



Digital sustainable entrepreneurship: A business model perspective on embedding digital technologies for social and environmental value creation

Patrick Gregori^{*}, Patrick Holzmann

Department of Innovation Management & Entrepreneurship, University of Klagenfurt, Universitaetsstrasse 65-67, 9020, Klagenfurt, Austria

ARTICLE INFO

Article history:

Received 21 February 2020

Received in revised form

4 June 2020

Accepted 11 June 2020

Available online 11 July 2020

Handling editor: Yutao Wang

Keywords:

Sustainable entrepreneurship

Digitalization

Business model

Institutional logic

Technology

Tension

ABSTRACT

This article explores how sustainable entrepreneurs embed digital technologies in their business models to leverage social and environmental value creation. To this end, we draw on the institutional logics perspective of sustainable business models. The article contributes to research on sustainable business models and entrepreneurship by showing that digital technologies enable novel configurations of sustainable business model components: a blended value proposition, integrative value creation, and multidimensional value capture. Moreover, we discuss the complementarities and tensions of a digital logic and logics of sustainability that clarify and advance the link between these concepts in an entrepreneurial context. This further adds to the theoretical development of sustainable business models as manifestations of multiple institutional logics. The article yields practical implications by describing possibilities and drawbacks of digital technologies for designing sustainable business models.

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1. Introduction

Entrepreneurship has been embraced as a potential solution to the grand social and environmental challenges such as climate change and gaping social inequalities (Gast et al., 2017; Howard-Grenville et al., 2014; Muñoz and Cohen, 2017). Sustainable entrepreneurs are considered to be key actors as they advance efforts of sustainable development through the implementation of financially viable and innovative business models that create positive social and environmental impact (Bocken et al., 2014; Evans et al., 2017; Hahn et al., 2018; Muñoz and Cohen, 2017). However, sustainable entrepreneurs are facing severe challenges as their businesses need to merge environmental, social, and commercial logics, which often diverge concerning their values, practices, and objectives (Laasch, 2018). Creating environmental and social value can stand in harsh contrast with the logic of the commercial market that prioritizes financial gain, causing tensions for the entrepreneurs (De Clercq and Voronov, 2011; Gregori et al., 2019; York et al.,

2016). If these emerging tensions cannot be accounted for in the design of the business model, they can lead to business instability and hinder environmental and social value creation (Davies and Chambers, 2018). Thus, investigating how entrepreneurs create and align multiple forms of value within their business models is a timely and important but not yet sufficiently explored area of inquiry (Hahn et al., 2018; Stubbs, 2017a; Terán-Yépez et al., 2020).

Recent research has adopted the notion that digital technologies can be supportive for tackling the challenges sustainable entrepreneurs face (George et al., 2020; Parida and Wincent, 2019). This assumption builds on the transformative capacity of digitalization that alters the nature of entrepreneurship (Nambisan, 2017; Yoo et al., 2012) and changes approaches to issues of sustainability (Seele and Lock, 2017; Stuermer et al., 2017). Specifically, digital technologies offer possibilities for new practices that provide entrepreneurial opportunities and enable the development of novel business models (Hinings et al., 2018; Holzmann et al., 2017; Nambisan et al., 2017; Täuscher and Laudien, 2018). Hence, there

^{*} Corresponding author.

E-mail address: patrick.gregori@aau.at (P. Gregori).

are potential synergies between entrepreneurs' efforts for sustainable development and digitalization that have yet to be explored. We address this gap by examining *how sustainable entrepreneurs embed digital technologies into the value proposition, value creation, and value capture components of their business models*.

To this end, we take an institutional logics perspective on sustainable business models (Gregori et al., 2019; Hahn et al., 2018; Stubbs, 2017b). Institutional logics refer to institutionalized sets of values, beliefs, and practices that orient, enable, and constrain action (Friedland and Alford, 1991; Thornton et al., 2012). In this view, sustainable business models are theorized to be compositions of different components, namely, value proposition, value creation, and value capture, that manifest environmental, social, and commercial institutional logics (Laasch, 2019, 2018; Ocasio and Radoynovska, 2016). In addition, we argue that digitalization entails an emerging digital logic that has distinct relationships with logics of sustainability.

Our findings show that digital technologies support the development of value propositions that blend environmental, social, and economic value. Further, digital technologies provide unique constellations for value creation components, allowing for practices of community development, co-creation, and broader stakeholder integration. Usage of digital technologies can also lead to multidimensional value capture as it enables impact complementarities, the scalability of socioenvironmental value, and value spillover. Moreover, findings provide insights into potential logic-related tensions within and between business model components.

This article contributes to sustainable entrepreneurship and business model research by identifying how digital technologies can be utilized to create socioenvironmental value. We add to contemporary research by explicating novel configurations of sustainable business model components enabled by digital technologies. Our research discusses complementarities and tensions of sustainability and digital technology, adding to a deeper understanding of how entrepreneurs contribute to sustainable development. In addition, by arguing for an emerging digital logic, we contribute to the theoretical development of the institutional logics perspective on sustainable business models and the intersection of digital and sustainable aspects within this stream of research. We conclude with practical implications for sustainable entrepreneurs as well as avenues for future research.

2. Theoretical framework

2.1. An institutional logics perspective on sustainable business models

The concept of institutional logics originated from the seminal work of Friedland and Alford (1991) that acknowledges the existence of several institutions (e.g. the market, religion, or family) which each possess their own distinct logic. These logics refer to intersubjective meaning systems comprised of values, beliefs, and norms that orient, enable, and constrain action (Friedland and Alford, 1991; Thornton et al., 2012). Institutional logics provide the frame to evaluate what is meaningful and influence the formation of goals (Friedland, 2018a), thus, shaping individuals and organizations as their values and beliefs guide what is considered worth pursuing. A key premise of this approach is that multiple logics are at work at the same time, potentially leading to complementarities and tensions between logics (Friedland, 2018a; Greenwood et al., 2011). Recent research has identified the institutional logic perspective as a fruitful approach to investigate how environmental, social, and commercial meaning systems influence business practices and the respective business models (Hahn et al.,

2018; Laasch, 2018; Stubbs, 2017a).

Sustainable business models are theorized to consist of an interrelated set of components that taken together depict a venture's value creation activities (Bocken et al., 2014). These components refer to the architecture of a venture, reflect how an organization functions to achieve its goals (Demil and Lecocq, 2015; Massa et al., 2017) and express the inherent relationships of value and the related aspirations of a company (Casadesus-Masanell and Ricart, 2010; Doganova and Eyquem-Renault, 2009). The components of a business model are embodied in the cognition of the entrepreneurs serving heuristic or narrative functions, materialize in tangible and visual-textual artifacts, and are enacted through distinct activities (Laasch, 2019). The literature conceptualizes business models as consisting of value proposition, value creation, and value capture components that are shaped by and manifest multiple institutional logics (Laasch, 2018; Ocasio and Radoynovska, 2016).

While the commercial notion of value that evolves around financial gain characterizes conventional business models, sustainable business models go beyond mere financial profit (Bocken et al., 2014; Schaltegger et al., 2016) and also emphasize values and beliefs of an environmental and a social logic (Laasch, 2018; Stubbs, 2017a). Environmental values, such as the pristineness of nature and waste reduction or social values such as the advancement, dignity, or empowerment of humankind emanate from these institutional logics (De Clercq and Voronov, 2011; Friedland, 2018b; York et al., 2016). Aspects of non-commercial logics can be integrated in all business model components. Enacting multiple logics in hybrid constellations potentially leads to complementarities and tensions (Friedland, 2018b; Greenwood et al., 2011), rendering sustainable business modeling a complex task (Davies and Chambers, 2018; Evans et al., 2017; Schaltegger et al., 2016). The entrepreneur, thereby, takes a key role in translating, integrating, and blending the available institutional logics into the business model (Gregori et al., 2019; Ocasio and Radoynovska, 2016). For example, sustainable entrepreneurs are shown to develop a value proposition that evolves around how sustainability aspects promote the quality of products (Davies and Chambers, 2018). Other cases provide insights into how the entrepreneurs' value capture function goes beyond profit by consciously considering waste reduction and community development or the integration of fair resources into the value creation (Hahn et al., 2018; Stubbs, 2017b).

2.2. The emerging logic of digitalization

Digitalization refers to the adoption or increased use of digital technologies such as cloud computing, artificial intelligence, 3D printing, or mobile computing by governments, industries, or organizations (Brennen and Kreiss, 2016). The unique properties of digital technologies create digital affordances that refer to new possibilities for action in relation to a specific user or use context that can be leveraged by actors such as entrepreneurs (Autio et al., 2018; Nambisan et al., 2019).

The process of digital transformation manifests in new institutional arrangements, bringing about novel values, practices, and structures impacting the established rules of the game and contesting contemporary logic constellations (Hinings et al., 2018). These arrangements include, for example, generally accepted and customizable digital modules like ERP systems, or standard-setting digital infrastructures that organize the interaction of actors such as product platforms and blockchain technology. Crucially, these highly influential digital innovations also affect business models. Scholars argue that the digital affordances accompanying the digital infrastructures and modules broaden the options and spawn new pathways for creating, delivering, and capturing value

(Holzmann et al., 2017; Täuscher and Laudien, 2018). The transformation of economic activity leads to radically new business models (Nambisan et al., 2017) that need specific organizational capabilities to be realized successfully (Rialti et al., 2020).

By introducing new practices, values, and structures, digital technologies arguably have their own but still emerging logic that coexists with and alters the interpretation and enactment of other institutional logics (Mangematin et al., 2014; Tumbas et al., 2018; Yoo et al., 2012). According to recent work, digitalization evolves around the concepts of connectivity, interfaces, openness, accessibility, changeability, and generativity (Caputo et al., 2019; Nambisan, 2017; Nambisan et al., 2019; Yoo et al., 2012). We argue that a digital logic comprised of these ideas and as such allowing for new practices can be added to the repertoire of possible logics that are molded at the business model level. However, how this emerging logic interacts with existing logics, that is the antagonistic and synergistic relationships between the digital and non-digital logics, is a major area for further research (Hinings et al., 2018).

3. Methodology

Drawing on past research on business models in sustainable entrepreneurship (Davies and Chambers, 2018; Hahn et al., 2018; Spieth et al., 2019), we opted to apply a qualitative methodology to analyze the gestalt of the embeddedness of digital technologies in the business models of sustainable entrepreneurs. Applying a qualitative research design enables the adequate study and description of the complex relations of individual business model components, their exemplification, and the materialization of multiple institutional logics. Further, qualitative research designs are recommended for the study of institutional logics (Reay and Jones, 2016). We followed a systematic approach that allows for an inductive engagement with the data within a theoretical framework (Charmaz, 2006; Corley, 2015; Gioia et al., 2013).

3.1. Data collection

We collected data following a theoretical sampling strategy that advocates the joint collection and coding of data and allows for the selection of study participants according to the emerging concepts within the research process (Charmaz, 2006; Glaser and Strauss, 2006). In line with grounded theory approaches (Corley, 2015), we started our data collection with a broader research question aiming to investigate the practices of sustainable entrepreneurs who are engaged in ecologically and socially sustainable value creation. To this end, we screened the submissions and contestants of Austrian new venture competitions that focused on environmental and social projects as well as relevant accelerator programs to identify sustainable entrepreneurs. We identified twenty entrepreneurs who were willing to participate in the study. Upon completion of the initial interviews, we started the coding procedure and inductively identified the importance of digital aspects within the business models of six of the sampled entrepreneurs. Subsequently, in a second round of data collection, we again approached participants of new venture competitions and accelerator programs to extend the initial sample with additional cases that fit our altered research focus. We continued adding entrepreneurs to our sample until no further new concepts emerged and thus saturation was deemed to have been reached (Charmaz, 2006). This sampling strategy allowed us to compose a coherent sample of fifteen cases.

Building on the notion that business models are represented in different forms of tangible and visual-textual artifacts and are expressed through narratives (Laasch, 2019), we collected

comprehensive primary and secondary data. We conducted up to three semi-structured interviews with the sustainable entrepreneurs that covered their personal background and motivation, the process of venture creation, the ventures' functional architecture, and envisaged potential future developments. Each interview took between 45 and 90 min. In addition, we collected data from various sources such as homepages, blog posts, social media information, newspaper articles, as well as videos of the founders. We anonymized these in-depth cases using selected letters of the Greek alphabet to enhance readability. A description of each venture and the data sources used are presented in Table 1.

3.2. Data analysis

We applied an inductively-oriented and multi-step data analysis process based on considerations originating from grounded theory approaches (Gehman et al., 2018; Gioia et al., 2013; Glaser and Strauss, 2006; Langley and Abdallah, 2011). This process is characterized by the iterative engagement with the collected raw material, the emerging codes and concepts, as well as theoretical notions of sustainable entrepreneurship, business model research, and institutional logics. In the first step, each researcher deeply engaged with the comprehensive data and open coded passages that were relevant for approaching the research question. By investigating commonalities between the cases, we discussed differences and similarities of codes to group these open coded passages into first-order codes. First-order codes then provided the foundation for more theory-driven second-order themes, which, in turn, were compiled into aggregate dimensions. This was a non-linear process, going back and forth between coding, grouping, and theoretical discussion. In line with previous research (e.g., Laasch, 2018), the componential approach to business models offered analytical guidance through which the codes could be discussed and interpreted (Charmaz, 2006). We present the final result of the coding procedure in the data structure in Fig. 1.

4. Findings

4.1. Blended value propositions

Our findings reveal that entrepreneurs utilize digital technologies to develop blended value propositions for their stakeholders. First, the digital logic allows to catalyze the socioenvironmental value creation and, second, it enables entrepreneurs to establish value propositions that merge environmental, social, and financial value for their stakeholders.

An integral promise of digital technologies outlined by the sustainable entrepreneurs is their ability to make sustainable practices more widely available, accessible, and feasible. Entrepreneurs acknowledge the technological aspects of their business model as powerful tools to catalyze more efficient ways of living:

"You know, we have the technology now, but it seems the world is still living like 200 years ago. You know, we have all these mobile devices and websites and internet connectivity, but we are not using it to simplify our lives." (Beta).

Hence, the premise of several sustainable entrepreneurs' value proposition is to ensure a convenient consumption of their offerings. Digital platforms, in particular, allow the effective and efficient connection of previously unconnected supply and demand, thus supporting the dissemination of social and environmental value as mentioned by one of our participants:

"It's a digital market where we bring regional food producers and urban consumers together. Currently, there are 400 small and family businesses that want to bring their products to you and me and we take care to ensure that they find their way from the

Table 1
Case descriptions and collected data.

Case Name	Description	Number of interviews	Additional data
Alpha	Offers software solutions for communities to monitor and manage public transport including an app for the end user. The data provided by the users are the foundation to alter traffic offerings avoiding traffic jams and making transport available where it is needed most.	1	Homepage, newsletter
Beta	Provides an online platform for sharing books between users with a built-in credit system to monitor the user's activities and experience.	2	Homepage, social media, videos, informal talks
Gamma	Develops a solar pump system to offer clean and low-cost water supply for regions affected by poverty. Supplemented by an online platform and community that organizes water projects around the world.	1	Homepage, blog, videos, informal talks
Delta	Distributes an app solution to enable older persons to arrange medical appointments and remote initial treatment through digital channels.	1	Homepage
Epsilon	Online platform that connects eco-certified farmers and their products with potential buyers reducing potential waste (a sale only takes place if there is a demand for parts of the animal) and promoting local farmers.	1	Homepage, blog, social media
Zeta	A gamified online vegetable garden (CO2 neutral and eco-certified). Users can design a garden and digitally plant and cultivate a range of vegetables, which are then grown by the company and transported to the customer.	1	Homepage, blog, social media, videos, newspaper articles
Iota	A digital farmer's market. The online platform connects local farmers and their products (e.g., fruit, vegetables, sweets, beverages, etc.) and potential buyers strengthening local and environmental-friendly production.	1	Homepage, podcast, blog, newspaper articles
Kappa	Develops an online social media solution that aims to enhance physical contact between people counteracting social isolation.	3	Homepage, observations, informal talks
Lambda	Comprehensive software solutions for managing and maintaining stations for e-vehicles.	1	Homepage, videos
Omikron	Offers a software platform and scientifically based matching methods to find the optimal caregiver for people in need of care. Aiming to reduce social stress and to improve care relationships of the involved parties.	1	Homepage, videos, informal talks, newspaper articles
Rho	An online learning platform combined with learning kits including 3D printing devices that facilitate an educational effect in areas of sustainability.	2	Homepage, observations
Sigma	A crowdfunding and project management platform that specializes in environmental projects and aims to alleviate civic participation and democratic values.	1	Homepage, blog, information on past funded projects
Tau	An online marketplace that specializes regional, sustainable and charitable products as well as the corresponding comprehensive and transparent information concerning the products.	1	Homepage, social media, videos
Phi	Offers an online booking service for green accommodation. A credit system rates the different accommodation offers supplemented by the rating of customers.	1	Homepage, blog
Omega	Supplier of locally and fairly produced lamps and luminaries. Through an online questionnaire and virtual reality, customers can furnish their homes.	2	Homepage, observations, blog, informal talks

countryside to the city." (Iota).

Another entrepreneur elaborated on the difficulties of finding, evaluating, and ultimately buying environmentally friendly and regionally produced goods. Hence, their online marketplace aims to provide an improved and more convenient alternative to buying sustainable products in various stores. This concept of enhanced convenience through a digital marketplace has also been introduced to other types of products in our sample (e.g., different types of food or books). Other entrepreneurs offer smartphone and web applications that provide efficiency for stakeholders by analyzing user data and recommending more sustainable alternatives. For instance, Alpha offers an app that provides its users with real-time data describing their mobility behavior and the respective ecological consequences. In addition, the app instantly suggests other environmentally friendly means of transport to trigger an immediate change of behavior. These apps function as catalysts for socioenvironmental value propositions by simultaneously making users aware of the existence of ecological alternatives and enhancing the accessibility and convenience of these alternatives.

The integration of the digital logic enables entrepreneurs to successfully merge environmental, social, and economic value propositions. By embedding digital technologies entrepreneurs can offer sustainable products and services at competitive prices. One entrepreneur, for instance, stated that his digital marketplace allows eco-certified farmers and potential customers to trade conveniently, leading to the reduction and prevention of unnecessary waste, while simultaneously observing animal rights in meat production. The digital marketplace therefore allows for efficient transactions by ensuring financial gains for the producers despite offering reasonable prices, thus, merging socioenvironmental and economic value.

4.2. Integrative value creation

Our findings show that digital technologies have the potential to increase the connectivity of actors within the value creation component. We identified three, often interrelated, sets of practices – community building, co-creation, and broadening stakeholder integration – where the digital logic facilitated an opening of the boundaries of value creation, making this component more integrative.

The entrepreneurs frequently strove to shape lively communities around the socioenvironmental challenge they aim to tackle, for example, through the creation and provision of information hubs, online forums/boards, platforms, or other digital networking and communication tools. One way to approach this is offered by Sigma, which aims to enable civic participation in public environmental projects via its online community. To this end, Sigma established a crowdfunding platform with an additional digital networking tool:

"We consider focusing on community building even more because the basic idea is the simple tool for citizen participation and customer integration [...]. Because that is actually the recipe for success. [...] As we can see from ongoing projects, the need for a community is very much there. We definitely have [...] already established ourselves more as a crowdfunding platform for users to support sustainability projects." (Sigma).

These communities are, for instance, depicted through digital cartographic representations showing where the individual actors are located, how they are connected, and what they contribute to the community (e.g. sharing information, managing additional projects, etc.).

Moreover, some entrepreneurs used digital technologies to

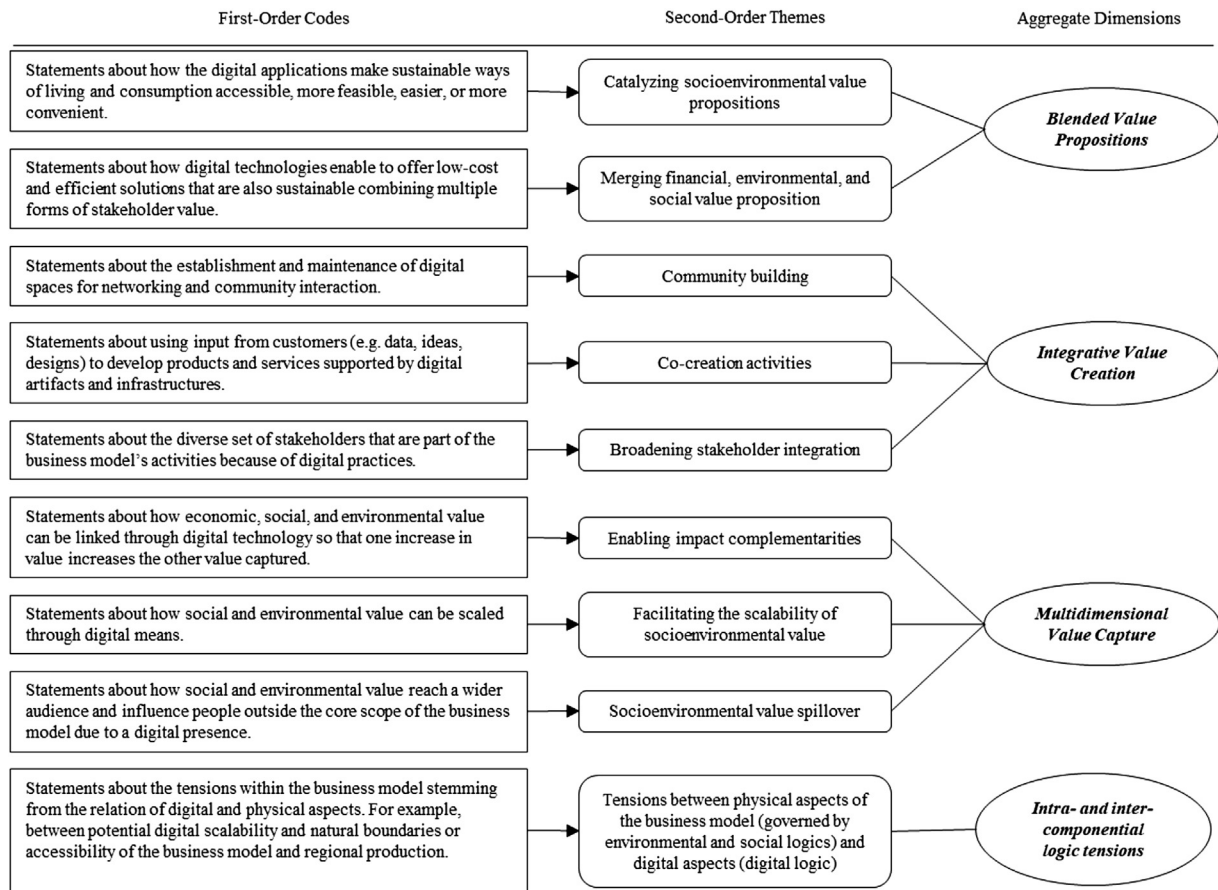


Fig. 1. Data structure.

facilitate co-creation with their users (Pralhad and Ramaswamy, 2004) as exemplified by the mission statement of Beta “Powered by community – curated and maintained by technology”. We found that in order to realize specialized online services that are based upon connectivity, the utilization of the customers’ individual resources is integral. This co-creation of value enabled by digital means can include tangible resources (e.g., sharing objects such as books), but also intangible resources of the users. For instance, users act as content creators for blogs and websites benefiting the community and thus the business (Rho) or articulate ideas for common public-private projects on crowdfunding platforms (Sigma). In this vein, Zeta allows customers to digitally design their own farmland where they choose and cultivate plants, vegetables, and fruits through a gamified user interface. These instructions are then realized by the venture and the regionally produced products are sent to the customers. Thus, the entrepreneurial venture acts as a digital intermediary transferring digital input into physical output. Besides the active integration of users in the value creation, various companies analyze user data to develop new or improve their existing offerings (e.g., Alpha, Lambda, Epsilon, Omega).

Linked to these efforts and permeating the notion of community building and co-creation is the integration of an increasingly diverse set of stakeholders going beyond customers and suppliers. Through digital networks, sustainable entrepreneurs can be inclusive when building their digital value creation networks as demonstrated by the following quote:

“Our global network invites individuals, local businesses, NGOs, volunteers and supporters to join in. Every member has free access to information on implementing and managing water supply

projects. Everyone can be a part of it!” (Gamma).

4.3. Multidimensional value capture

In terms of the value capture component, the digital logic allows entrepreneurs to enable impact complementarities (i.e., intertwining socioenvironmental and financial value capture), supports the scalability of the socioenvironmental value, and facilitates the spillover of the socioenvironmental value through digital means. This leads to a multidimensional value capture by bridging multiple forms of value as well as the boundaries and scale of the value captured.

Findings show that the digital logic supports the resolution of the challenge of combining socioenvironmental and economic value capture. Entrepreneurs stated that the realization of one value often corresponds to the increase of another and vice versa (e.g., Sigma, Phi). This complementary relationship is most evident in business models performing intermediary functions to connect various actors (digital platforms). Here, every sold service or product entails the capture of social and/or environmental value (e.g., a booking platform for sustainable accommodation) while simultaneously allowing the capturing of financial value (e.g., through charging commission fees). Crowdfunding services for sustainable projects enable similar impact complementarities. They heighten public awareness of their fundable projects through digital channels allowing entrepreneurs to curate projects with the highest potential impact. Every related action of the crowd – whether it’s a simple click, a donation, or a pledge – leads to financial and socioenvironmental value capture. Hence, different

forms of value are not dichotomous in these business models but can complement each other when intertwined through digital means.

We further identified how entrepreneurs utilize characteristics of digital solutions to facilitate the scalability of the socio-environmental value. The generativity of the digital aspects of the business model allows the entrepreneurs to “include usability requirements and opinions of users” (Kappa) to adapt their products. The digital applications and infrastructures are customizable and expandable towards new products and services. In addition, they are characterized by seemingly effortless transferability to other markets (e.g., Epsilon, Zeta). These aspects allow for the scalability of multiple forms of value as signified by the following comment:

“I wanted to find a model, which has a positive impact on my environment but also has the classic attributes of a start-up. In other words, it is scalable like a venture capital case. I wanted to show that both are possible in the 21st century.” (Phi).

Moreover, findings show that sustainable entrepreneurs increase awareness and education regarding sustainability issues, which is often an additional outcome of their business model. We termed this value spillover because it is not exclusive to the immediate target group but potentially spills over to various stakeholders leading to additional socioenvironmental value capture for the business. To achieve such spillovers, the sustainable entrepreneurs mostly rely on digital media such as websites, blogs, social media, networking activities on the respective platform, or the fostering of online communities. Due to this digital presence, the entrepreneurs conduct “educational work” (Epsilon) or “work on the level of awareness” (Tau) and seek to “start a movement” (Beta), tightly related to community building as part of the value creation component. The following quotes further illustrate this notion:

“So, we are not yet quite where we wanted to be in terms of sustainability, but I still think that we have created a certain awareness for the issues.” (Tau).

“I think this happens automatically because of our community. Every person who comes to our website will have to deal with the topic for better or worse. Everybody who sees our advertisement will get in touch with the topic. And if they think about it, it might stay in the back of their mind.” (Phi).

4.4. Inter- and intra-componential logic tensions

We also identified challenges in relation to combining environmental, social, and digital logics expressed in inter- and intra-componential logic tensions. A major tension between the social and environmental values and the digital logic originates from the collision of digital and physical aspects of the business model. Digital means theoretically provide the potential of unlimited scalability and, as shown, allow to scale the capture of multiple forms of value and enable impact complementarities. However, there are restrictions that arise from the given natural boundaries that are governed by social and environmental logics. Products and services often have physical properties and require physical resources to produce. The intended value creation, thus, has to consider social and environmental logics.

An example of this challenge is the contradiction between online accessibility and regionality. Digital solutions are potentially less constrained by geographic considerations, but they can challenge the idea of regional production and consumption. Entrepreneurs seeking regionality often aim to capture value by reducing waste and supporting the local value creation. Consider, for instance, Zeta, the gamified online gardening application where the digital aspects are potentially highly scalable. Zeta’s cultivation area, however, is located in a rural region in Austria and after being harvested the fruits and vegetables are packaged and shipped to

the customer. In this business model, the scalability of the value capture is enhanced through their digital approach yet constrained by environmental considerations of the value creation in terms of the availability of agricultural land and the distance to the end-consumer. Similarly, Iota offers an online platform for agricultural products that is digitally accessible with virtually no constraints. Yet, their value proposition is limited to stakeholders in a relative geographic proximity due to the CO₂ considerations of transport as part of the value creation as well as the aim to empower local farmers, which is a crucial element of their value capture. This is exemplified through the following quote:

“90% of our suppliers come from within a radius of less than 100 km [...] The purchase of food with short transport distances and organic farming makes a considerable contribution to the climate balance. At the same time, the regional economy and small producers from the surrounding area are strengthened.” (Iota).

5. Discussion and implications

5.1. Embedding digital technologies in sustainable business models – complementarities and tensions of an emerging digital logic

This article sought to gain a deeper understanding about how sustainable entrepreneurs embed digital technologies in their business models to foster socioenvironmental value creation. This is the first study to investigate the emerging digital logic in sustainable entrepreneurship. We argue that practices enabled by the digital logic support the interrelation of the environmental, social, and commercial logics but also entail tensions. Hence, we contribute theoretically and empirically to the development of the topical and ambitious new field of research on sustainable business models in an entrepreneurial context (Davies and Chambers, 2018; Hahn et al., 2018; Stubbs, 2017b; Terán-Yépez et al., 2020).

In sustainable business model design finding ways of calibrating, balancing, and blending value is a key effort (Bocken et al., 2014; Laasch, 2018; Laasch and Pinkse, 2019). We add to this by showing that sustainable entrepreneurs can utilize digital technologies to develop blended value propositions. Sustainable offerings often lack financial value for the customer because sustainable products and services are associated with higher costs of value creation than their less sustainable counterparts (Davies and Chambers, 2018). Literature on sustainable behavior, however, argues that aspects such as time, effort, and financial costs are crucial determinants of pro-environmental behavior of customers (de Groot and Steg, 2009; Stern, 2000). Our findings suggest that the selective use of digital technology can enhance convenience and efficiency, while lowering costs in concert with more sustainable ways of living, ultimately providing more balanced value propositions.

We also offer novel insights into the digital practices of entrepreneurs’ value creation (Parida et al., 2019; Parida and Wincent, 2019). Our findings suggest extensive complementarities between the values of the social logic (e.g., community development, democratic participation, equality) and the affordances of digital technologies within the value creation element. By combining multiple digital artifacts and infrastructures (e.g., blogs, boards, social media interfaces, platforms, etc.) they create spaces for community interaction, engage in co-creation activities, and broaden the stakeholder integration. With these digitally enabled practices, sustainable entrepreneurs manage the boundaries of their business models, rendering them more dynamic and open (Caputo et al., 2019). Furthermore, we found platform approaches to be especially effective in bringing together multiple actors (Hahn et al., 2018). This is of particular importance for sustainable business models, which are fraught with additional efforts in managing

external relationships because they need to include a wider range of diverse stakeholders (Evans et al., 2017; Stubbs and Cocklin, 2008). Enacting a digital logic enhances the connectivity of actors across geographical boundaries and enables integrative value creation. We, thus, add to further establish the relationship between co-creation (Kruger et al., 2018; Prahalad and Ramaswamy, 2004) and sustainable business model design (Geissdoerfer et al., 2018).

Furthermore, we identified synergetic relations between digital applications and sustainable business models that lead to multi-dimensional value capture. Extant research on sustainable entrepreneurs expresses concerns in terms of the business models' scalability (Stubbs, 2017a) and financial stability (Hahn et al., 2018). We add to this body of knowledge by providing novel insights into how entrepreneurs utilize digital technologies to scale their intended value capture in conjunction with the exploitation of impact complementarities. Such impact complementarities are theorized to be of particular importance for sustainable business models (Spieth et al., 2019) and we demonstrate potential ways in which sustainable entrepreneurs can achieve them. We further show that digital technologies can enable the parallel growth of socioenvironmental and financial value. This unravels the importance of digital technologies and their supportive function for sustainable business models (George et al., 2020). However, findings also reveal that this potential scalability may conflict with the social and environmental logic. Our sampled entrepreneurs often consciously constrain the connectivity and accessibility provided by digital technologies due to considerations involving CO₂ reduction and the support of local people. Thus, there are indications pointing towards potential tensions between the logics and their manifestation within the business model components. As such, our research adds to the literature investigating the challenging combination of multiple logics within business models and examining how logics enable and constrain efforts for sustainability (Davies and Chambers, 2018; Gregori et al., 2019; Laasch, 2018).

We further identified a spillover effect of value. Through digital artifacts entrepreneurs create awareness and educational value, meaning that their socioenvironmental value capture is not necessarily bounded to sales of their core products and services. Thus, they are breaching the conventional boundaries of the business model. Based on this and on the idea of social movement spillover (Meyer and Whittier, 1994), we argue that the online communities formed and the content that is provided and/or co-created in these communities is not limited to the stakeholders directly involved in its creation. Digital content does not exist in a vacuum but rather influences other individuals and groups. Our results show that digital means allow to mobilize and connect individuals which can result in spillover effects. We, thus, offer novel insights about how digital technologies might be leveraged to influence stakeholders in order to support the ventures' social and environmental impact (Evans et al., 2017; George et al., 2020).

5.2. Theoretical implications

This article adds to the theoretical development of sustainable business models conceptualized as a combination of different components that manifest plural institutional logics (Gregori et al., 2019; Hahn et al., 2018; Laasch, 2018; Stubbs, 2017b). Prior research in this field mostly focused on institutional logics of sustainability and thus considered how environmental, social, and commercial logics relate to each other (Hahn et al., 2018; Laasch, 2018; Stubbs, 2017a). This, however, can potentially leave out further logics that are relevant for this specific context (Laasch, 2018). We add to this discourse by discussing the influence of an emerging digital logic on the socioenvironmental value creation of sustainable business models. We excavate how the digital logic that is based upon

connectivity, openness, accessibility, and generativity relates to other relevant logics within a sustainable business model and identify complementarities and tensions. As such, this is also one of the first studies that do not rely on the dichotomous relationship of two logics but rather aims to incorporate multiple logics to broaden the perspective on sustainable business models (Davies and Chambers, 2018; Schaltegger et al., 2016; Stubbs, 2017b).

We further add to an emerging stream of research in the field of entrepreneurship that seeks to combine sustainability and digitalization (George et al., 2020; Parida and Wincent, 2019). We contribute to building the foundations for this digital sustainable entrepreneurship. First, we show that the institutional logics perspective on sustainable business models can provide a common theoretical foundation for studying the intersection of these previously separate research streams. In addition, it provides analytical guidance for studying the efforts of sustainable entrepreneurs balancing environmental, social, and commercial value creation in the digital era (Parida et al., 2019; Terán-Yépez et al., 2020). Second, the identified themes open rich pathways to advance the connection between other streams of research such as co-creation (Kruger et al., 2018; Prahalad and Ramaswamy, 2004) or social movement theory (Becker et al., 2017; Meyer and Whittier, 1994) and sustainable entrepreneurship. Specifically, we contribute to the theoretical development of sustainable entrepreneurship by presenting the concept of value spillover. Value spillover draws attention to socioenvironmental value capture (e.g., education and raising awareness) that goes beyond the targeted customers and influences additional groups. Specifically, value spillover coupled with the role of digital technologies for enabling the formation of communities, co-creation activities, and broader stakeholder integration offers new perspectives on entrepreneurial value creation for sustainability.

5.3. Practical implications

Digital technologies can substantially contribute to the sustainable development goals (Seele and Lock, 2017). Yet, how this potential can be realized in practice is still largely unknown, especially for entrepreneurs that seek to create socioenvironmental value through financially viable business models. This article provides practitioners with important insights on how digital technologies can be embedded in the design of sustainable business models. As such, practitioners can utilize the identified configurations of sustainable business model components (i.e., blended value propositions, integrative value creation, and multidimensional value capture) as an inspiring starting point to develop novel sustainable business models. For instance, they can draw on the importance of digital means for the formation of communities that channel many individual contributions and efforts of a multitude of actors towards a common goal. This, in turn, can leverage the socioenvironmental value creation through co-creation activities and lead to spillover effects within the value capture element. This example shows the potential of the identified themes for practice but also points towards the complex relations that practitioners should be aware of when designing sustainable business models.

Creating viable business models that align a plethora of different value systems is difficult and digital technologies cannot solve this entirely. Despite the reported complementarities, practitioners should also be aware of the tensions identified in this article. Digital solutions enhance connectivity and accessibility, but this can counteract environmental and social aspirations. Digital technologies are, thus, not a panacea for sustainable development and should be used responsibly, keeping potential contradictions of logics in mind. Building on this, we recommend a critical but unbiased approach when contemplating the integration of digital means to increase the impact of sustainable business models.

6. Limitations and future research

This article has limitations that can provide foundations for future research. The qualitative research approach applied sought to gain novel insights that are transferable to other contexts (Gioia et al., 2013). We argue that the identified themes are not solely particularities of the sampled cases at hand but transferable abstractions that can advance the research on sustainability and digitalization in general. Nevertheless, future research could also apply quantitative approaches that build on and expand our findings. Cluster analysis, for instance, is beneficial to identify context-specific business model patterns (Holzmann et al., 2019; Täuscher and Laudien, 2018). Further, we explored business models at a specific point in time. Longitudinal studies would be of interest to examine if and how sustainable businesses change over time due to digital technologies (Cherrier et al., 2018; Gregori et al., 2019).

We also urge those engaged in future research efforts to investigate the specific challenges that arise from combining social, environmental, and digital logics. Even though digitalization provides promising potential to substantially contribute to mitigating the grand challenges of today, the path towards increased digitalization can also have severe negative effects (Stuermer et al., 2017). From a social perspective, for example, it changes labor market constellations significantly (Frey and Osborne, 2017), and from an ecological perspective, the increase in energy consumption can be enormous (Tiefenbeck, 2017). While we were able to identify and discuss some of the possible tensions, we need additional studies to gain a more detailed understanding of the relationship between sustainability and digitalization. Identifying tensions is crucial for research on sustainable entrepreneurship and business models.

Moreover, this article postulates the existence of a digital logic that can provide analytical guidance for future research. We encourage further research on the concept of the digital institutional logic. Using our elaborations as a stepping stone would allow for further investigations of the transformative potential of digital technologies for sustainable entrepreneurship.

CRedit authorship contribution statement

Patrick Gregori: Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Writing - review & editing, Visualization. **Patrick Holzmann:** Conceptualization, Formal analysis, Writing - original draft, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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