

Balancing on the Triple-Bottom-Line: Tensions in the Success Factors of Digital Business Models for Sustainability

Timo Phillip Böttcher
Technical University of Munich
timo.boettcher@tum.de

Jana Petry
UVC Partners
jana.petry@uvcpartners.com

Jörg Weking
Queensland University of
Technology
joerg.weking@qut.edu.au

Andreas Hein
Technical University of Munich
andreas.hein@tum.de

Abstract

We need innovations that enable sustainable economies and sustainable private consumption to meet the grand challenges of the UN Sustainable Development Goals. As an essential source of innovation, startups play a crucial role in improving sustainability by creating innovative and sustainable products and services as part of their business models (BMs). Since BMs are at a firm's core, BMs are a decisive factor that influences whether startups fail or thrive; we analyze the success factors of sustainable BMs. We interviewed 16 experts from 15 startups implementing sustainable BMs based on digital technologies and one incubator specializing in sustainability. We identify six success factors representing tensions in digital BM design that entrepreneurs need to address. Our analysis shows how the design of sustainable digital BMs differs from regular digital BMs and how the tensions affect the success of startups. For established firms, the results guide BM design and technology use.

Keywords: sustainability, business model, entrepreneurship, success factors, tensions.

1. Introduction

The global economy is expected to experience a loss of 3% in the year 2050 and up to 4.4% in 2060 due to climate change. Hence, the UN's sustainable development goals (SDGs) include the economy as a central dimension of a sustainable world (United Nations, 2015). Sustainable development can only be fostered by transforming our economy (Schaltegger, Lüdeke-Freund, et al., 2016). Therefore, we need firms to create sustainable offerings to private and corporate customers. However, firms struggle with changing their

business model in general, and towards sustainability in particular (Lokuge et al., 2021; Teece, 2010).

Digital technologies, such as robotics, artificial intelligence (AI), and machine learning, already foster digital innovations that disrupt value creation logic (Teece, 2018; Weber et al., 2021). Also, they can enable sustainable innovations (Dean & McMullen, 2007). For example, Delicious Data predicts the number of needed food portions in canteens to reduce food waste using AI. Besides, digital technologies also enable innovative business models (BMs), such as the data-driven business model of Delicious Data (Baecker et al., 2021; Böttcher & Weking, 2020; Jabłoński et al., 2020).

Sustainable startups designing new BMs for sustainability (BMfS) fostering social and environmental change play a key role in innovation for sustainable development (Gregori & Holzmann, 2020). They incorporate sustainability as a distinctive factor in their business models and drive sustainable development by changing old patterns through sustainable and innovative processes or products that change markets and consumption habits (Schaltegger, Lüdeke-Freund, et al., 2016). In business-to-business (B2B) settings, these startups are vital, as they enable other firms, such as multi-national incumbents, to become more sustainably by adapting the startups solution, thereby leveraging their sustainable impact. They serve as catalysator and forerunners of the sustainable transformation of the economy other firms can use and draw inspiration from.

However, sustainable startups face particular tensions: To create sustainable impact, sustainable startups must scale and eventually disrupt the current industry logic, but sustainable (e.g., environmentally friendly) products are often more expensive in production, with notable exceptions such as cheaper frugal innovations or savings from the use of recycled resources. Thus, sustainable startups must maintain

financial efficiency to keep prices low and attract mainstream customers (Gregori & Holzmann, 2020). They need to balance on the triple-bottom-line, managing economic, environmental, and social value creation to become successful.

Research in entrepreneurship, management, and information systems has focused on different types of value creation, such as ecological value creation (Bocken et al., 2014), economic value creation (Amit & Zott, 2001), and digital value creation (Steininger, 2019). While scholars recognize that BMfS must balance economic, environmental, and social value creation for lasting sustainable impact, little research has been done on the role of digital technology for sustainable value creation and the arising tensions in BMfS. However, we observe digital startups, such as Delicious Data, implementing BMfS that enable this transformation. To analyze how successful B2B startups implement BMfS leveraging digital technology, we propose the following research question: *What are the entrepreneurial success factors for sustainable digital B2B business models?*

To answer this research question, we conducted an exploratory qualitative approach and interviewed 16 experts from 15 B2B startups with successful digital BMfS, and one incubator focused on sustainable entrepreneurship. We identify six success factors for BM design and discuss the tensions that startups need to address, and how digital technology can support the resolution of these tensions. The success factors and tensions highlight the differences between the BM design of sustainable and regular startups and guide early design decisions for BMfS.

2. Related Work

2.1 Sustainable Entrepreneurship

Sustainable development means balancing the three dimensions social, environmental, and economic development (United Nations, 2015), so that the present needs can be satisfied without limiting future generations in satisfying their needs (United Nations General Assembly, 1987). The term "Triple Bottom Line" also refers to these three dimensions (Elkington, 1998). Sustainable entrepreneurs have sustainable development as their core mission and thus strive to positively contribute to social and environmental challenges with their business activities (Hall et al., 2010). This can include more sustainable ways of producing goods or offering a more sustainable substitute for a product, for example. This means they simultaneously create a positive environmental and social impact while taking advantage of market

opportunities through new BMs (Schaltegger, Lüdeke-Freund, et al., 2016).

2.2 Business Model

A BM is not purely a business's financial model but rather shows how the business is constructed conceptually (Teece, 2010). It "articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers." (Teece, 2010, p. 173). Thus, it includes the value offered to customers, the way the business creates and delivers this value, and how it monetarizes this value (Teece, 2010). Customer segmentation, company resources, distribution channels as well as streams of costs and revenue are to be described amongst others within the respective areas (Bocken et al., 2014). The BM is seen as one of the most critical determinants of business performance (Al-Debei & Avison, 2010), and an inimitable BM supports greater value creation (Teece, 2010).

The value-based view on BMs articulates three core value dimensions of the BM: the customer value proposition, the value creation and delivery, and the value capture. This conceptualization is similar to the conceptualization of Boons and Lüdeke-Freund (2013). In the context of BMfS, they consider four dimensions: value proposition, supply chain, customer interface, and financial model, whereas supply chain and customer interface are elements of the value creation (Abdelkafi & Täuscher, 2016).

2.3 Digital Business Model

Digital technologies, such as AI and blockchain, can function as a lever for BM design as new opportunities arise regarding how they create, deliver and capture value (Böttcher et al., 2022; Weking et al., 2020). For example, digital platforms as digitally enabled infrastructures create innovation opportunities for connecting various stakeholders (Gregori & Holzmann, 2020; Hein et al., 2019), help cut costs, and/or increase the performance of primary activities of a firm, such as the sales activities through the introduction of digital sales channels. Moreover, digital technology can be the core of the business, for example, if the product is software (Steininger, 2019).

Thus, digital technology can be incorporated into the BM in various ways. Steininger (2019) distinguishes between four types: Technology-facilitated BMs, using digital infrastructure, technology-mediated BM, adding digital customer interfaces, technology-bearing BMs, offering digital products, and purely digital BMs, which have digitalized all elements of the BM. In this paper, we define a digital BM according to this fourth type, if

the value is created through a “completely digitized product or service, digitally sold and delivered.” (Steininger, 2019, p. 381)

2.4 Business Models for Sustainability

All three dimensions of sustainability, i.e., the social, environmental, and economic perspective, need to be incorporated into the BM to avoid financial instability and foster environmental and social value creation (Gregori & Holzmann, 2020). Conventional BMing is insufficient when aiming to balance the three dimensions of sustainability, which is more complex than focusing on financial value creation (Schaltegger, Hansen, et al., 2016). In literature, this particular form of BMs is often referred to as Sustainability BMs, Sustainable BMs, or BMfS (Gimpel et al., 2019; Schaltegger, Hansen, et al., 2016). These BMs integrate sustainability into their value proposition and their way of creating value for the customer plus the society and the environment (Abdelkafi & Täuscher, 2016). They are designed to solve issues regarding integrating the three dimensions, i.e., social, economic, and environmental, into the BM and thereby foster sustainable development (Lüdeke-Freund & Dembek, 2017).

2.5 Success factors of startups

The success factors of startups have been analyzed extensively in extant research. It is argued that the elements of startup success consist of the entrepreneur, the industry structure, the business strategy (Sandberg & Hofer, 1987), resources, and the organizational processes and systems (Chrisman et al., 1998). For example, the entrepreneur, or the entrepreneurial team, is responsible for identifying profitable opportunities or innovations that create the basis for a successful startup. To leverage these opportunities successfully, research found the entrepreneur's experience, attitude, and managerial skills influential on success (e.g., Cantamessa et al., 2018; Chrisman et al., 1998). The importance of a startup's resources and assets is also argued in the literature (Balboni et al., 2014). Furthermore, the literature suggests that the protection of the digital solution alongside gaining trust due to technology usage is a critical success factor for startups implementing digital BMs.

The BM design is one of the significant failure reasons for startups (Cantamessa et al., 2018). But it can also foster startup success and drive competitive advantage (Zott & Amit, 2007). A startup's growth rate and survival have been the primary measure of success (e.g., Balboni et al., 2014; Weking et al., 2019). However, the recent consolidation in startup funding

supports the BM element of efficiency as identified by Amit and Zott (2001). Startups are now expected to create scalably but profitable BMs that can sustain without external funding (Ogrean & Herciu, 2020), even though received funding is often used both as a measure of success (e.g., Böttcher et al., 2021) and a source of success (e.g., Forti et al., 2020).

3. Methodology

We followed a qualitative research approach based on 16 interviews (Bhattacharjee, 2012). This approach provides an opportunity to explore an emerging research field and create novel insights based on qualitative insights.

ID	Digital product	Main Sector	Year founded	Interview duration
I1	Digital products	Agnostic	2017	29:48 min
I2	Deep tech	Supply chain	2016	29:25 min
I3	Software	eCommerce	2019	28:58 min
I4	Software	Agnostic	2006	21:30 min
I5	Digital products	Agnostic	2009	38:27 min
I6	Software	Agnostic	2018	31:25 min
I7	Software	Agnostic	2020	30:13 min
I8	Platform	Supply-chain	2020	33:19 min
I9	Deep tech	Food	2019	44:55 min
I10	Software	Agnostic	2017	24:03 min
I11	Software	Agnostic	2019	21:25 min
I12	Deep tech	eCommerce	2019	43:34 min
I13	Software	Agnostic	2020	25:40 min
I14	Software	Agnostic	2021	~ 25:00 min
I15	Platform	Food	2019	47:44 min
I16	Accelerator		2007	39:28 min

Table 1. Overview Interviews.

We collected our data from expert interviews. Therefore, we searched for startups offering digital solutions supporting sustainable development in a B2B context. We selected only B2B startups, because of their scalable impact on sustainability triggering a transformation from within the industry. Also the challenges of B2B and B2C BMs differ, particularly in their marketing approach, and have to be analyzed separately. The selection of the startups was based on Eisenhardt (1989); thus, the sample was not set before the data collection process started, but the interviewees were selected along the process to derive the appropriate insights. This approach provided us the flexibility to build theory from an in-depth analysis of emerging concepts (Gioia et al., 2013). Eventually, we interviewed 16 experts from 15 startups and one startup accelerator.

We interviewed experts, such as the founders, board members, or head strategists. We aimed to retrieve detailed insights into the startups' BMs, mainly focusing on their value creation and how they leverage digital technology in the value creation and as part of their value proposition, value delivery, and value capture. The interview with the startup accelerator was used to collect general information about BMfSs and the innovations introduced by startups in this field. We focused on open questions to avoid bias in the answers (Gioia et al., 2013). We iteratively adapted our questions to reveal new insights and new concepts.

The data collection was terminated when no new insights for the emerging concepts were gained (Eisenhardt, 1989). All interviews were conducted online between March and May 2021. We recorded the interviews to assure the correctness and completeness of the collected data.

To prepare the data collected for analysis, the interviews were transcribed using a de-naturalized transcription approach. All interviews were anonymized to make the interviewees speak freely and keep their privacy while allowing them to provide the required transparency for our research.

We analyzed the data following the open coding procedure by Gioia et al. (2013). We first coded open codes in the interview transcripts such as "reusability of code" based on statements such as "if you have created code for something that is actually relevant to something else, that can be adapted and reused to save a bit of resources." In sum, we created 178 such open codes. Second, we subsumed the open codes to 19 axial codes based on the similarity of codes to identify success factors of digital BMfS. For example, we summarized the open codes "reusability of code," "technological flexibility," and "standardization versus customization" as "scalability of the technology." Finally, we created aggregated dimensions to summarize the coded data,

representing the success factors, such as "Using digital technology effectively" based on the axial codes "scalability of the technology," "technology as BM enabler," and "managing technological complexity." Eventually, the data analysis resulted in six aggregate dimensions.

4. Results

By analyzing the 16 experts' experiences and learnings, we identified six overarching aggregate dimensions that influence the development and success of B2B startups implementing digital BMfS.

4.1. Aligning the firm's and team's sustainability purpose

A joint and authentic team purpose is fundamental in fostering success for sustainable startups. The team needs to be aligned with their purpose, even more than a "standard startup." This purpose needs to be authentic as "the authenticity issue is a big one" (i4). It makes a difference whether "I [am] doing this out of conviction or am I just jumping on it because it is the hottest new shit" (i4). In highly competitive markets, the firm's purpose's authenticity becomes a competitive advantage "because it comes from within, because we do not have to fake it, but because that is why we have always had it" (i4).

It seems important not only for the founders to be aligned on a common purpose but also for the whole team with its skills and experience since "people are more motivated by the fact that there is a higher meaning, so to speak, this purpose. So, the team spirit is also greater when everyone is pursuing a purpose" (i5). Some startups even put the employees' purpose above skills and experience, as "knowledge can always be built up. It is probably more the right attitude and the right mindset." (i6). Ultimately, the engagement of all parties involved in value creation results in better products.

4.2. Understanding customers' external sustainability motivations

Understanding your customer is always critical. An essential success factor for B2B startups with digital BMfS is understanding the external forces creating customer demand for sustainable solutions. The startups need to acquire knowledge of the market to understand the dynamics customers are exposed to and the motivations driving them to adopt sustainability-promoting products. For example, more restrictive regulations influence the need for sustainable products. Almost all interviewees mentioned that new regulations

their customers must comply with constitute a significant creator of customer demand. A solution that makes this compliance easy while providing additional benefits is a central selling argument (i2, i6, i10, i11, i13, i15).

Besides regulatory pressure, customers of our interviewed startups also aim to become more sustainable due to the pressure they sense from their respective customers, both private and corporate. "If the consumers did not ask for sustainable products, nobody would be pushing for sustainable products." (i2). If companies meet these needs for more sustainable behavior, products, and actions, they will "stay in the market and get bigger, because the end consumers want it" (i8). Corporate customers also increasingly demand sustainability from their suppliers along the supply chain. If this pressure from the supply side goes hand in hand with the individual demand side, this "is what works best" (i4).

4.3. Focusing on simultaneous economic, environmental, and social value creation

For the value created by sustainable startups, it is necessary to design the BM to create sustainable impact and economic benefit. "Without the economic aspect, you will not be successful, at least not on the scale, and the challenge is definitely to sell a sustainable digital product in such a way that it also conveys the economic benefit directly in the value proposition" (i3). i9 adds that sustainability benefits are a nice feature but eventually will not be the decisive argument for or against a product: "I am sure they all think it is cool when sustainability is added as a factor. But I do not think that this is something that will have a significant influence on their decision. [...] Neither positively nor negatively" (i9). Eventually, cost savings or efficiency gains will influence the final decision rather than increased sustainability indicators (i12). The success factor for digital BMfS is thus to provide value in the form of an efficiency enhancement, meaning cost reduction, time-saving, or revenue increase while providing a more sustainable solution (i2, i3, i6, i8, i9 i12).

However, measuring and demonstrating the value created for the business's customers is complicated. Efficiency-related measures can be measured and communicated, such as reducing processing time by 75% (i13). Other values, such as brand value creation, are more challenging to measure in monetary value. Some startups match internal success measures with their sustainability-related value creation. On the sustainability side, some measure how much revenue they are making and the carbon emission savings provided for their customers using their solution (i12).

Startups creating social value track the number of people/employees they reach (i1, i7) or the recurring engagement with their solution (i15). However, many startups do not have metrics to measure their environmental or social impact in place (i2, i3, i7, i8, i10).

4.4. Using digital technology effectively for sustainable value creation

Digital technology is an enabler and lever to maximize sustainable value creation and scale BM growth. However, despite the benefits of digital technology for BMfS, it also poses challenges in managing sustainable startups (i7).

First, technology is considered a "means to an end" in sustainable value creation (i4, i11, i13), implying the BM would not work without the technology. This view is quite prevalent in the statements of the interviewees. Digital technology provides the basis for success, but in the startup space, it is no point of differentiation or source of competitive advantage (i7).

Second, the effective use of digital technology in the BMfS helps startups scale their business. Scaling a business is a significant success factor for all startups. However, in the sustainability context, scaling the business also implies scaling the sustainability impact, which is the ultimate measure these startups are compared against (i1, i9, i14). The flexibility, adaptability, and reusability of digital technology are the crucial characteristics supporting scalability. These properties of digital technologies quickly adopt digital value propositions to new markets or customize to individual customers (i1, i2, i6, i9).

Third, digital technology challenges the startups' management (i7). For example, the user experience must be implemented appropriately from an interface perspective or customer support. The experience must be as convenient as possible to make the complex information provided as simple as possible (i2, i3, i6, i7), which requires much effort on the development side (i7). The success factor is to communicate the value in a user-friendly way, even if the value creation is complex through the use of digital technology.

4.5. Selling the sustainable value in a targeted approach

Ultimately, the startups have to sell their solution to businesses. Several similar approaches have proven successful for our interviewed startups (i4, i10, i11). Approaching the business customers directly is the most common approach. The difference for the digital BMfS is that they get "a foot in the door" with their customers

through the sustainability departments. (i12). Their purpose aligns with the startups'; thus, they can connect to the relevant decision-makers (i4, i6, i12). However, depending on the customers' motivations to engage in sustainability and the product or service offered by the startup, customers are also approached through finance, if there is a clear and easy economic benefit or a legal reporting issue that can be resolved, or through the technology and innovation departments, if the solution is very technical and operates mainly in the backend (i2, i4, i10). Nevertheless, in the end, digital BMfS always have to balance the economic and sustainable value creation to convince economically driven management.

Some startups, however, take a different approach targeting consumers as their customers' customers to create external need to engage in sustainability solutions. One interviewee compared this approach to the payment provider Klarna: consumers are used to paying purchases with Klarna as the central payment platform, and "at the end of the day, they stay in the market and get bigger because that is what the end consumers want." (i8) So, if consumers demand traceability or sustainability certificates provided by the startups, they will find customers buying their solution. Hence, this approach centers around brand building and marketing campaigns to engage consumers with the startups' B2B solutions (i3, i7, i8, i9, i15).

Ultimately, network effects appear strong for digital BMfS. Their customers create networks proposing the startups' solutions to partners across their supply chain, for example, to create a transparent end-to-end reporting along with the entire value creation that requires compatible tools for data exchange (i4, i13).

4.6. Finding supportive funding for economic growth and sustainable impact

Finally, another major success factor for any startup is finding investors whose money and expertise help grow the BM. The challenge, thus the success factor, is to choose the right investors (i8, i16). As sustainable startups are the prime target for impact investors, they have more funding options to choose from, making it easier to receive funding overall (i7, i9). These impact investors focus on helping the startups grow to maximize their sustainable impact. Therefore, following the earlier presented importance of aligning the firm's and team's purpose, many of these investors focus on the people and their motivation to create impact "because business models change, markets change, products change, but the people, the team, the founders do not change." (i8)

However, the interviewees also faced problems with impact investors. Some pretend to focus on impact but are only interested in the financial aspects for their

good (i8, i13). Impact investors rejected startups because the startups' commercial focus and highly profitable BMs clashed with the social interests of impact investors (i3, i7, i12). Also, the digital focus of our interviewees presents an issue for impact investors because of the complexity of the technology (i3). Instead, traditional investors have focused on complex digital technology in the past and are experts in scaling digital startups. This also helps sustainable startups to scale their sustainable impact (i3, i7, i11, i12). Eventually, there will be hybrid investors, a mixture between impact-driven and classical investors interested in sustainable and economic value creation (i3), or the startup will mix both types in their investment rounds to retain the best of both worlds.

5. Discussion

Startup success is a complex and challenging task. While it is already hard enough for any kind of startup, startups implementing BMfS face several ambidextrous challenges balancing the three elements ecology, economy, and society. We identified six success factors in how 15 B2B startups successfully implement and run digital BMfS supporting the UN SDGs. Figure 1 graphically summarizes these six success factors and reveals their relationships with the three BM elements value proposition, value creation and delivery, and value capture.

These connections demonstrate how the individual success factors influence the startups' BMs. In turn, this also shows how they influence the ambidexterity of balancing social, ecological, and economic success. Thus, sustainable startups need to address the rising tensions in BM design.

First, an economically and sustainability-driven team-based common purpose based on intrinsic motivation among team members sets the foundation for a successful BMfS. Creating a clear purpose for the startup and aligning the team with it influences startup growth and its funding potential (Balboni et al., 2014). It influences the value proposition, which some define as the "core of a firm's entrepreneurial identity" (Chandler et al., 2014, p. 236). However, an excessive focus on the ecological or social value may be positive only in the short term but potentially harms the business in the long run due to the lacking business focus, such as a missing professional network (Abebe et al., 2020). Therefore, we identify a knowledgeable and experienced team to be a critical resource for fostering the symbiosis of economic, environmental, and social value creation. The startup's human capital and knowledge are crucial, especially regarding technology commercialization, expertise, skills, and alignment among founders (Kirchberger & Pohl, 2016), as missing

experience and a mismatch of skills are sources of startup failure (Cantamessa et al., 2018). Consequently, team formation positively influences new ventures' growth and funding potential (Balboni et al., 2014).

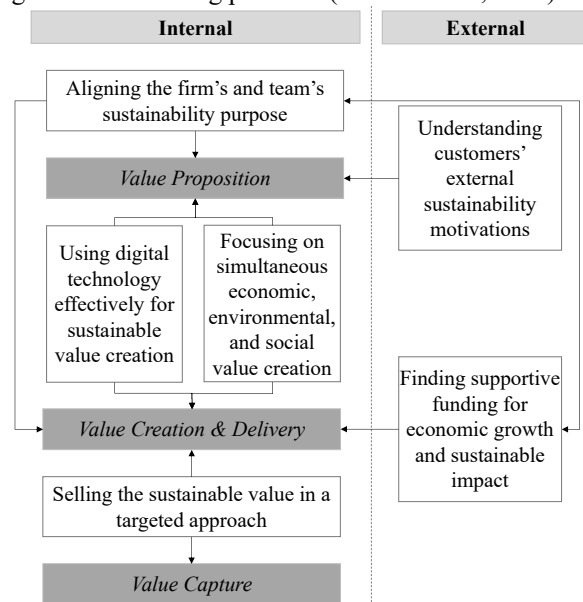


Figure 1. Success Factors for B2B Startups with digital BMfS.

Second, market dynamics regarding regulations, individual demand, and company stakeholders influence the need for sustainable solutions, which must be addressed in a successful value proposition. External motivators for customers create the need for sustainable solutions. Hence, a profound understanding of them is necessary for startup success. Regulatory requirements force firms to introduce solutions enhancing their contribution to sustainable development, which drives demand (Balboni et al., 2014). The marketing effect of sustainability creates demand for corporate customers to increase their sustainability efforts and communication for differentiation from competitors (Chandler et al., 2014). Finally, the interest in consumers' sustainability has been increasing, driving their need for more sustainable consumption and the emergence of BMfS (Gimpel et al., 2019). Understanding the motivations of business customers, their needs must be addressed in the startup's BM. Yet this is an ongoing process of BM evolution, constantly adapting to the market dynamics (Täuscher & Abdelkafi, 2018).

Third, similar to the team capabilities, economic value creation must accompany environmental value creation in the value proposition to drive the success of sustainability startups. The achievement of a BM that merges financial value capture for the startup while simultaneously generating sustainability-related impact is a widely discussed tension that startups have to overcome within building successful BMfS (Gregori &

Holzmann, 2020; Lüdeke-Freund & Dembek, 2017). As the BM is designed around customer needs, a value proposition addressing both financial and sustainable needs drives the adoption of respective solutions. Consequently, digital BMfS must include a balanced value proposition for their customers. Moreover, this value needs to be communicated clearly (Chandler et al., 2014).

This leads to fourth, as we find the effective use of digital technology for sustainable value influencing the value proposition and the value creation. In the value proposition, the simplicity and ease of use of digital technologies, enabling the sustainable solution, need to be communicated clearly to the customer to present a critical factor for adopting the solution. This is especially crucial when escaping the sustainability niche and targeting mass markets (Mancha et al., 2021; Vernay et al., 2020). Extant research adds that this communication must be close to existing solutions to clarify differences (Vernay et al., 2020). For value creation, adaptable digital technologies enable scaling and adoption of the BM to changing customer demands. Especially scaling with limited resources is crucial but demanding for startup success (deLange & Valliere, 2020). Digital technology thus presents the lever to scale and adapt with ease. When creating their solution, startups thus need to balance the complexity of digital technology needed to create the value proposition but make it easy to use and scale by standardization and modularization and customize it to individual needs.

Fifth, external support, such as venture capital, positively impacts BMfS if it supports the current focus on economic, environmental, or social value. Investors provide resources for economic scaling, thus positively influencing startup survival (Cantamessa et al., 2018). The financial capabilities influence growth strategies, such as market expansion, innovation growth, and brand assets (Forti et al., 2020). However, for sustainable startups, the interests and purpose of investors have to be aligned for successful funding. Investors of any type operate between the two extremes of maximized social or ecologic value (i.e., pure impact investors) or maximized economic value (i.e., "traditional" investors). Accordingly, they look for startups whose BMs align. For startups, it is critical to select investors accordingly: maximize impact or profit. Depending on the startup stage, the selection of investors may vary and mix differently. For example, while venture capitalist firms help build legitimacy in the economic space, they may negatively influence legitimacy in the impact-driven community (deLange & Valliere, 2020). If startup purpose and investor purpose do not align,

Finally, the startup's sales approach must be targeted to adapt to the individual customer, influencing value creation and value capture. Therefore, the startups

need to highlight the sustainable value specifically for the focal customer. This correlates and builds on the understanding of the customers' sustainability motivations. For example, the sustainability department presents a good way to approach potential customers. However, if regulatory requirements drive the startup's value proposition, startups target the financial department. Differentiation also applies to the customers' industries, whether the primary need of the industry is increasing sustainability or improving cost-effectiveness. For digital BMfS, a success factor is the leverage of network effects (Mancha et al., 2021). As customers want integrable solutions along their value chains, the startups profit from the diffusion of their solutions along the value chains. To convert companies to paying customers, the revenue model as part of the BM's value capture must meet the customers' needs (Bocken et al., 2014). On the startup's side, the revenue model depends on the digital technology used for value creation. While subscription models are common for software, they are less found for hardware-heavy value propositions. On the customers' side, the preferred payment model is context-dependent. Thus the startups should be able to adapt their revenue models or offer several different models to choose from. A value-oriented revenue model specific for sustainable startups in which customers pay for the created sustainable value. This lowers the risk for customers and builds trust. Yet, measuring the sustainable value remains a difficult task as there are limited measurement mechanisms for the value creation of BMfS.

5.1 Implications for Theory and Practice

This paper contributes to research on digital innovation, entrepreneurship, and sustainability. As IS research is only starting to focus on sustainability (e.g., special issues in the *Information Systems Journal* and the *Journal of the Association for Information Systems*), this paper presents an exploratory approach to the design of digital BMfS.

Based on 16 interviews with B2B startups implementing digital BMfS, we identify six success factors of BM design. These success factors reveal tensions in the BM designs that need to be addressed by sustainable startups to balance economic, ecological, and social success. The findings present a framework of success factors and their tensions in BM design for digital innovation and entrepreneurship. As the achievement of the UN SDGs requires profound shift in firms value creation towards sustainability as particularly argued in SDG9, we present a foundation for future research on digital BMfS that is especially relevant for entrepreneurs. We also show that digital technology is critical in navigating these tensions as it

allows for balancing the three elements of sustainability. For research on (digital) sustainability, we discuss how the integration of sustainability in the BM alters the design and the success factors of entrepreneurial BMs, demonstrating how the BM concept supports research supporting the UN SDGs by combining economic, environmental, and social value creation.

For practice, especially for entrepreneurs engaging in sustainability, this paper presents lessons from 15 startups implementing digital BMfS. Entrepreneurs can benefit from these lessons by considering the success factors and their tensions in their early BM design. By knowing these arising tensions, entrepreneurs can address them early and design their BM and strategy accordingly. Especially, the role of digital technology in BM design is essential so that entrepreneurs build their technological infrastructure accordingly, for example, allowing for flexible pricing or value measurement. As the different types of venture capital create tensions, investors as well as policy decision-making needs to adapt their practices and goals to support startups' success of achieving the UN SDGs combining economic, ecologic, and social value and benefit.

5.2 Future Research

As our identification of success factors for digital BMfS in the B2B context is explorative, it provides several avenues for future research. We will continue this work by further detailing the results. We will collect more startup data to create a medium-sized sample allowing for a configurational analysis. The configurational analysis will help us detangle the different factors regarding digital technology, BM, and sustainability and create a configurational theory on startup success in implementing digital BMfS. Our research can also be extended through quantitative analysis. In addition to our configurational approach, scholars can gather larger sample sizes to analyze the proposed success factors in variance-based statistical models. Such a quantitative analysis may allow for a detailed data-based comparison of differences and similarities between sustainable and not explicitly sustainable BMs. In addition, longitudinal research on BM's influence on startup success remains scarce. In the sustainability context, this proposes added value, as the sustainable impact can only be achieved through the persistence and success of the startups offering such sustainable solutions. Sustainable solutions have to stay successful and become adopted throughout to have a lasting impact on the world's sustainability.

Lastly, we explicitly mentioned network effects as influencing startup success in sales. We did not analyze ecosystem embeddedness in our analysis. However, all our interviewed startups stem from the same vibrant

entrepreneurial ecosystem, finding support in numerous accelerating programs, such as the one we interviewed. As any firm cannot solve the sustainability challenge alone, collaboration, value co-creation, and social networks are needed. Scholars should analyze how ecosystem embeddedness and the related inter-start-up-relations influence the economic and sustainable success of digital BMfS.

5.3 Limitations

The conducted inductive qualitative research brings limitations that need to be considered. Even though the underlying approach provides the generation of valuable new insights into the investigated field of research (Gioia et al., 2013), the sample is restricted to 16 experts of digital B2B BMfS. First, this limits the results to B2B specific determinants, and findings may differ for B2C startups. Second, even though the experts deeply understand the investigated topic, failed startup perspectives may have delivered further insights. As the interviews were completed within a limited timeframe, the determinants for success in digital BMs are identified at a specific time.

Consequently, the context is set to the current situational characteristics, and development over time is not considered in the data analysis - neither for the BM development nor the future successful development of the companies. Furthermore, the results are limited concerning the startup development stages. Even though new ventures with different lifetimes are included in the study to get a diverse picture of the challenges and successful strategies along the way, the data is not analyzed related to the startup development stage.

6. Conclusion

We must promote sustainable development to limit the negative consequences of environmental challenges and support the UN SDGs with practicable research. Digital innovation and entrepreneurship enable great opportunities for BMfS to create innovative solutions that help combat these grand challenges. As firms significantly influence sustainable development, the success factors of digital BMfS of B2B startups presented in this paper support startups to foster economic, ecologic, and social success in symbiosis. We call for future research on how digital technology enables sustainable development, as we argued digital technologies enable the adoption, diffusion, and scalability of sustainable impact to achieve a more sustainable economy.

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