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Business Model for Sustainability and Digitalization: the empirical case of an ecosystem participation

Authors

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Abstract

As digitalization can improve an organisation's sustainability performance, the literature calls for more research into the relationship between digitalization and the organisation's portfolio of business models for sustainability (BMfS). This research addresses the role of the organisation's ecosystem in this relationship. Building on an inductive analysis, we use the case of a proactive multinational company. An in-depth investigation, relying on an analysis of secondary data and interviews, reveals that the ecosystem plays different roles. Firstly, it acts to maintain a balance between the organization's core business model (BM) and its emerging new BMfS that rely on digitalization. Additionally, it supports the optimization of the organization's digital resources for its emerging new BMfS that rely on digitalization. Finally, it helps generate new value for the organization's BMfS. We discuss the implications for practitioners in fostering partnerships to develop more BMfS, and create more environmental benefits through digitalization.

Keywords Business model for sustainability, digitalization, ecosystem

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1. Introduction

BMfS emphasizes the creation of value across multiple stakeholders while relying on sustainability of environmental, social, and economic activities (Bocken et al., 2014; Lüdeke-Freund et al., 2020; Schaltegger et al., 2016). Studies about BMfS integrate multiple factors to meet sustainability such as to develop strategic capabilities (Stubbs & Cocklin, 2008), value proposition (Vladimirova, 2019), supply chain (Boons & Lüdeke-Freund, 2013), non-monetary benefits (Schaltegger et al., 2016) and value proposition along ecosystem participation (Bocken et al., 2014; Evans et al., 2017). In particular, previous literature has explored the contribution of new technologies to facilitate the development of BMfS. Hence, a study on electrical sector shows that software (SW) solutions increase the self-consumption of the energy coming from renewable and to facilitate energy saving instead to utilize fossil-fuel-based electricity generation (Bohnsack et al., 2021) or another significant study highlights that digital platforms may optimize the use of renewable energy assets (Reuter, 2022) but increase the amount of energy consumption too, due to data, analytics and complex algorithms they require (Itten et al., 2020) and finally, a third study shows that energy companies prioritize digitalization as digital solutions, communication, and SW services to reinforce the energy system's centralization rather than focus on sustainable energy activities (Pereira et al., 2022). In line with Evans et al (2017), the dimension of BMfS in this paper is the environmental aspect, while realising economic value, and in line with Jacobides et al (2018), 'ecosystem' refers to a group of interdependent organisations that complement each other without a controlled hierarchical presence.

A more recent study from Broccardo et al. (2023) argues that digitalization supports the creation and the development of BMfS. First, their literature review found out that digitalization has a positive contribution to BMfS. Second, their research reveals the mechanism to move from BMs to BMfS by relying on digitalization. Although these studies demonstrate that BMfS benefit from digitalization, this relationship remains not completely revealed (Bohnsack et al., 2022) and its knowledge is limited (Broccardo et al., 2023). There is a claim to expand the empirical evidence at intersection between BMfS and digitalization (Broccardo et al., 2023) including the ecosystem contribution to develop BMfS (Upward & Jones, 2016). Furthermore, Correani et al. (2020) show how large multinational companies benefit from ecosystem collaboration to implement digital strategies, utilizing platforms and AI technology. Sjödin et al. (2022) recommend a collaborative ecosystem strategy for large manufacturers seeking digital transformation. In sectors like electric vehicles (EV), disruptive digital platforms can impact established organizations, aligning with goals of reducing carbon emissions (Anderson et al., 2022).

More claims address the role of the organization's ecosystem to advance BMfS at intersection with digitalization. Indeed, a recent call for research from Snihur and Bocken (2022) claims that external collaborations and ecosystems could have a positive impact on the development of BMfS to further understand how companies can position ecosystem to have an impact on the environment. Indeed, Ringvold et al. (2022) claim that the ecosystem is a key element for advancing BMfS, where the early stages necessitate infrastructure development and trust-building with external stakeholders such partners, customers, and governments. Furthermore, it is possible to observe the

advancement of BMfS, especially in the context of the circular economy, within an ecosystem environment by adopting orchestration mechanisms to facilitate value creation (Blackburn et al., 2022). Alternatively, online platforms within an ecosystem can play a pivotal role in facilitating companies' transition towards BMfS in the context of a circular economy (Konietzko et al., 2019) or to overcome legitimacy challenges in new BMs that are related to platform or data (Zhang et al., 2022).

However, exploring the catalysers of virtuous cycles in BMfS impact, as posed by Snihur and Bocken (2022), highlights a literature gap in understanding the driving forces behind positive cycles in sustainable business practices. Additionally, the inquiry into how ecosystem participants can be effectively aligned with a company's objective to create BMfS, as noted by Bocken et al. (2022), highlights a research claim that needs further investigation. Addressing these gaps is crucial for advancing the knowledge needed to enhance the transformative potential of sustainable BMs.

Hence, we investigate the research question: How can the ecosystem participate in a virtuous circle between BMfS and digitalization? To answer this, we adopt an in-depth investigative approach.

This paper aims to contribute to a better understanding of the participation of ecosystems in the intersection of BMfS and digitalization. The findings, based on an empirical study conducted in a manufacturing organization in Switzerland, aim to enhance valuable knowledge for BMfS researchers while it could help manufacturers understand the role of an ecosystem in promoting the development of BMfS relying on digitalization (Li et al., 2023).

2. Methodological approach

An in-depth qualitative approach is suitable to understand the relationship between theories (Eisenhardt, 1989). A case study approach is adopted, as this allows an investigation of a contemporary phenomenon within a real-world context (Yin, 2018). CompanyABC, based in Switzerland, has a long history of providing energy metering solutions. Recently, CompanyABC has expanded its offerings for business customers. They develop new BMfS and keeping current core BM, which include grid-edge solutions, and smart infrastructures—all using digital technology. They now provide cloud services, SW/Platform as a Service, cybersecurity, and electric vehicle (EV) charging stations. To achieve this, CompanyABC has engaged in an ecosystem with Google in order to develop cloud-based energy management solutions to enhance the adoption of renewable energy sources while improving efficiency and resiliency of the grid. This case is an excellent opportunity to explore how BMfS and digitalization intersect as CompanyABC is willing to share data and insights with researchers too.

2.1 Data collection

The data captured in the semi-structured interviews refer to the primary data collected directly from senior management of the company. Questions are listed in the appendix. The primary data were collected between January 2022 and March 2023. The interviews were mainly conducted and recorded via an online platform lasting an average time of 41 minutes each. The secondary data, corporate reports, cover the timeframe from 2020 to January 2023. The Table 1 presents the data.

Data source	Role of interviewee or Publication title	Use in the analysis
Primary data – Interviews (17)	Head of Product Management grid-edge EVP and Head of Strategy President of EMEA region Director of sales and business development Head of Market & Business Intelligence Director of Digital SW Global Product Manager grid-edge Director of EV Charging VP of Digital Solutions Head of Product Management SW, service & solution Director of Product Management & Sales Cybersecurity VP of Business Unit SW, Service & Solution Director of sales and business development VP of Business Unit Electricity VP of sales and business development VP of sales, service & solution CEO	Contextualize the BMfS and digitalization. Contextualize the ecosystem environment adopted. Enrich the data with multiple points of view at different organizational level.
Secondary data (3)	Capital Markets Day 2023: Investing in the future MANAGE ENERGY BETTER Annual Report 2021 Sustainability Report 2020-2021 Company news	Validate and triangulate the data from interview with information shared to the investors.

Table 3. Overview of data collected.

3. Data analysis and results

We transcribed the data and further analysed using the Atlas.ti SW. This SW allows for advanced code structure such as an initial set of coding (first order) and folder coding (second order) to identify significant patterns (Yin, 2018, pp. 165-201). Authors also identified the research question as a theme.

We adopted an inductive approach that allows the formulation of empirical generalization starting from observations and interviews (Gray, 2014, p. 6) followed with the analysis of secondary data. Currently, our analysis of primary data generates a good number of first-level codes that close-fit the data collected. Two levels of structured coding were implemented: first-order coding, and second-order coding. The first-order coding emerged from both interview replies and factors or gaps identified in the literature. Then, the first-order coding was classified into a second-order coding based on similar properties and characteristics. The three second-order codes were derived through an inductive reasoning (Corley & Gioia, 2011) called: “Balancing both core BM and BMfS,” “Digital resource optimization,” and “Retention of the value.” The first level coding, the proposed second level coding and the transcription evidence are displayed in Figure 1.

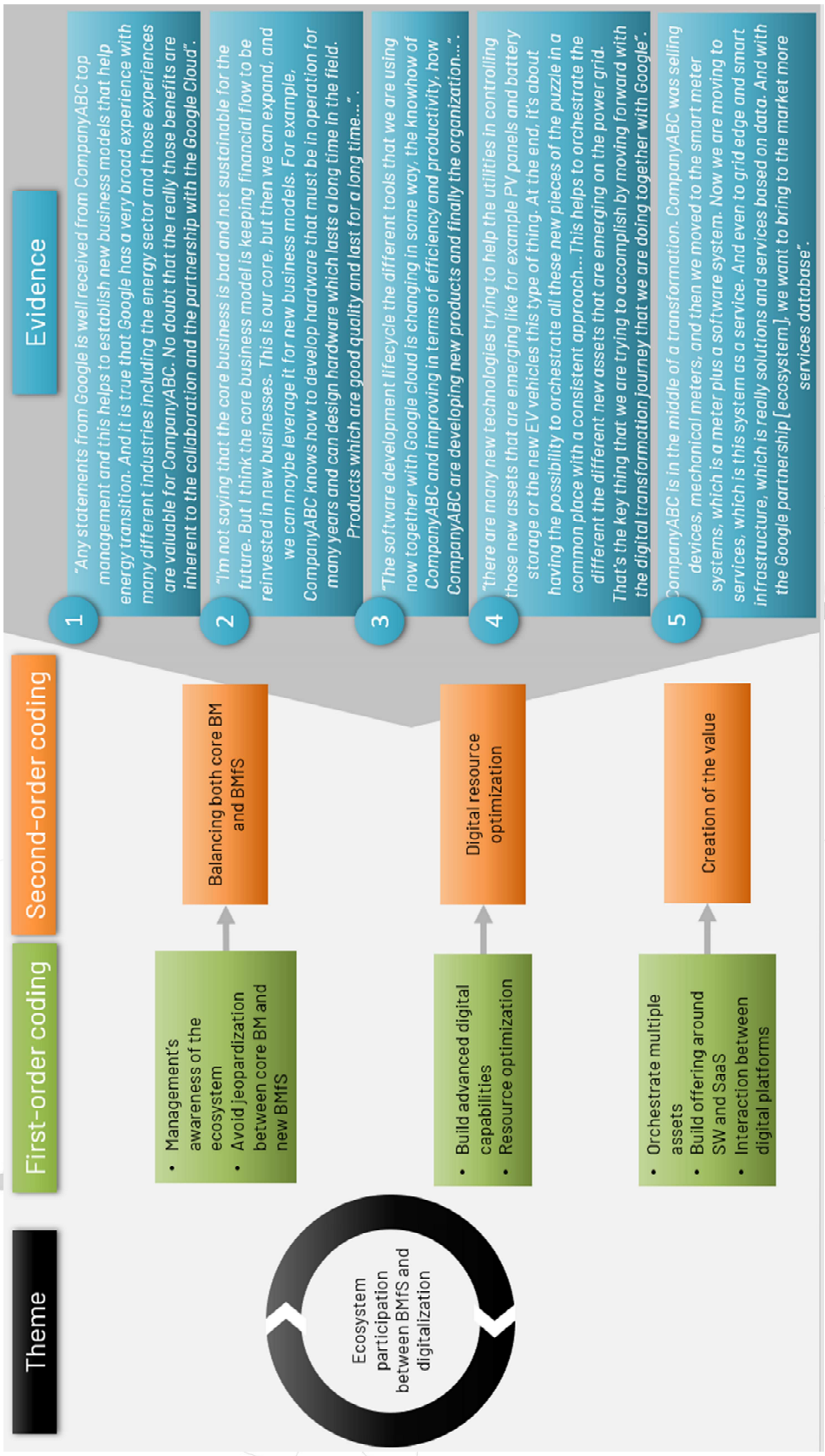


Figure 1. Result of data structure and transcription evidence.

4. Discussion

Comparing these results with former literature, we get three main findings on the relationship between BMfS and digitalization as the result of the company's participation in an ecosystem.

4.1 Ecosystems play a crucial role in maintaining a balance between the core business BM and emerging new BMfS that rely on digitalization

In contrast to Ringvold et al. (2022), who assert that ecosystems support the development of BMfS with external stakeholders, this paper highlights how ecosystems can prevent the jeopardization of the core or already established BM when integrating new BMfS relying on digitalization.

The core business serves as a cornerstone, providing essential financial inflow for ongoing operations and venturing into novel BMfS, while simultaneously avoiding potential competition between the core BM and nascent BMfS. CompanyABC actively seeks an ecosystem where its offerings are recognized, aligning with the cognitive mindset of its management. The management at CompanyABC demonstrates a profound understanding that ecosystems contribute to maintaining a delicate balance between the dominant BM and the envisioned BMfS, particularly in the context of digitalization.

Indeed, we observed that top management is willing to leverage its partnership with Google to implement alternative institutional logics in order to challenge middle-management cognition while developing new BMfS that rely on digital solutions (cf. VP of Digital Solutions statement 1 in the Figure 1), and to reduce the risk of conflict or disruption between the existing core BM and the emerging BMfS dependent on digitalization (cf. Global Product Manager grid-edge statement 2 in the Figure 1).

4.2 Ecosystem supports the digital resource optimization of emerging new BMfS that relies on digitalization

The growing complexity of digital landscapes poses a critical dilemma, with the heightened demand for technical expertise resulting in increased costs. Recognizing the limitations of cultivating all capabilities internally, organizations turn to strategic partnerships, as highlighted in interviews, where partnerships play a pivotal role in fostering new BMfS. Collaborating with both technological and service-oriented partners underscores the strategic importance of combining diverse strengths for optimal outcomes. The recognition of escalating complexity in the digital landscape emphasizes the need for robust partner ecosystems. Beyond technological prowess, the interconnection of skill sets, knowledge, and people catalyse the realization of digitalization within BMfS (cf. Head of Product Management SW, service & solution statement 3 in the Figure 1).

Furthermore, organizations can leverage ecosystems to optimize their internal resources. The benefits of ecosystem utilization for resource optimization, while embracing new BMfS, are emphasized by the transformative impact on SW development lifecycles and operational practices. Collaborative use of diverse tools and integration of partner ecosystems yield tangible improvements in efficiency, productivity, and innovation. This is evident in the accelerated development of new offerings and the enhancement of new BMfS. Therefore, unlike previous platform studies focused more on the coordination value and network effect of ecosystem (Gawer & Cusumano, 2014), this proposition shows potential originality to enrich theory around BMfS and digitalization (Broccardo *et al.*, 2023).

4.3 Ecosystem helps to generate new value for BMfS

Companies participate in an ecosystem to capitalize on the opportunity to orchestrate multiple assets within the energy transition. In the dynamic landscape of modern energy transition, orchestrating multiple assets is pivotal to facilitating a shift toward BMfS, as indicated by the Director of Sales and Business Development's statement 4 in Figure 1. Companies recognize the importance of a collaborative ecosystem approach to navigate the intricate interplay of energy resources, technology, and consumer demands. This expands the current literature, which typically focuses on the relationship between technology and business strategy innovation in the smart grid (Choi & Kwon, 2023) or new energy distribution infrastructure (di Silvestre et al., 2018), rather than emphasizing the role of the ecosystem in BMfS.

Secondly, ecosystems facilitate interactions between digital platforms that are developing within the new BMfS, as highlighted by statements 4 and 5 from the Director of Sales and Business Development and the VP of Business Unit SW, Service & Solution in Figure 1. For instance, platforms with open interfaces via APIs (Application Programming Interface) enable control mechanisms for players in the ecosystem (Blackburn et al., 2022) without the need to become a closed system (Anderson et al., 2022).

Lastly, an ecosystem can support the development of new offerings around Software as a Service (SaaS). Engagement in collaborative ecosystems has become a crucial strategy driving the development of novel SaaS offerings. A pivotal benefit of ecosystem participation lies in utilizing advanced technologies to interpret extensive data repositories. As CompanyABC undergoes a comprehensive transformation, transitioning from mechanical meter sales to integrated smart meter systems and subsequently to service-oriented models, the role of ecosystem partnerships becomes paramount, as indicated by the VP of Business Unit SW, Service & Solution's statement 5 in Figure 1. These collaborations empower the integration of specialized technologies that align with the evolving market landscape, such as communication technologies, allowing the company to adapt without resource-intensive internal development. Additionally, the ecosystem of digital information, such as data analytics based on big data, is essential for an investment plan. For example, in the case of upfront investment in the energy grid, digitalization enables understanding where and when to upgrade the infrastructure,

resulting in environmental benefits, thanks to the use of fewer materials (Bocken et al., 2014).

5. Conclusions

The paper contributes to the literature on BMfS and digitalization within the context of ecosystem participation.

Firstly, we advance the literature by highlighting the pivotal role of ecosystems in maintaining equilibrium between established core BMs and emerging BMfS reliant on digitalization. In contrast to certain perspectives suggesting that ecosystems primarily support BMfS development, our paper asserts their critical function in safeguarding the core business during the integration of new digitalized services.

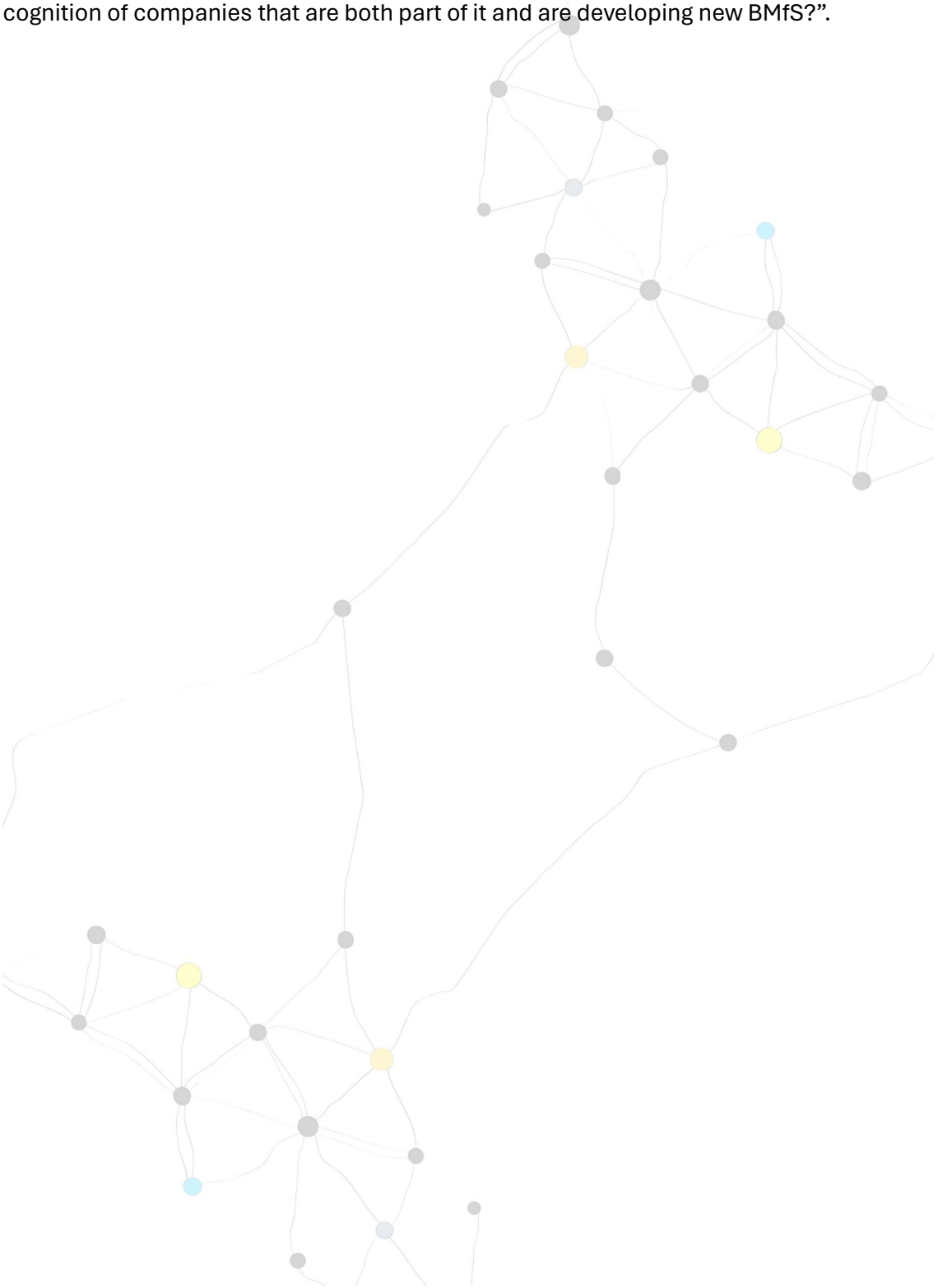
Secondly, our study demonstrates that ecosystems serve as a strategic solution to the escalating complexity of digital landscapes. Collaborative partnerships within ecosystems optimize resources by combining diverse strengths for optimal outcomes. This contrasts with prior studies that predominantly focused on the coordination value and network effects of ecosystems, presenting a novel perspective on BMfS and digitalization theory.

Lastly, we illustrate how companies leverage ecosystems to orchestrate assets in the energy transition, a vital component for BMfS evolution. This collaborative approach, often overlooked in existing literature concentrating on technology and business strategy, effectively navigates the intricacies of energy resources, technology, and consumer demands. Ecosystems facilitate interactions between digital platforms, enabling control mechanisms without the need for closed systems. Additionally, they support the development of new SaaS offerings, crucial for companies transitioning to service-oriented models.

It is important to note that this study has some limitations, primarily stemming from its reliance on a single-case study approach.

Future analysis might include the exploration of new empirical cases across different geographical area or value chain of the energy transition. Indeed, some studies tend to focus on benefit of ecosystem platforms for circular economy (Blackburn et al., 2022). Furthermore, one important element of the BM theoretical concept such as value capture often remains undisclosed and not clear for practitioners too. Indeed, the mechanism of capture value and monetization between BMfS relying on digitalization and ecosystem remains not fully explored. Academics may explore how various companies operating in the value chain of the energy transition can effectively share the captured value among all stakeholders within an ecosystem. The aim would be to study the mechanisms involved, focusing on the economic value and the role of digitalization. Furthermore, in the triangle between digitalization, BMfS, and the ecosystem, while the impact on digitalization and BMfS has been recently debated (Broccardo et al., 2023), the effect of the ecosystem is yet to be thoroughly examined. Indeed, papers often tend to focus on debating the topic from the perspective of a single company rather than considering all participants within the ecosystem. Some relevant questions could include, “Who maintains the customer relationship among all the companies in an

ecosystem and how does digitalization influence this?" or "How can the ecosystem influence the components of a BMfS that relies on digitalization, and what advantages and disadvantages can it bring?" or "'How does the ecosystem influence the managerial cognition of companies that are both part of it and are developing new BMfS?".



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Appendix - Questions

1. Could you introduce yourself?
2. How do you define energy transition within your company?
3. What kind of new technologies are you using?
4. What are the products or services offered?
5. What is the value proposition of the new offering? What is the commercial, environmental, and social benefits?
6. How do the new BMs they coexist within current BMs? What is the role of partnership?
7. What are the most important changes in the BM that are required for the digitalization and energy transition?