" elucidates how the chosen constructs are related to each other. Operationally, this implies a causality between the concepts. "Why" should explain the dynamics that justify the concept selection and the causality. The "who, when, and where" questions set the boundary conditions for the theory and limit its generalizability. In the following we build upon Dubin (1978), Whetten (1989), and Einhorn and Hogarth (1986) to examine whether the business model exhibits the characteristics of a strong theory that explains "connections among phenomena" and tells "a story about why acts, events, structure, and thoughts occur" (Sutton & Staw, 1995, p. 371), addressing the questions of what, how, why and who, when and where explicitly. This approach allows understanding the behaviour of firms as a dynamic phenomenon by looking at several levels of analysis, not only at the firm level, but also below the firm level at product, team or business unit levels of analysis, and beyond the firm at network/ecosystem/cluster/geographical, industry, or market levels of analysis (c.f., Wirtz et al., 2016).

Traditionally, BMs are understood in terms of *resources, structures, and positions* a firm utilizes to create and deliver *value* to customers and other stakeholders. From this perspective, the central element of the BM is the value proposition, as exemplified, for example, by the widely used Osterwalder and Pigneur's (2010) business model canvas that depicts the BM of the focal firm as networked within its industry. As a variation, the lean canvas (Maurya, 2012) focuses on customer relationships. Thus, value represents one of the main building blocks of a BM (Pedersen et al., 2018). It is important to note that recent discussions in the BM research field have gradually broadened the meaning of value to include customer needs, economic return, compliance, and societal and environmental goals to ensure "sustainable value creation" (Bocken et al., 2015, p. 70). Integrating *sustainability* into BM thinking allows for a departure from narrow and simplistic views regarding boundaries and focus (Pedersen et al., 2018). Building on the resource-based view (Barney, 1991), it can be argued that firm resources, structures, and positions form the basis of a firm's competitive *advantage*, allowing it to outperform others (Porter, 1980). In turn, the sustainability of competitive advantage is contingent upon its *replicability* (Chaharbaghi & Lynch, 1999). Replicability implies a BM's flexibility to meet the challenges of different contextual requirements, as business models always need to be calibrated to their environment (Teece, 2010). For example, Martins et al. (2015) see BMI primarily as a form of replication to enter new markets.

Another approach to BMs that we have identified is based on seeing them in terms of *actions, events, and actors* as a vehicle to explore and exploit business *opportunities* in the environment, as exemplified by Ahokangas et al. (2014), Ahokangas and Myllykoski (2014) or Atkova (2018). Utilizing an action perspective, Atkova (2018) explains BM creation through two key processes: conceptualization, which refers to choices regarding opportunity and BM contents, and contextualization, which means testing these choices against reality. In this thinking, the BM is built around the opportunity exploration-exploitation nexus, where value is co-created and co-captured with partners and customers instead of being first created, delivered to customers, and finally captured by the customer firm. The emergence of digital platforms and ecosystems as a new venue for organizing value processes widens the spectrum of available business opportunities to be explored and exploited. In this context, the *scalability* of a BM can be understood as the ability to deal with the business volume, business space, and business model changes and becomes a critical attribute for a BM (Juntunen et al., 2018, p. 19). In other words, it refers to its internal growth potential beyond the scale/volume it was initially developed for.

Following the logic of Martins et al. (2015), the resources-structures-positions perspective implies a static understanding of the BM concept; in turn, the actions-events-actors approach builds upon a dynamic understanding of BMs. The former perspective views BMs as static representations of reality, whereas the latter implies that BM development is closely associated with experimentation, discovery, and learning during the process (McGrath, 2010; Sosna et al., 2010). Dynamism is frequently positioned as an integral feature of the BM concept as the BM's sustainability can only be achieved by constantly calibrating the BM to its environment (Demil & LeCocq, 2010; Teece, 2010). Also, the resources-structures-positions and actions-events-actors approaches are an entrepreneur, single firm, business, or offering focused and more descriptive than explanatory by nature.

The third perspective allows for balancing the static-dynamic dyad and explains BMs in terms of *approaches, processes, and purposes* as frameworks (Bocken et al., 2015), stories (Magretta, 2002), or cognitive schemas (Baden-Fuller & Mangematin, 2013; Chesbrough, 2010; Doz & Kosonen, 2010; Martins et al., 2015). The resources-structure-positions perspective helps to answer the question of which resources, structures, and market positions are critical for creating and delivering value. In turn, the actions-events-actors approach is primarily concerned with exploring and exploiting the business opportunity. The question in the approaches-processes-purposes view is related to why business model thinking can benefit us, rather than what a single BM is or could be

(Doganova & Eyquem-Renault, 2009). Thus, Doganova and Eyquem-Renault's (2009) focus on what a BM does and conceptualize it as a market device that supports the emergence of innovation networks.

The above discussion points out three key constructs present in the extant BM literature as antecedents to BMI and communication: opportunity, value, and advantage. These three constructs help explain what business firms do and how they do business. Parallel to this, we recognize three outcomes expected from a successful BM to be present in the business model literature: scalability (Nielsen & Lund, 2018a, 2018b; Stampfl et al., 2013), replicability (Aspara et al., 2010; Dunford et al., 2010; Martins et al., 2015), and sustainability (Bocken et al., 2014, 2015; Schaltegger et al., 2012). The latter three constructs help explain why, where, and when firms do business. Next, we aim to answer the question "how" and present how these six constructs constitute the core elements of the business model theory.

Antecedents to Business Model Thinking

Whether discovered or created (Alvarez & Barney, 2007; Shane & Venkataraman, 2000), opportunity can be regarded as the antecedent to any business model (Atkova, 2018), as without an opportunity, there is little point in creating a business model in the first place. Opportunity exploration and exploitation (March, 1991; Zott & Amit, 2010) lead to the interdependence between opportunity and the BM. BMs are always becoming or in transition; they are never ready or finished (McGrath, 2010) as the environment that feeds businesses with opportunities is in continuous change. Therefore, from the strategic perspective, this calibration to the environment, as Teece (2010) puts it, means continuous scoping of opportunities through the business model. Opportunity can thus be regarded as a separate but related concept to the BM. Over the firm lifecycle, there is a range of potentially available options concerning the opportunity formulation (Atkova, 2018). This variety is explained not only by the continuously changing external environment but also by the internal firm transformations. Therefore, opportunity scoping implies the continuous testing of available opportunity options against reality, assessing their relevance and feasibility, and ensuring that a BM allows exploiting a constantly evolving opportunity most effectively.

The processes of value creation, delivery, and capture (Amit & Han, 2017; Foss & Saebi, 2017; Osterwalder & Pigneur, 2010), value co-creation and co-capture (Bengtsson & Kock, 2000), and even value sharing (Verstraete & Jouison-Laffitte, 2011), have constituted the foundational part of the BM construct from the beginning. Value exchange (Verstraete & Jouison-Laffitte, 2011; Wilson, 2003) for the sake of value accumulation can be seen as the key driver for any economic activity. Value accumulation is substantiated by an array of different value processes, including value (co)-creation, delivery, (co)-capture, and sharing. Therefore, it can be claimed that value processes largely explain what, how, and why companies do something.

The BM can be seen as a vehicle for creating competitive advantage through opportunity exploration and exploitation. With opportunity, competitive advantage links the BM to the external business environment (Ahokangas & Myllykoski, 2014). Given the contemporary business environment, an advantage is rarely sustainable and can quickly become uncompetitive (McGrath, 2010). Therefore, BMI and communication are necessary to secure an industry position and complement resources and capabilities (Chesbrough, 2010). A competitive advantage refers to conditions and circumstances that allow a firm to create greater value.

Outcomes of Business Model Thinking

Scalability (Nielsen & Lund, 2018a, 2018b), sustainability (Schaltegger et al., 2016), and replicability (Martins et al., 2015) are expected outcomes for any BM. First, although both scalability and replicability are frequently related to growth in the extant literature (Aspara et al., 2010; Stampfl et al., 2013), we relate scalability conceptually more to opportunity as the size and type of opportunity addressed/chosen by a firm sets the scale for the growth potential enabled by a BM. Continuous opportunity scoping triggers and supports the process of BM creation, transformation, and innovation—as the primary function of a BM is to explore and exploit an opportunity (Ahokangas & Myllykoski, 2014; Zott & Amit, 2010). Second, we relate the concept of replication to (competitive) advantage (Aspara et al., 2010; Dunford et al., 2010), as replication of advantages across contexts implies utilizing advantages as widely as possible to ensure competitiveness in the future. Finally, we relate sustainability conceptually to value as all economic activity aims at value accumulation that can be measured in terms of sustainability. In addition, the predicted outcomes will give feedback and influence a BM.

The BM concept links opportunity as the antecedent to scalability as the outcome, value as the antecedent to sustainability as the outcome, and advantage as the antecedent to replication as the outcome, which explains why and how companies create, transform, and innovate their BMs. As visualized in Fig. 9.1, the business model theory allows for identifying what and how the emerging technologies will influence, mapping new opportunities for scalability, organizing for sustained value creation, and replicating new advantages. In this, the BM antecedents and outcomes (or choices and consequences at the managerial level) provide a suitable *approach to futuristic BMs and BMI* and explicate the dynamics of BMI in the larger, ecosystemic context. By connecting different but related concepts, the business model explores and explains why companies do what they do.

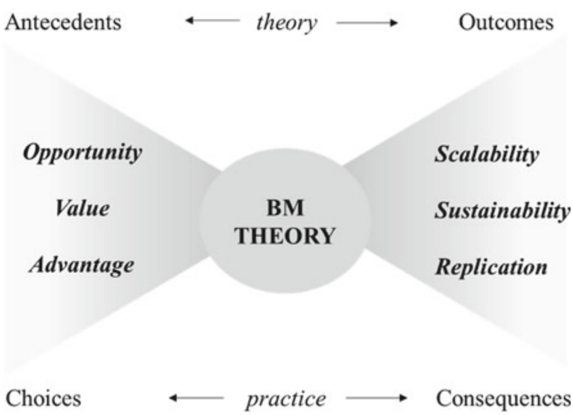

Fig. 9.1 Key elements of business model theory

Framing Future 6G Mobile Communications

Traditionally the mobile communications ecosystem has followed a global define-standardize-develop-deploy/use cycle of technology commercialization. Based on recently identified technology trends by the United Nations' International Telecommunication Union Radiocommunication (UN ITU-R) Sector, in 2023 the UN ITU-R will provide a global vision for international mobile telecommunications (IMT) towards 2030 and beyond which will serve as the starting point for the 6G definition. This vision will be followed by a definition of requirements at a later stage and currently provides a basis for the standardization process to produce technology releases for the parallel development of 6G solutions by the technology vendors, ensuring backward compatibility with earlier technology generations and global compatibility of the solutions between different vendors whose solutions will be deployed and utilized by mobile operators. The operators' activities will be regulated by national regulatory bodies that grant operators licences to use the radio spectrum necessary for providing the service.

Up to 4G, BMs and BMI within the mobile communications ecosystem have remained relatively stable and dominated by the technology perspective. However, the currently developed and deployed 5G, and especially the future 6G, are expected to disrupt the employed BMs and the whole ecosystem. For the 5G use case definitions, the ITU-R adopted a service-centric approach. This definition opened the opportunity to change from connectivity-centric BMs toward various connectivity plus bundled content (data-based), context (location-based or service-specific), and commerce (platform) BMs and offering the whole network as a service (NaaS). In parallel, this development has disrupted the ecosystem by enabling new entrants, such as factories, to run their own local private 5G networks. Additionally, other technologies such as cloud computing, AI, and Web3 have started to converge with or complement 5G.

Web3 enables new, decentralized forms of industrial, commercial, and civil organization that fundamentally differ from present operation modes. Decentralized Web3 solutions give users and developers more control and authority over their generated content, enabling a token-based economy. This decentralizes the market to empower the supply of and demand for connectivity services and network infrastructure resources via open and automated transactions. A decentralized platform will distribute the value between the players, while open-source software lowers market entry barriers for developers, promotes interoperability, and expedites development cycles based on shared knowledge. Novel decentralized business models will not necessitate a focal point but depict the design of transaction content, structure, and governance (Zott & Amit, 2010) to create value. Everything-as-a-Service will become the dominant model beyond IT and evolve to Outcome-as-a-Service providing service level agreement (SLA) based and on-demand with elastic access to applications, information, and resources. Application developers will have more control than before over what is being purchased. Companies will build their products to make it easy for developers to adapt and shift their expensive top-down go-to-market motion to bottom-up product-led growth, where customers can easily try out the product and expand usage over time. Open supply of best-in-breed solutions in a decomposed and open architectural environment with open interfaces and open hardware is being adopted. In the 6G era, software developers will be the drivers of a new kind of innovation and service delivery, integrating the supply and demand side and forming a multisided platform-of-platforms market or a sharing economy.

Technology foresight and futures research have provided insights into what 6G could become and what its impacts on the user, business/organization, sustainability, and society/geopolitics levels could be, framed by technology, business and market, and regulation and policy perspectives. If 6G is expected to emerge as a ubiquitous wireless intelligence that connects the human, digital, and physical worlds for human and machine users alike, this vision will extend the service-centric definition of 5G toward user experience and environmental and societal outcomes. For example, the following are examples of use cases that raise new concerns and set new requirements for future 6G-related BMs and BMI:

- Future holographic communications and extending human capabilities with novel human-machine interaction with haptic and empathic communications to help access the metaverse.
- Seamlessly functioning collaborative and independent machines such as robots, drones, or self-driving vehicles.
- Mission-critical functions of smart cities that ensure privacy, security, and safety for everyone.
- Using 6G to fight climate change or ensure environmental or societal sustainability.

5G was earlier defined in terms of three service classes: enhanced mobile broadband targeted at consumers, ultra-reliable low-latency communications for mission-critical services for organizations such as factories, and massive machine-type communications. Visions of 6G propose hundreds of use cases, making it extremely complicated to deal with these partly overlapping, complementary, and competing ideas of what 6G could become. Yrjölä et al. (2021a, 2021b) coined future 6G to enable, among other things:

- Cost-efficient, sustainable, ubiquitous, near instant, unlimited mobile connectivity, also with novel kinds of devices.
- Multisensory applications and services such as virtual, augmented, or extended mixed reality paving the way toward holographic communications and immersive telepresence.
- Transhumanism via 6G connectivity, body-area networks, or implanted biosensors to merge humans and machines, providing humans with new capabilities (a digital twin of me).
- In addition to humans, serving a growing variety of autonomous things and machines, robots, cobots (collaborative robots), vehicles, drones—also swarms of them—and communities.
- Privacy, security, and safety for humans, machines, and society.
- Massive online and real-time digital twinning (DT) of the physical reality.
- Sustainable development, both societally and environmentally.

The envisioned future 6G may potentially have a drastic impact on society. Therefore, visionary works on 6G have presented new goals and expectations for 6G, including human-centricity and inclusivity, trustworthiness in terms of privacy, security, and safety, societal, environmental, and economic sustainability and resilience and sovereignty. Additionally, the users of 6G have been redefined to comprise of humans and machines in private and public organizations and communities. The business opportunities, value creation and capture, and the related advantages relate to what 6G will enable and what kind of expectations will be placed on it by different stakeholders. The BMs to be utilized in future 6G will be increasingly ecosystemic, platform-based, and sustainability-driven (Matinmikko-Blue et al., 2021). They will cover both currently existing and novel, emerging service providers and users in various changing roles as asset or resource providers or bridging, matching, or sharing these assets and resources with others. Examples such as sensing for sustainability, connecting intelligence, connecting the unconnected, and immersive communications showcase the potential variety of BMs needed for providing 6G services. This in turn calls for novel performance indicators (KPIs) and value indicators (KVIs). These KPIs and KVIs directly relate to the scalability, replicability, and triple bottom line economic, environmental, and societal sustainability of 6G. Yet, the challenge remains to involve proper stakeholder groups, including end users and developers, in the process, where the main drivers are the technology providers.

In addition to the technical and business-related complexities, 6G as a general-purpose platform will also be subject to increasingly complicated regulatory developments. Already 5G introduced a new deployment model of local mobile communication networks operated and owned by a variety of stakeholders, which opened the discussion on regulations related to mobile communications (Matinmikko et al., 2018). Mobile communications is strictly regulated, including, e.g., who can deploy and operate the networks, which defines the markets. Data-related regulations are increasingly being introduced, shaping who can collect and use different data. The entire regulatory environment will become increasingly complex, and when the networks are used in specific vertical sectors, sector-specific regulations will also need to be followed.

Most recently, sustainability has entered the arena to cut emissions in different sectors. Increasing the use of ICTs, even when used to combat major sustainability challenges, does not justify the ICT sector's current emission growth but calls for actions from stakeholders to reduce their environmental burden. Gradually, this will transform into regulations.

Discussion and Conclusions

BMI research has traditionally focused on innovating the BM. In our view, BMI extends from innovating the BM to also include innovating the ecosystem around the BM. The presented forward-looking approach to BMs and BMI around future 6G mobile communications technology allows understanding the challenges and uncertainties related to developing and commercializing new technologies in practice while also exploring the difficulties and complexities associated with framing and scoping research phenomena related to futuristic technology contexts. The business model theory and forward-looking approach to BMs and BMI in the emerging technology context reveal that the envisioned 6G, as the next-generation mobile communications technology, must not only be backward compatible with the earlier technology generations. It will also need to converge and mix with other related, adjacent, and complementary technologies, giving rise to the emergence of a novel kind of general-purpose connectivity technology platform or infrastructure for simultaneous innovation and transactions. This emergence can be framed in three phases: definition, parallel standardization and implementation, and deployment/use. At the same time, the ecosystemic business context and the regulative environment for 6G will face a transformation.

This research builds on the key antecedent and outcome concepts around the BM—the antecedent opportunity with the outcome scalability, the antecedent advantage with the outcome replicability, and the antecedent value with the outcome sustainability—and outlines how the becoming of 6G can be approached, framed, explained and theorized as a continuum. We propose the three antecedent and outcome concepts discussed to form the basis of a new business model theory and provide a novel, forward-looking tool for future BMI research. Additionally, we approach time as a continuum as and as a key variable in BMI. Next, we discuss the empirical and theoretical implications of our research.

Empirical Contributions: Approaching and Framing BMI

The question of managing BMI in emerging futuristic technology contexts calls for considering not only the technology but also the business and regulatory aspects of companies within the ecosystem. 6G-related BMI can be approached and framed to comprise the definition, standardization and implementation, and deployment/use elements, as depicted in Fig. 9.2. The BMI needed for defining what 6G could or will become delineates the drivers and limitations to the opportunities and scalability of future 6G at the ecosystemic level. For example, the new requirements for human-centricity, extreme experience, trustworthiness, or environmental and societal sustainability can be seen to open, define, but also limit the opportunities for novel BMs, thereby influencing the degree of scalability and possible roles within the emerging 6G ecosystem for the different interested actors. It is expected that platform and AI companies, among others, will increasingly enter the traditional mobile communications field with their services. Similarly, the emerging definitions may be expected to trigger changes in the regulative environment and regulations. Good examples of these changes include the recently introduced and evolving data, AI, or platform-related regulations.

After the definition phase, the BMI for standardization and implementation of the 6G solutions and services will impact the extent to which sustainable value creation and capture may occur in the emerging 6G ecosystem and by whom. In the current 5G environment, we are witnessing the consequences of diverging and competing standardization of various innovations via different standardization organizations in different verticals or application domains and with competing implementations, potentially leading to new technology versions and trajectories. Regarding 6G, the connectivity and intelligence needs of web3, metaverse, and various industrial verticals' 6G services may require

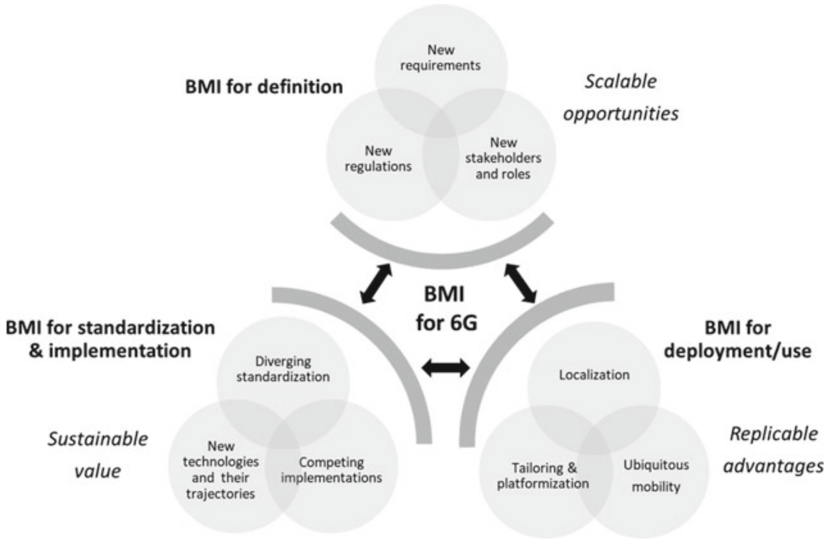

Fig. 9.2 Framing BMI in the ecosystemic 6G context

completely different combinations of complementary and adjacent technologies, the standardization of which may be carried out by different standardization organizations and implementation by various technology and device vendors and service providers.

The third phase of BMI concerns the deployment and use of the technologies in replicating the advantages created in the previous phase across different ecosystemic application domains. At the ecosystem level replicating the advantages means extending the ecosystem to cover new actors, creating network and spillover effects on downstream and upstream sectors around mobile communications. In the 6G context, ubiquitous mobility has been envisioned to lead to the localization of services from satellite to national, regional, and local down to body-area networks, and giving rise to long-tail tailoring of platforms and creating a myriad of simultaneously overlapping, complementary, and competing 6G services.

Global competition to achieve leadership in 6G has already started, exemplified by the national 6G programmes initiated by several governments with leading technology vendors, industry partners, and research institutions. These 6G programmes are closely related to other emerging technology programmes such as AI. Furthermore, the current geopolitical situation encourages international collaboration between like-minded countries in 6G and AI.

Theoretical Contributions: Explaining and Theorizing in BMI

This study aimed to explore the nature and impact of technology on future business models (BM) and business model innovation (BMI), intending to develop a forward-looking approach for theorizing on BMs and BMI. Using the emerging 6G context, we show that the BM is not just a model but extends to a fully-fledged explanatory theory (Sandberg & Alvesson, 2021). Following Whetten (1989), we explicate the what, why, and how of the business model theory, thereby conforming to the requirements of an explanatory theory type. We identify the key conceptual blocks of the business model theory, show the causal relationships between them, and explain the dynamics that justify concept selection.

Additionally, by operationalizing BMI through the antecedents and outcomes, we answer the call by Foss and Saebi (2017), who explicate that research on antecedents and outcomes of BMI remains limited. According to the authors, no articles directly address the question of BMI antecedents, whereas research on BMI outcomes primarily focuses on the implications for the firm performance. In our paper, we systematically link the antecedents and outcomes to BMI, thereby contributing to the clear identification of the causal structure in the theory. The discussed antecedents and outcomes contribute additional nuances to the holistic explanation of BMI. To date, researchers have primarily addressed these aspects separately, allowing for only part of the story (Boons & Lüdeke-Freund, 2013; Nielsen & Lund, 2018b; Shane & Venkataraman, 2000; Zott et al., 2011).

Furthermore, despite the growing interest in bridging corporate sustainability and business model research (Schaltegger et al., 2016), "understanding of sustainable business models…is weak" (Stubbs &

Cocklin, 2008, p. 103). By operationalizing BMI through the antecedents and outcomes, the business model theory provides additional insight into how to (re-)design a business model to achieve not only financial sustainability but also to realize goals that benefit society and the environment. The business model theory helps to understand the components that need to be actively managed to "create customer and social value by integrating social, environmental, and business activities" (Boons & Lüdeke-Freund, 2013; Schaltegger et al., 2012).

Furthermore, we illustrate that the business model theory helps explore BMI in the past, present, and future and assists in inquiring into the interfirm and ecosystemic aspects of BMI. Thus methodologically, the business model theory provides necessary conceptual tools for embracing the entire temporal continuum from the past into the future. The business model theory allows inquiring into the interfirm and ecosystemic BMI, thereby explicating the difference of BMI at the focal firm and the ecosystem levels of analysis but depicting their interconnectedness. Firm-level BMI extends to ecosystem-level BMI which requires and justifies a need for a forward-looking managerial approach.

Implications for Future Research

Extending a business model concept from a descriptive phenomenon toward an explanatory and predictive theory opens new avenues for future research. The first of these research areas concerns the organizing beyond the focal firm: how do firms organize themselves to implement the business model, and what kind of a relationship is there between the BM and the organization? More specifically, the question is how the BM design and implementation process are planned and executed. Indeed, focusing solely on business model design elements and themes, BM research does not provide sufficient empirical insight into the BM creation process (Atkova, 2018; Zott & Amit, 2013).

In addition, the organizational side of BMs has rarely been examined in the extant research. Yet, understanding a management model of a BM is of critical importance as it describes the decision-making logic behind the fundamental choices that any firm needs to make regarding how to do business (Birkinshaw & Goddard, 2009). By overcoming silo-thinking and integrating process dynamics and context into a coherent picture, the business model theory allows inquiring into "the choices made by a firm's top executives regarding how they define objectives, coordinate activities and allocate resources; in other words, how they define the work of management" (Birkinshaw & Goddard, 2009, p. 82).

Another future research area concerns the business environment. Researchers interested in ecosystems and BMs (c.f., Warnier et al., 2018) claim that the ecosystemic view of the business environment in BM research is paving the way for a new perspective on the business environment. Although the need for calibration to the environment has been seen as essential for business model success (Teece, 2010), no unified way exists in the literature to conceptualize the business environment. If seen as a theory, the BM might provide us with valuable insights into the business environment.

In addition, the business model theory supports the exploration of how to achieve consistency between a firm's BM, its strategy, and the surrounding ecosystem (Zott & Amit, 2013). It has been acknowledged that a BM needs to be constantly adapted to the external environment to account for exogenous changes. Yet, the question remains of how to go about the adaptation process and maintain consistency between the business model, strategy, and the ecosystem. Thus, the business model theory shifts the focus from the traditional product/firm/industry perspective to seeing the business environment from business model/firm/cluster/network/ecosystem perspectives. Adopting an ecosystemic perspective of the BM also has implications for our understanding of competition, collaboration, and coopetition, allowing us to integrate coopetitive relationships into BM research.

Finally, in the sustainability field, the business model theory supports further inquiry into how to integrate social and environmental goals into a firm BM and align them with the economic goals. A key question is how to organize value-related processes to achieve diverse sustainability goals. The new global driver for 6G is sustainability. The increasing use of ICT and requirements to cut greenhouse gas emissions result in the need to develop environmentally sustainable future 6G systems and economically feasible solutions and address major social sustainability challenges.

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10

AI-Driven Business Model Innovation: Pioneering New Frontiers in Value Creation

Annabeth Aagaard and Christopher Tucci

Introduction

Digitalization and digital technologies significantly transform value creation in markets characterized by demand heterogeneity, influencing business model innovation and value creation in several key areas (e.g., Aagaard, 2019; Cennamo et al., 2020; Lanzolla et al., 2023; Lee et al., 2023; Lehmann et al., 2022). Firstly, they broaden the spectrum of products and services that vendors can present to consumers, enhancing customization and catering to diverse needs (Abou-Foul et al., 2023; Zhang et al., 2022). Secondly, they extend the reach of sellers, enabling them to connect with a more extensive array of potential buyers, thereby increasing market penetration and accessibility (Sullivan & Wamba, 2024). Thirdly, digitalization reduces the search costs involved in finding

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the optimal match between buyer and seller, streamlining transactions, and enhancing market efficiency (Benner & Waldfogel, 2023). Lastly, digitalization yields valuable insights into consumer preferences that are yet to be met, offering critical data that can drive product innovation and development (Kohli & Melville, 2019; Lanzolla et al., 2020; Nambisan et al., 2019). These dynamics indicate substantial opportunities for developing or refining theories on how digitalization impacts market scope, value chain reconfiguration, and business model innovation/ reconfiguration (Massa & Tucci, 2013; Massa et al., 2017).

Understanding these effects is pivotal for academics and practitioners alike, as they navigate the evolving landscape of digital transformation in business. In the ever-evolving landscape of digitalization, Artificial Intelligence (AI) has emerged as a cornerstone, fundamentally reshaping some principles of business model innovation (Iansiti & Lakhani, 2020b; Jia et al., 2024; Lanzolla et al., 2021a; Mariani et al., 2023; Rammer et al., 2022). For one, Teece (2018) explains that AI is an enabling technology that can be integrated throughout a network of products and systems and can provide a beneficial service for customers in various parts of the value chain. Hence, AI is arguably the most important recent technological development and certainly a "pervasive economic and organizational phenomenon" (Von Krogh, 2018, p. 404) and stands at the confluence of revolutionary business model creation and the reengineering of innovation processes. This significant dual role of AI not only heralds the emergence of new value propositions but also epitomizes a paradigm shift in the methodologies employed to foster and implement business model innovation (Berente et al., 2021). Beyond spawning new business models, AI is instrumental in redefining the processes through which these innovations are conceived and realized, while increasing employee creativity (Jia et al., 2024; Liu et al., 2017).

The escalating significance of AI within the domain of innovation and business model innovation is manifest in the emergence of a dedicated research stream within innovation and management studies, as highlighted by seminal contributions such as Verganti et al. (2020), Iansiti and Lakhani (2020a), Lanzolla et al. (2021a), Krakowski et al. (2023), and Gama and Magistretti (2023). This burgeoning field has further been elucidated through systematic literature reviews, notably by

Haefner et al. (2021), Igna and Venturini (2023), and Mariani et al. (2023), underscoring the expanding scholarly interest. For example, Bahoo et al. (2023) delineate eight critical areas at the nexus of AI and corporate innovation, including its integration into business models, product innovation, open innovation, the innovation process, organizational innovation architecture, knowledge enhancement, market performance impact, and supply chain innovativeness.

Accordingly, AI and Industry 4.0 are pivotal in reshaping business model innovation, introducing advanced strategies such as "Bolt-On" AI systems that enhance existing CRM or ERP frameworks, enabling real-time data analysis and insights. In supply chain management, AI-driven asset tracking optimizes logistics and inventory control. Vertical process enhancements through AI, such as IBM Watson or H2O.AI, streamline specific business operations, offering bespoke solutions. For example, agriculture benefits from remote diagnostics, optimizing conditions for indoor growers. Generative AI is creating new content frontiers, from AI-generated podcasts to study materials. Moreover, Industry 4.0 introduces servitization and autonomous IoT services, such as Kespry drones for insurance inspections, transforming traditional business models into agile, responsive, and technologically integrated frameworks. This evolution underscores a strategic shift toward data-driven, customer-centric, and flexible business practices, heralding a new era of competitive advantage and innovation.

The critical role of data and AI in driving successful digital business model innovation has been explored by a number of researchers. For example, Ghasemaghaei and Calic (2019) document that firms having a greater capacity of exploiting data, in terms of volume, variety, and velocity, reveal larger innovation competences and performance. Furthermore, Bessen et al. (2022) illuminate the pivotal role of proprietary data in AI startups, underlining the strategic importance of data as a foundational asset in the AI-driven innovation landscape. In the study by Rammer et al. (2022) of AI in the context of the German corporate sector, adoption of highly automated, AI-driven methods plays a crucial role in fostering world-first product innovations. Accordingly, the studies by Akter et al. (2023) and Ferràs-Hernández et al. (2023) indicate that that the dominant design for AI is based on business model innovation as much as on technology, and where the dominant business model encompasses AI as a service. Collectively, these studies underscore the transformative potential of AI in redefining business models and innovation strategies, highlighting AI's capacity to not only enhance operational efficiency and productivity (Brynjolfsson et al., 2018, 2021; Noy & Zhang, 2023), but also to drive groundbreaking innovations that can redefine market landscapes (Pearlson et al., 2024). The dynamic and adaptive capabilities afforded by AI technologies facilitate a more agile, informed, and participative approach to business model innovation. However, despite the development of multiple definitions and typologies within the management discipline, as delineated by Davenport and Ronanki (2018) and Huang and Rust (2021), the research community has yet to fully apprehend the extensive array of opportunities that Generative AI (GenAI) presents for innovation and business model innovation research (Burström et al., 2021).

The Transformative Role of Artificial Intelligence on Business Innovation

In his historical AI research, Nilsson (2010, p. 13) defines AI as "that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment." Thus, AI marks a pivotal advancement in data processing, enhancing computers' and machines' ability to augment human decision-making, problem-solving, and technological innovation. Consequently, AI has been recognized as a potentially transformative general-purpose technology, a notion supported by Brynjolfsson and McAfee (2017), Brynjolfsson et al. (2018, 2021) and Goldfarb et al. (2023). This evolution is primarily driven by significant advancements in machine learning, leading to a rapid decrease in prediction costs across multiple fields, as highlighted by Agrawal et al. (2018).

For instance, the use of AI in real-time data analytics allows for a more effective and nuanced understanding of market dynamics, enabling organizations to rapidly iterate and refine business model hypotheses. AI/digital technologies such as machine learning (ML), the Internet of

Things (IoT), automation, and intelligence-driven robotics are pivotal in redefining corporate structures and the innovation process. These advancements are also underscored by Bocquet et al. (2007) for their transformative role in facilitating more efficient operations and fostering innovation, significantly influencing traditional business practices.

By efficiently parsing complex datasets, leveraging sophisticated algorithms, and applying machine learning, AI uncovers insights previously out of reach, fundamentally transforming business innovation, operational efficiency, and strategic alignment with market shifts. Davenport and Ronanki (2018) delineated Artificial Intelligence into three distinct categories: process automation, cognitive insights, and cognitive engagement. Process automation, also known as robotic process automation (RPA), stands out for its cost-effectiveness and rapid ROI, automating routine tasks efficiently. Cognitive insights utilize algorithms and machine learning to analyze and find patterns in large datasets, offering deep analytical capabilities. Cognitive engagement, through natural language processing and machine learning, enhances interactions within and across organizational boundaries, including employee and customer engagement (Bankins et al., 2023). In a parallel framework, Huang and Rust (2021) categorized AI into mechanical, thinking, and feeling types, aligning with tasks that are routine, rule-based, or emotionally driven, respectively, further enriching the understanding of AI's multifaceted roles in innovation and beyond.

The innovation impact of AI significantly transforms firms across three key areas: product, service, and business model innovation; operational efficiency; and R&D. AI facilitates data-driven business models, enhancing product performance and enabling new services, such as autonomous driving and tailored healthcare, while also optimizing marketing through advanced user pattern analysis (Garbuio & Lin, 2019). In operational contexts, AI drives automation and supports human decision-making in diagnostics, predictive maintenance, and digital security, showcasing potential for substantial efficiency gains in both production and administrative processes (OECD, 2020). Furthermore, AI revolutionizes R&D by leveraging large datasets and predictive algorithms to accelerate and expand research activities, notably in pharmaceuticals, chemicals, and machinery, thereby redefining invention and knowledge production processes through advanced prediction technologies and deep learning methods (Agrawal et al., 2018; Cockburn et al., 2018).

With the introduction to Generative AI, new innovative frontiers are ahead for business development. For instance, Generative AI facilitates a new level of personalization, termed hyper-personalization, empowering complementors to customize their products or services instantly to align with the unique preferences of every user. Since the launch of ChatGPT3 by OpenAI in 2022, Generative AI has seen accelerated growth. According to Gartner, it is projected that by 2025, 30% of outbound messages will be generated through synthetic means. According to *Forbes* (2023) the main difference between traditional AI and Generative AI lies in their capabilities and application. Where traditional AI systems are primarily used to analyze data and make predictions, Generative AI goes a step further by creating new data similar to its training data. Currently, corporate executives are actively integrating AI into business process reengineering, markedly shaping innovation practices worldwide (Burgess, 2018), and are adeptly merging AI technologies with their innovation processes to enhance operational capabilities and secure competitive advantages (Krakowski et al., 2023; Musiolik et al., 2020; Porter, 1985). Hence, the integration of AI in business practices not only deepens understanding of consumer behavior and streamlines supply chain operations, but also encourages the emergence of innovative business models in driving superior performance. Predictive analytics, a cornerstone of AI, equips businesses with the ability to foresee market trends, fostering agility in strategic adjustments (Haenlein & Kaplan, 2019). Furthermore, AI-driven process automation significantly cuts operational costs, boosts efficiency, and enhances service quality, illustrating AI's integral role in shaping future business landscapes. This synergy between human cognitive functions and machine-based analytics heralds a new era in business model innovation (Burström et al., 2021), which fosters the development of novel business strategies, optimizing operational efficiencies and creating unprecedented value propositions (Mishra & Tripathi, 2021; Mustak et al., 2021). Thus, Bresnahan (2021) emphasizes that integrating AI in business development requires significant organizational restructuring to be fully leveraged, a phenomenon consistent with historical transformations initiated by analogous technologies. While AI constitutes a pivotal element for innovation within business models, mere investments in digital infrastructure, technology, and data are insufficient for its holistic integration.

However, there are critical voices that raise concerns about the use of AI in business development. The advent of AI necessitates a reevaluation of organizations and poses potential disruptions within the labor market, thereby underscoring the critical need for legislative bodies and labor unions to engage in thoughtful policy dialogue. Such deliberations aim to devise strategic interventions capable of alleviating the adverse employment effects engendered by the proliferation of AI technologies (Sarker et al., 2019; Mariani et al., 2023). Concerns surrounding the advancement of AI and its impact on organizations include the potential for job displacement as automation supplants roles traditionally held by humans (Bankins et al., 2023; Hunt et al., 2022). Furthermore, Generative AI risks exacerbating societal inequalities by advantaging those with access to the technology, thereby contributing to the emergence of a new digital divide (Balsmeier & Woerter, 2019), not to mention the fact that with fewer employees per "digital" company (compare the number of employees at a bank branch vs a digital bank, or automated robotic warehouse vs a traditional warehouse), the concentration of wealth is likely to increase further.

In response, the European Union has taken a leadership role with the introduction of the AI Act in 2023 (EU AI Act, 2023), creating a comprehensive regulatory framework for AI across various sectors, excluding military/defense, setting a benchmark not yet matched by most non-EU nations. This Act requires strict adherence from organizations involved in the development or use of AI systems, with regulations calibrated to the specific risks posed by each AI application (WEF, 2023). Despite these efforts, the AI Act faces criticism for its lack of robust enforcement mechanisms, ambiguous definitions of AI, and unclear assignment of responsibility for the negative consequences of AI usage. These critiques underscore the necessity for more precise regulatory frameworks to effectively address the multifaceted ethical and socio-economic challenges presented by AI (Wörsdörfer, 2023).

AI in Business Model Innovation: Transforming Value Creation

The integration of AI and digital technologies emerge as pivotal mechanisms for fostering business model innovation (BMI), enabling the development of new business models and the revitalization of existing ones, while generating new value creation and value capture pathways and enrich traditional ones (Aagaard, 2019; Brynjolfsson & McAfee, 2017; Kohli & Melville, 2019; Li, 2020; Mariani & Dwivedi, 2024; Mukherjee & Chang, 2023; Sjödin et al., 2020, 2021). AI and digital advancements have spurred innovative approaches to value generation and value capture (Lanzolla et al., 2021a), including extreme personalization, servitization, and novel pricing models such as subscriptions and pay-per-use (Bahoo et al., 2023; Burström et al., 2021; Kohtamäki et al., 2020), thereby enhancing revenue growth, competitive positioning, and performance (Correani et al., 2020; Krakowski et al., 2023). Hence, value creation and value capture with AI necessitates the development of new routines, skills, operational processes, and business models tailored to customer needs (Sjödin et al., 2021). Furthermore, AI catalyze rapid and nonlinear business model transformations, crucial for navigating crises by swiftly addressing technological shifts. This agility is essential in times of uncertainty, allowing organizations to respond effectively to challenges and avoid detrimental outcomes (Ardito et al., 2021).

Accordingly, the integration of Artificial Intelligence (AI) into the fabric of business models represents a paradigmatic shift, necessitating a fundamental reevaluation of the principles that govern the incorporation of AI technologies into the mechanisms of value offering. This shift extends beyond mere technological adoption, impacting the very essence of organizational roles, functions, and processes to ensure the seamless delivery of value and maintenance of competitive edge (Iansiti & Lakhani, 2020a, 2020b). The promise of AI extends across a spectrum of operational and strategic benefits, offering businesses the opportunity to significantly increase their innovation capabilities (Gama & Magistretti, 2023), while at the same time reduce costs, elevate the quality of services, enhance productivity and coordination, and thereby optimize delivery efficiencies (Brynjolfsson et al., 2018, 2021; Davenport & Ronanki, 2018; Noy & Zhang, 2023).

In this transformative landscape, AI-driven business models serve as a catalyst for exploring innovative pathways of creating, delivering, and capturing value, fundamentally altering the competitive dynamics within industries (Iansiti & Lakhani, 2020a, 2020b; Leone et al., 2021; Mancuso et al., 2023; Nambisan et al., 2019). Organizations endowed with superior AI capabilities are uniquely positioned to redefine their value spaces, leveraging the power of automated insights derived from exhaustive analysis of industrial data. This facilitates the adoption of data-driven operational strategies and fosters a collaborative ecosystem for customer interaction, enriching the customer experience through personalized and interactive engagements (Jovanovic et al., 2022).

However, the journey from conceptualization to widespread application of AI in business models presents substantial challenges, notably the scalability of AI services. Transitioning from initial proofs of concept to applications that cater to larger customer segments requires meticulous planning and execution (Burström et al., 2021). Thus, there emerges a critical need for a deeper understanding of the foundational principles underpinning AI-enabled business model innovation. This entails a strategic integration of AI capabilities into the core business activities related to value creation, delivery, and capture, aiming for scalable growth and ensuring that AI's transformative potential is fully realized (Sjödin et al., 2021). However, Krakowski et al. (2023) discover that performance disparities in AI and hybrid settings are not solely attributed to humans or AI alone. They identify the emergence of a novel decision-making resource at the confluence of human and AI interaction, which is pivotal in driving performance outcomes but shows no correlation or a negative relationship with the innate abilities of humans. Hence, as businesses navigate this complex terrain, the strategic assimilation of AI into business models becomes imperative, demanding a holistic and human-centric approach that addresses the technological, organizational, and strategic facets of AI deployment for enduring success and competitiveness.

Accordingly, in elaborating further on the pathways of integrating AI into business model innovation and value creation, we develop an archetype model presenting four different approaches (Table 10.1). This model positions the application of AI across two axes, degree of AI integration (Low to High) and impact on competitive advantage (Low to High). Hence the degree of AI integration represents the extent to which AI technologies are embedded within the company's operations, products, and services. Low integration denotes basic AI applications with minimal alterations to existing processes, while high integration indicates comprehensive, AI-driven transformations across the business model. The axis, impact on competitive advantage' assesses the contribution of AI applications to the company's competitive positioning within the market. Low impact refers to incremental improvements, whereas high impact signifies radical enhancements in value proposition, market differentiation, and customer engagement.

Navigating the landscape of business transformation underpinned by AI demands an intricate balance between strategic foresight, organizational adaptability, and technological innovation. The conceptual journey from initial AI applications to comprehensive business model transformation encapsulates a series of strategic shifts across distinct archetypes—each representing a unique blend of AI integration and competitive advantage impact. This evolution is not merely about leveraging AI for operational efficiency or customer engagement but encompasses a broader vision of redefining market patterns and establishing new norms of competitive leadership. A detailed understanding of the progression from one archetype to another within the context of business model innovation necessitates rigorous empirical research. Nevertheless, we propose several critical considerations for managers to contemplate as they navigate these transitions.

The pathway from being Incremental Optimizers to becoming Efficiency Enhancers signifies a foundational shift in approach. Initially focused on deploying AI for marginal improvements, companies must pivot toward embedding AI deeply within their operational fabric. This transition, characterized by substantial investments in AI technologies, necessitates a cultural metamorphosis toward data-driven decision-making and process automation, aiming for profound efficiency gains and cost reductions.

Table 10.1 The four archetypes of AI application in Business Model Innovation

		Degree of AI integration	
		Low	**High**
Impact on competitive advantage	**High**	**Experience innovators** (Low Integration, High Impact) Businesses apply AI in targeted, customer-facing functions to enhance the customer experience and engagement, thus creating a competitive edge Example: A healthcare provider using AI for personalized patient engagement through an intuitive app that tracks health metrics and offers customized health advice, markedly improving patient loyalty and satisfaction	**Transformation leaders** (High Integration, High Impact) Organizations that fully embrace AI, redefining their business models, value propositions, and market positioning. They leverage AI to create new products, services, and customer experiences, fundamentally altering the competitive landscape Example: Tesla's integration of AI in autonomous driving and battery management systems not only enhances vehicle performance but also establishes Tesla as a leader in electric and self-driving technology, significantly distinguishing it from competitors

(continued)

Table 10.1 (continued)

	Degree of AI integration	
	Low	**High**
Low	**Incremental optimizers** (Low Integration, Low Impact) Companies in this quadrant use AI for minor improvements in operational efficiency and customer service Example: A retail company employing basic chatbots for customer inquiries, slightly improving customer satisfaction without fundamentally altering the value proposition	**Efficiency enhancers** (High Integration, Low Impact) Firms focus on internal processes, leveraging AI to streamline operations and reduce costs significantly, yet with limited external market differentiation Example: A manufacturing firm implementing AI-driven predictive maintenance across its production lines, achieving cost savings and operational reliability without directly enhancing its market offering

Conversely, some organizations might leapfrog directly from Incremental Optimizers to Experience Innovators, prioritizing customer-centric AI applications over internal optimization. This strategic choice underscores the importance of leveraging AI to craft personalized and engaging customer experiences, thus differentiating companies in a competitive marketplace. It requires a deep understanding of customer needs and behaviors as well as a lean experimentation approach, utilizing AI to tailor interactions and enhance satisfaction.

The evolution from Efficiency Enhancers to Transformation Leaders represents a pivotal moment in a company's strategic journey. Organizations adept at internal optimizations are challenged to leverage these AI-driven efficiencies to fundamentally innovate their value propositions. This involves a comprehensive rethinking of how AI can drive not just cost savings but also market differentiation and leadership, requiring a holistic application of AI across all facets of the business model. A corporate venturing approach embracing a portfolio of experiments to see which products/services/business models gain traction is a preferred approach, while at the same time remaining mindful that the experiments may cause friction or entail resistance from internal stakeholders (Chesbrough & Tucci, 2020).

Similarly, transitioning from Experience Innovators to Transformation Leaders demands an expansion of focus. Companies that excel in delivering superior customer experiences through AI must integrate these capabilities more broadly into their business models. This shift involves leveraging AI not only to enhance customer engagement but also to drive innovation in product and service offerings, thereby reshaping competitive dynamics. Embarking on this dynamic journey requires:

- Strategic Clarity and Commitment: Defining a coherent vision for AI within the organization and dedicating the necessary resources to achieve this vision.
- Investment in AI Capabilities: Committing to ongoing investments in AI technology, talent, and infrastructure to support the strategic application of AI.

- Cultural and Organizational Agility: Fostering a culture of innovation, flexibility, and experimentation, enabling the organization to adapt and thrive as it transitions through different archetypes.
- Ecosystem Engagement: Actively building and participating in ecosystems that provide access to AI insights, technologies, and innovations.

As organizations traverse this evolutionary path, they are compelled to continuously reevaluate and adapt their strategies considering emerging AI capabilities and market feedback. This journey from incremental optimization to transformative leadership in AI application is emblematic of the broader challenge of navigating digital transformation, underscoring the imperative for companies to remain agile, innovative, and forward-looking in an increasingly complex and AI-driven business environment.

AI's Impact on Redefining Business Model Components

The advent of AI is catalyzing a transformative shift across the spectrum of business modeling, redefining traditional patterns and ushering in an era of unprecedented innovation. As we delve into the integration of AI within the framework of the Business Model Canvas (Osterwalder et al., 2005), it becomes evident that AI's role in business model innovation transcends mere automation or efficiency gains; it represents a paradigm shift in how companies approach market opportunities, develop products and services, engage with customers, and compete in the digital age (Huang & Rust, 2021). Through sophisticated data analytics, machine learning algorithms, and cognitive technologies, AI enables businesses to harness deep insights, predict trends, and personalize interactions at scale. This profound integration of AI across business dimensions not only enhances operational capabilities but also redefines value propositions, customer relationships, and revenue streams, thereby enabling businesses to navigate the complexities of the modern market landscape with agility and foresight (Jorzik et al., 2024; Holland et al., 2024; Haefner et al., 2021; Sjödin et al., 2020). We explore specific, real-world examples that illustrate the transformative potential of AI across each dimension (component) of the Business Model Canvas. These examples not only underscore the versatility and power of AI in driving business model innovation but also highlight the strategic imperatives for organizations seeking to leverage AI for sustainable competitive advantage.[1]

Customer Segments

AI revolutionizes the identification and understanding of customer segments by employing sophisticated data analysis and pattern recognition techniques (Perez-Vega et al., 2021). Through machine learning algorithms, businesses can search, analyze, and recombine vast amounts of data from various touchpoints to identify nuanced customer behaviors, preferences, and unmet needs (Lanzolla et al., 2021b). This granular insight enables companies to tailor their offerings more precisely to different segments, or even individual customers, enhancing the customer experience and satisfaction significantly (Lehmann et al., 2022). A well-known case exemplifying this is Netflix, which employs AI to analyze viewing patterns, search histories, and ratings to cluster users into micro-segments. This segmentation allows for highly personalized content recommendations (see Villarroel et al., 2013), which not only enhances user engagement but also optimizes content acquisition and production strategies, making Netflix's offerings more aligned with user preferences.

Value Propositions

In the realm of value propositions, AI serves as a catalyst for creating differentiated and compelling offerings (Mustak et al., 2021). It does so by enhancing products and services with intelligent features, automating personalization, and enabling the creation of entirely new, AI-driven

[1] As in any Business Model Canvas analysis, the components are not mutually exclusive and there are some overlaps and interdependencies between components.

solutions (Abou-Foul et al., 2023). AI's predictive capabilities allow businesses to anticipate customer needs and offer proactive solutions, thus delivering exceptional value. Interesting case examples hereof are DeepMind's AI solutions for healthcare and its Streams app, which were developed to promptly identify patients at risk of acute kidney injury and showcase how AI can underpin new value propositions that significantly improve patient outcomes and operational efficiencies in healthcare settings (Garbuio & Lin, 2019).

Channels

AI transforms channels by optimizing how products and services are delivered and experienced (Bahoo et al., 2023). Virtual assistants and chatbots, powered by natural language processing (NLP) and machine learning, offer personalized and interactive customer service across digital platforms (Jovanovic et al., 2022). Moreover, AI enables the optimization of distribution channels by predicting the most effective pathways and timings for reaching customers. An example is Domino's Pizza using AI for its order-taking process through Dom, a virtual assistant that can take orders via voice or text through multiple channels. This not only streamlines the ordering process but also enhances the customer experience by providing a convenient and personalized service.

Customer Relationships

AI deepens customer relationships through personalized interactions and predictive customer service (Haenlein & Kaplan, 2019). By analyzing customer data, AI can help businesses anticipate customer needs and address them proactively. Additionally, AI-driven sentiment analysis tools can gauge customer emotions and satisfaction levels, enabling companies to tailor their engagement strategies more effectively (Wessel et al., 2023; Rane et al., 2023). One case example hereof is Sephora's Virtual Artist app that uses AI and augmented reality (AR) to offer customers a virtual makeup try-on experience. This tool allows customers to see how products will look on them before purchase, fostering a more personalized and engaging shopping experience.

Revenue Streams

AI impacts revenue streams by enabling dynamic pricing models, personalized product offerings, and new service-based models (Kohtamäki et al., 2020). By analyzing market trends, customer behavior, and inventory levels, AI can optimize pricing strategies in real-time to maximize profits (Correani et al., 2020). Additionally, AI can identify upselling and cross-selling opportunities by recommending relevant products or services to customers. For example, Uber uses AI to implement surge pricing, which adjusts fares in real-time based on demand and supply conditions. This not only optimizes revenue but also ensures service availability by incentivizing drivers to meet demand. And any AI-based servitization model, such as anticipatory maintenance of Caterpillar earth-moving equipment, opens up new revenue streams.

Key Resources

In the context of key resources, AI technologies themselves become critical assets. Data, algorithms, computing infrastructure, and AI expertise are essential for developing and sustaining competitive advantage (Pearlson et al., 2024). Businesses invest in these resources to fuel their AI initiatives, drive innovation, and improve operational efficiencies (Noy & Zhang, 2023). As an example, the IBM Watson platform exemplifies how AI can serve as a key resource, offering businesses across industries AI-powered capabilities for data analysis, natural language processing, and machine learning to inform decision-making and innovation.

Key Activities

AI influences key activities by automating processes, enhancing decision-making, and driving research and development. Automation of routine tasks frees up resources for strategic activities, while AI-enhanced analytics improve decision-making accuracy and speed (Huang & Rust, 2021; Hunt et al., 2022). Furthermore, AI accelerates innovation by enabling rapid prototyping and testing of new ideas. An example is Zara using AI to optimize its supply chain and inventory management. By analyzing sales data, customer preferences, and fashion trends, Zara can swiftly adjust its production and distribution plans, ensuring that popular items are restocked quickly and efficiently.

Key Partnerships

AI reshapes key partnerships by fostering collaborations with AI technology providers, startups, academia, and research institutions (Nobari & Dehkordi, 2023). These partnerships are vital for accessing cutting-edge AI technologies and expertise and are often facilitated through platforms (Jovanovic et al., 2022; Wulf & Blohm, 2020). These collaborative efforts in AI research and development can lead to innovations that enhance business models and help to co-create new market opportunities (Leone et al., 2021). As an example, the partnership between NVIDIA and Audi to develop AI-powered autonomous vehicles demonstrates how collaborations can accelerate technological advancements. NVIDIA provides Audi with advanced AI and deep learning technologies that are specifically designed to process the vast amounts of data generated by the vehicle's sensors in real-time. This includes sophisticated algorithms for object detection, scene recognition, and decision-making processes crucial for autonomous driving.

Cost Structure

Finally, AI influences the cost structure by automating operations and optimizing resource allocation, leading to significant cost savings. While the initial investment in AI technology can be high, the long-term efficiencies gained from automation and improved decision-making can drastically reduce operational costs (Agrawal et al., 2018; Mariani & Dwivedi, 2024). Moreover, AI can help identify areas where resources are being underutilized, enabling further cost optimizations. One case example hereof is JPMorgan Chase's COIN (Contract Intelligence) platform, which uses AI to automate the review of legal documents, a process that previously consumed thousands of human hours annually. This not only reduces costs but also accelerates the document review process, improving efficiency and reducing the potential for errors.

Summarizing the transformative impact of AI on business models, it is evident that AI redefines the dimensions of value creation and capture, positioning itself as a critical driver of competitive advantage. Through advanced analytics and cognitive technologies, AI enables a deeper understanding of customer segments, enriches value propositions with personalized and innovative solutions, and optimizes channels for enhanced delivery. Moreover, AI deepens customer relationships through tailored interactions and dynamically adjusts revenue streams, highlighting its pivotal role in reshaping how businesses engage with markets and stakeholders. As organizations adapt to this digital model, the strategic application of AI across business model dimensions is not just beneficial but essential for sustaining growth and navigating the complexities of the modern competitive landscape.

Implications of Generative AI on Value Creation Through Platform Ecosystems

Platform ecosystems drive value creation and digital business model innovation by orchestrating connections among diverse groups or sides of a market—for example, end users and complementors—fostering exchanges that revolutionize how goods and services are accessed and delivered beyond conventional market boundaries (Teece et al., 2023; Parker et al., 2017; Wulf & Blohm, 2020). Within the digital platform ecosystem, the advent of Generative AI holds the potential to fundamentally alter the dynamics between all stakeholders and their interrelations. Generative AI, for instance, facilitates novel practices of hyper-personalization, empowering complementors to precisely customize their services in real-time to align with the unique preferences or needs of end users (Rane et al., 2023). Yet, this technological innovation does not come without its challenges for complementors, who may perceive Generative AI's capabilities as a disruptive force. Lysyakov and Viswanathan (2023) suggest that the deployment of Generative AI systems within a crowdsourcing context can lead complementors (crowd participants in this case) to reconsider their engagement with the platform. Specifically, they may opt to exit the platform or pivot their contributions toward more intricate contests, thereby circumventing direct competition with the AI system. This nuanced interplay underscores the transformative impact of Generative AI on the digital platform landscape, necessitating a reevaluation of strategies by complementors in the face of technological advancements (Wessel et al., 2023; Lehmann et al., 2022).

Accordingly, Generative AI emerges as a catalyst for change, redefining the landscape for complementors that are pivotal to the vibrancy and sustainability of digital platforms. Its role transcends the boundaries of advanced personalization, prompting a critical reassessment of the strategic, operational, and competitive dynamics that underpin complementor activities (Pearlson et al., 2024; Sacks, 2015). The democratizing effect of Generative AI, characterized by its ability to lower barriers to entry and streamline development processes, opens the digital innovation space to a broader spectrum of actors. This inclusivity, while fostering innovation and diversity, simultaneously engenders a heightened competitive milieu (Soh & Grover, 2022). Complementors, ranging from seasoned veterans to novices devoid of technical expertise, find themselves navigating a new reality where differentiation (Zhang et al., 2022)—or lead time—becomes paramount in a sea of AI-generated content. These dynamics naturally lead to a discussion on the enduring value of human creativity and strategic ingenuity in distinguishing oneself when everyone has access to the same technological infrastructure (Ameen et al., 2024).

Parallel to the shifts observed among complementors, the user experience on digital platforms is undergoing a transformation of equal magnitude. Generative AI equips users with unprecedented creative tools, enhancing productivity and facilitating the effortless creation of content across varied formats such as text, images, and music (Noy & Zhang, 2023). As users leverage Generative AI to articulate their ideas and share their creativity with greater ease, a reflection on the shifting perceptions of quality and authenticity ensues. The disclosure of AI's role in content creation invites a reevaluation of value, authenticity, and distinction in the digital content landscape, raising pertinent questions about competition, differentiation, and the evolving criteria for excellence in platform markets (Wessel et al., 2023; Raj et al., 2023).

The ramifications of Generative AI extend to the very architecture and governance of digital platforms themselves. As platform providers grapple with the dual forces of empowerment and complexity ushered in by Generative AI, they confront a myriad of ethical, legal, and operational challenges (Figueroa-Armijos et al., 2023; Martin and Waldman, 2023). These include navigating the delicate balance between innovation and privacy, copyright adherence, and the mitigation of unethical applications (Chatterjee et al., 2015). Moreover, Generative AI holds promise for enhancing the governance and orchestration of digital platforms, potentially streamlining operations, and fostering more integrated and aligned ecosystems. Yet, the path to adopting Generative AI toward these ends is fraught with uncertainties and challenges (Cram et al., 2022). The quest to harness its potential for creating flourishing ecosystems, aligning stakeholder interests, and constructing open value networks necessitates a strategic and nuanced approach.

The management and control of Generative AI within platforms emerge as critical areas of inquiry, as providers seek to navigate the intricacies of fostering innovation while ensuring ethical integrity and stakeholder alignment. Consequently, in synthesizing these perspectives, it becomes evident that Generative AI is not merely a technological innovation but a transformative force that reconfigures the digital platform ecosystem. Its impact on complementors, users, and platform providers underscores the need for a comprehensive and multidisciplinary approach to understanding and navigating the challenges and opportunities it presents (Mariani and Dwivedi, 2024).

Managerial Implications of AI-Enabled Business Model Innovation

In the realm of business model innovation, the advent of AI serves as both a catalyst for transformation, reconfiguration and as a beacon that guides strategic reorientation. As organizations seek to navigate the complex interplay between technology and business, the role of management becomes pivotal in orchestrating a harmonious integration of AI within the corporate fabric. This necessitates a multifaceted approach, blending strategic foresight with tactical agility, underpinned by a profound commitment to ethical considerations and societal welfare. The strategic implications of AI for business model innovation cannot be overstated. Managers are tasked with the dual mandate of envisioning future landscapes shaped by AI while grounding their strategies in the pragmatic realities of today's technological capabilities and market dynamics. This involves a thorough reevaluation of the organization's strategic objectives, ensuring they are not only aligned with but also augmented by AI's potential to drive competitive advantage. The strategic process extends beyond mere alignment, requiring a dynamic and continuous adaptation to the rapidly evolving AI landscape. This adaptability is paramount, as the pace of AI development often outstrips traditional strategic planning cycles.

Central to the successful integration of AI into business models is the recalibration of organizational structures and processes. The conventional hierarchies and siloed departments that characterize many organizations are ill-suited to the cross-functional collaboration that AI initiatives demand. Therefore, managers must champion organizational redesigns that foster agility, promote cross-disciplinary teamwork, allow for sometimes uncomfortable experimentation, and facilitate seamless information flow. Such structural adjustments serve as the scaffolding upon which AI-driven innovation can thrive, enabling the rapid iteration and implementation of AI solutions. At the same time, the ecosystem within which organizations operate also undergoes a transformation in the age of AI. Hence, managers must navigate this expanded landscape, leveraging collaborations and partnerships that extend beyond traditional industry boundaries. The interconnectivity facilitated by AI technologies enables organizations to tap into a wider network of knowledge, resources, and capabilities. Engaging with this broader ecosystem not only accelerates AI innovation but also amplifies the potential for business model reinvention/reconfiguration.

Finally, investing in human capital emerges as a critical component of this integration process. The dichotomy between the technical prowess required to develop and deploy AI technologies and the domain-specific expertise necessary to apply these technologies effectively presents a significant challenge. Managers must, therefore, spearhead efforts to bridge this gap through comprehensive talent development programs. This encompasses not only the acquisition of external AI expertise but also the upskilling of the existing workforce. Creating a culture of lifelong learning and intellectual curiosity is essential, as it equips employees with the skills and mindset needed to navigate the AI-augmented business landscape. Moreover, the ethical implications of AI deployment necessitate a principled approach to management. As AI technologies become increasingly embedded in organizational operations and decision-making processes, managers must ensure these systems are designed and utilized in a manner that upholds ethical standards and societal norms. This involves a commitment to transparency, accountability, and fairness, alongside proactive engagement with the broader ethical debates surrounding AI.

Future Research Avenues in AI-Facilitated Business Model Innovation

The integration of Generative AI into business model innovation stands at the forefront of academic inquiry, blending technological innovation with strategic business transformation. This emergent field beckons both junior and senior scholars to explore AI's pivotal role in redefining business practices against the backdrop of rapidly evolving digital platforms and economic landscapes. The pressing need for rigorous academic exploration into how AI reshapes business models and market dynamics is underscored by the technology's widespread deployment across sectors such as healthcare and finance, exemplified by IBM's forays into these areas with Watson.

This exploration demands a multidisciplinary approach that merges insights from technology, management, sociology, and ethics, addressing the socio-economic and organizational shifts induced by AI. Such a comprehensive analysis is vital for unpacking the implications of AI-driven analytics, autonomous decisions, and personalized content on business strategies and market behavior. It also highlights the necessity of interdisciplinary strategies to navigate issues of trust, accountability, and inclusivity, aiming to forge AI-enabled BMIs that are not only technologically sound but also socially responsible and ethically aligned.

Moreover, AI's potential to drive sustainable business innovation forms a crucial research domain. Investigating how AI aids in achieving environmental, social, and governance (ESG) goals—such as optimizing renewable energy distribution—reveals the technology's capacity to balance technological growth with environmental care. Additionally, the ethical, legal, and governance challenges introduced by AI integration into business models call for scholarly focus. Developing ethical AI frameworks, exploring legal regulations around AI applications, and understanding regulatory standards highlight the need for global standards in AI ethics and governance, guiding organizations through regulatory and ethical complexities.

In addition, research into the organizational culture and change management essential for AI integration could uncover effective strategies for embedding AI within business practices. Studies on leadership roles in AI adoption, managing resistance, and cultivating digital transformation environments offer insights crucial for navigating AI implementation challenges. The scalability and adaptability of AI-enabled BMIs across various sectors and geographies present another vital research area. This includes examining technology transfer mechanisms, ecosystem dynamics including architectural control, and market conditions that influence AI innovation adaptability. Understanding the sustainability and evolution of AI-enabled BMIs over time is key to assessing their long-term viability and adaptability. Empirical validation and case studies are essential for connecting theoretical frameworks with real-world applications. These methodologies offer detailed insights into the operational challenges and successes of AI integration, enriching our understanding of AI's business impact.

In conclusion, the intersection of AI and BMI offers a rich array of research opportunities spanning technological, strategic, ethical, and organizational fields. This multidisciplinary exploration is poised to provide valuable insights for practitioners, advance theoretical knowledge, and address the digital transformation's challenges and prospects. This scholarly endeavor is a call to action for navigating the unexplored territories of AI-enabled business model innovation, aiming for contributions that steer technology and business toward sustainable, ethical, and impactful futures in the digital economy. Thus, the integration of AI into business model innovation and value creation presents a complex array of challenges and opportunities for managers to navigate in, and for researchers to explore even further.

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Concluding Remarks

As we look toward the future, the integration of these game changers into business model innovation will likely continue to evolve, driven by technological advancements, changing consumer preferences, and the imperative for sustainable development. The ability of organizations to adapt, integrate, and innovate within this complex landscape will determine their success in crafting resilient, competitive, and value-driven business models for the twenty-first century. In conclusion, "Business Model Innovation - Game Changers and Contemporary Issues" offers a comprehensive exploration of the forces reshaping the business landscape. By integrating insights from various domains, e.g., digitalization, sustainability, circularity, platforms, and collaborative ecosystems, etc.—the book provides a nuanced understanding of the contemporary and future challenges facing business model innovation. In addition, the individual chapters provide venues for further research for junior and senior researchers to pursue in progressing the developments of business model innovation research. Thus, it serves as a vital resource for academics, practitioners, and policymakers seeking to navigate the complexities of the modern business world, offering a roadmap for creating value in an era of unprecedented change and in driving the future research streams.

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Through this exploration, the book underscores the critical importance of innovation, collaboration, and sustainability in forging business models that are not only economically viable, but also socially responsible and environmentally sustainable. Amid these developments, the synergy between digitalization and sustainability emerges as a powerful driver of new types of BMI. Digital technologies offer potent tools for enhancing sustainability efforts, who explore the role of digitalization in promoting sustainable and circular business practices. This intersection underscores the potential for digital innovations to amplify the impact of sustainable and circular business models. Furthermore, the advent of artificial intelligence (AI) and other digital technologies as well as and mobile communications technologies signifies another frontier in the evolution of business models.

Researchers in the field are actively exploring these shifts, employing methodologies that range from qualitative case studies to quantitative data analysis. They investigate the mechanisms through which these innovations disrupt markets, alter consumer behavior, and redefine industry boundaries. The academic inquiry often focuses on the diffusion of innovations, the scalability of new business models, and the sustainability of competitive advantages conferred by such innovations. Practitioners, on the other hand, are on the front lines, navigating the turbulent waters of change. Their approach to business model innovation often involves iterative experimentation, rapid prototyping, and agile adaptation. They are not merely passive observers of change, but active participants who leverage insights from data analytics, customer feedback, and competitive intelligence to refine their models continuously. Consequently, it is imperative that researchers and practitioners collaborate more effectively to develop timely and pertinent research and practices, thereby fostering the sustainable development of businesses and society.

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