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Article

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Digital Business Model Innovation: An External Enablement Perspective and Research Agenda

Author

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Abstract

With the growing prominence of digital technologies, the business model concept has become increasingly popular in the digital innovation domain. Research on how digital technologies enable business model innovation has so far mainly taken an inside-out perspective focussing on, for example, an organization's innovation process or dynamic capabilities. Conversely, we present a framework that takes an outside-in perspective focusing on how digital technologies as environmental changes enable business model innovation. This framework emphasizes external enablers, which represent aggregate-level phenomena from which multiple emerging ventures within the context of start-ups or established organizations can benefit. We highlight the path and functions of enablement by explaining how digital technologies as external enablers influence business model innovation through their types, characteristics, mechanisms and roles. Our integrative framework consolidates different but related research topics for digital business model innovation, thereby shaping a research agenda with key questions to advance the field. We also see this framework as contributing to a cumulative tradition, notably by bridging the gap between more generic digital business model research and research into new business models driven by specific digital technologies or innovations.

Keywords business model, business model innovation, environmental changes, external enablers, digital technology, digital innovation, digital business model

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1. Introduction

With the growing attention to digital technologies, innovation and transformation, the business model concept has become increasingly popular (e.g., Bouncken, Kraus, & Roig-Tierno, 2021; Broekhuizen, Broekhuis, Gijsenberg, & Wieringa, 2021; Snihur & Eisenhardt, 2022; Trischler & Li-Ying, 2023). Digital business model innovation (BMI) addresses how new, digital technologies enable significant changes to the way business is conducted. For example, digital platform business models have affected industries such as transportation, hospitality, retail, software, etc. Moreover, the ubiquity of digital technologies makes business models possible that create value through a completely digitized product or service that is digitally sold and delivered (Steininger, 2019). For example, media consumption takes more and more place through online streaming services with subscription models like Netflix and Spotify. In addition, the transformative impact of digital technologies on the business models of different industries is substantially highlighted in different practitioner publications (e.g., Gartner, 2020; OECD, 2019; World Economic Forum, 2021). With digital BMI being an interesting and relevant topic for research (e.g., Veit et al., 2014; Wirtz, Müller, & Langer, 2022), there is a need to address the question of how to understand and study digital BMI?

BMI research generally discusses how organizations can use business models as a vehicle for innovation (driven by new technology) or as a new form of innovation (complementing traditional forms like product and process innovation) (Massa & Tucci, 2014). While this research addresses the external environment and enablers like technology, it has mainly taken an inside-out perspective as highlighted by literature reviews (e.g., Filser, Kraus, Breier, Nenova, & Puumalainen, 2021; Spieth, Breitenmoser, & Röth, 2023; Wirtz et al., 2022) with as regularly recurring topics the BMI process, (dynamic) capabilities, or managerial cognition. For example, a meta-review by Wirtz et al. (2022) shows how the dynamic capabilities framework of sensing, seizing, and seizing (Teece, 2007) has been a prominent approach in BMI research. BMI research that focuses specifically on the role of digital technologies also often takes an inside-out perspective with digital transformation being a dominant topic (e.g., Schallmo, Williams, & Boardman, 2017; Verhoef et al., 2021; Vial, 2019). For example, a literature review by Verhoef et al. (2021) sees new digital business models as the outcome of digital transformation. While there is some attention to the role of external enablers such as technology, customers and competition (e.g., Broekhuizen et al., 2021), this is mostly in the form of external factors or determinants (e.g., Wirtz et al., 2022; Zhang et al., 2021), without looking more closely at how external enablement happens from an outside-in perspective by addressing the enablement path and functions.

In addition, we see literature on business models for specific digital technologies and innovations resulting in research clusters around, for example, cloud business models (e.g., Giessmann & Legner, 2016), AI business models (e.g., Weber, Beutter, Weking, Böhm, & Krcmar, 2022), or digital platform business models (e.g., Zhao, von Delft, Morgan-Thomas, & Buck, 2020). While some of this work takes an external, outside-in perspective by looking at how a new digital technology or innovation can result in new or improved business models, this is mainly limited to looking at that specific digital technology or innovation. There is little accumulation of knowledge across these

different digital technologies and innovation resulting in a lack of more generic theory development on digital business models. This also means that these research clusters often start from scratch when there is a new digital technology or innovation to be studied. In addition, if this research takes a wider, external outside-in perspective then it can also bridge the gap between the literature on specific digital business models (such as cloud or AI business models) and the more general literature on digital BMI with its more internal perspective focussing on digital transformation.

The object of this paper is to introduce and develop a research agenda for digital BMI taking an *external, outside-in* perspective. This perspective should go beyond identifying external factors and show the influence of these factors on the (new) ways organizations can create and capture value through digital BMI. This requires an *integrative* framework in terms of that it brings together different but related research topics for digital BMI and as such can form the foundation for a research agenda and cumulative tradition. This can also support bridging the gap between more generic digital business model research and research into new business models driven by specific digital technologies or innovations. We see this external, outside-in perspective as complementary to the existing research focussing on an inside-out or internal perspective, similar to research in strategic management that has traditionally benefitted from both perspectives. A classic example is the strengths, weaknesses, opportunities, and threats (SWOT) analysis with the former two representing the internal perspective and the latter two representing the external perspective.

The remainder of this paper is organized as follows. First, we discuss the background literature on digital BMI. Next, we present an integrative framework for looking at digital BMI from an external, outside-in perspective. Then, we use the core elements from this framework to derive research questions that address the enablement path and functions. We end with conclusions and suggestions for future research.

2. Digital Business Model Innovation (Digital BMI)

Digital BMI brings together ideas about business models, innovation, and digital technologies. We will first discuss business models and business model innovation in general. Next, we will explore these concepts in the context of digital technologies.

2.1 Business Model and Business Model Innovation

Every firm has a business model that reflects the underlying rationale of “how it does business,” whether that model is explicitly articulated or not. A business model encapsulates the value logic of a firm with a focus on creating and capturing customer value within its ecosystem (Chesbrough, 2006; Fiet, 2013; Massa & Tucci, 2014; Teece, 2010, 2018a). The business model concept has shifted the strategic emphasis from value capture to value creation, highlighting the latter without ignoring the former (Zott, Amit, & Massa, 2011), with the focus of value creation moving from supply side to demand side (Massa, Tucci, & Afuah, 2017). Moreover, business models often require a system-level, holistic approach (Zott et al., 2011) by specifying the interdependent activities that are performed by a focal firm and by its partners and the mechanisms that link these activities to each other (Amit & Zott, 2020). This activity system reflects the fundamental choices of a firm and their consequences (Casadesus-Masanell & Ricart, 2010) with

respect to key elements such as target customers, value proposition, organizational architecture and revenue model and their relationships (Fielt, 2013; Gassmann, Frankenberger, & Csik, 2014; Osterwalder & Pigneur, 2010).

When there is a shift in the value logic of a firm, accompanied by novelty, business model innovation (BMI) occurs. BMI has been defined by Foss and Saebi (2017, p. 201) as “designed, novel, nontrivial changes to the key elements of a firm’s business model and/or the architecture linking these elements.” Novelty often comes from challenging implicit assumptions about how to do business (Cachon, 2020). Business models represent a new dimension of innovation that broadens the boundaries of innovation-related phenomena (Massa et al., 2017). As more new business models are both feasible and actionable than ever before, unprecedented opportunities for today’s organizations open up (McGrath, 2010). BMI can relate to how firms use business models as a vehicle for innovation (driven by, for example, a new technology) or as a source of innovation in and of itself (complementing traditional sources of innovation like product, process, or organizational) (Massa & Tucci, 2014). BMI can take place within the context of a start-up with often an emphasis on the introduction of a business model that is novel to the product-market space as well as established firms with normally an emphasis on changes to its activity system so that the new system is novel for the firm (Amit & Zott, 2020). BMI can be a complex, time-consuming process that requires specific knowledge and skills and needs the appropriate attitude (Wirtz, Göttel, & Daiser, 2016).

BMI research has significantly increased over the years with several reviews trying to build a cumulative body of knowledge (e.g., Filser et al., 2021; Foss & Saebi, 2017; Schneider & Spieth, 2013; Spieth et al., 2023; Spieth, Schneckenberg, & Ricart, 2014; Wirtz & Daiser, 2017; Wirtz et al., 2016; Wirtz et al., 2022; Zhang et al., 2021). These reviews highlight BMI as a focal concept together with its enablers (or antecedents, determinants) and outcomes (or consequences, impacts), and differentiate between external and internal enablers for BMI (e.g., Foss & Saebi, 2017; Wirtz et al., 2022; Zhang et al., 2021). The external enablers, such as changes in technology, customer needs competition, policy & regulation or business environment (e.g., sustainability, globalization), are often seen as the major drivers of BMI as firms can take advantage of them by innovating their business models (Casadesus-Masanell & Ricart, 2010; Saebi, Lien, & Foss, 2017; Schneider, 2019). Most BMI studies look at these external enablers as external factors (e.g., Wirtz et al., 2022; Zhang et al., 2021) and address them from an inside-out perspective where they are studied in relation to, for example, the BMI process (e.g., Foss & Saebi, 2017; McDonald & Eisenhardt, 2020; Teece, 2010; Wirtz & Daiser, 2018), (dynamic) capabilities (e.g., Bocken & Geradts, 2020; Böttcher, Weking, Hein, Böhm, & Krcmar, 2022; Wirtz et al., 2022), or managerial cognition (e.g., Egffjord & Sund, 2020; Osiyevskyy & Dewald, 2015).

2.2 Digital Technologies and Business Model Innovation

Technology is seen as one of the most prominent external enablers of BMI (e.g., Foss & Saebi, 2017; Teece, 2010; Wirtz & Daiser, 2017; Wirtz et al., 2022; Zhang et al., 2021), with digital technology becoming a dominant theme (e.g., Broekhuizen et al., 2021; Li, 2020; Trischler & Li-Ying, 2023; Wirtz et al., 2022). Digital technologies are contemporary information and communication technologies such as Artificial Intelligence, Big Data Analytics, Blockchain, Internet of Things, Cloud Computing etc. Digital refers to the

conversion of processes, content or objects that are physical or analogue to a binary format (i.e., bitstrings) that can be understood and manipulated by computers (Faulkner & Runde, 2019; Fichman et al., 2014). This is more broadly referred to as ‘digitization,’ which can be defined as “the creation of digital artifacts through technical processes of conversion, representation, and enhancement” (Gradillas & Thomas, 2023, p. 17). As such, digital technologies and the digital artefacts or objects that they enable have new properties such as loose coupling, programmable, malleable, edible, interactive, generativity, etc. (e.g., Fichman et al., 2014; Henfridsson, Nandhakumar, Scarbrough, & Panourgias, 2018; Kallinikos, Aaltonen, & Marton, 2013; Yoo, 2010). This can facilitate new business opportunities by improving and innovating value propositions and business models (Gradillas & Thomas, 2023) through, for example, effects on (1) scale, scope and speed, (2) ownership, assets and economic value, and (3) relationships, markets and ecosystems (OECD, 2019).

As digital technologies can fundamentally change the way business is conducted, there has been an increasing interest in digital BMI. It is, therefore, no surprise that business models feature prominently in debates regarding digital innovation (e.g., Fichman et al., 2014; Hund, Wagner, Beimborn, & Weitzel, 2021), digital transformation (e.g., Verhoef et al., 2021; Vial, 2019) and digital entrepreneurship (e.g., Zaheer, Breyer, & Dumay, 2019). Business models are seen as particularly important in the digital world for understanding and articulating how new technologies enable significantly new ways of creating and capturing value (e.g., Broekhuizen et al., 2021; Fichman et al., 2014; Trischler & Li-Ying, 2023; Veit et al., 2014). This will be reflected in new or different, non-trivial choices and consequences for the key elements of the business model (i.e., target customers, value proposition, organizational architecture, and revenue model) and their relationships. Some emphasize the digital nature of these key elements by, for example, referring to digital offerings, experiences, or platforms (e.g., Bock & Wiener, 2017; El Sawy & Pereira, 2013; Weill & Woerner, 2013). However, while this research sees digital technology as an external enabler of business model innovation, it is also positioned here mainly as an external factor with a focus on how firms deal with it internally, in particular through digital transformation (e.g., Broekhuizen et al., 2021; Caputo, Pizzi, Pellegrini, & Dabić, 2021; Verhoef et al., 2021; Volberda, Khanagha, Baden-Fuller, Mihalache, & Birkinshaw, 2021).

3. An External Enablement Framework for Digital BMI

To research the influence of digital technologies as external enablers for BMI more closely from an outside-in perspective, we use the ideas on external enablement from Davidsson, Recker, and Briel (2020). In their work, an external enabler is “a single, distinct, external circumstance, which has the potential of playing an essential role in eliciting and/or enabling a variety of entrepreneurial endeavours by several (potential) actors” (Davidsson, 2015, p. 683). External enablers address how environmental changes such as new technologies can influence entrepreneurial action and outcomes that lead to new economic activity. They are aggregate-level phenomena from which multiple emerging ventures (or new economic activities) can benefit (Davidsson et al., 2020). External enablers focus on partial enablement and should not be seen as complete, pre-

existing ‘opportunities’ but as potential for better outcomes than in the absence of the enablers (Davidsson et al., 2020).

Digital BMI can be seen as an entrepreneurial action and outcome that leads to new economic activity – as is the focus of external enablement – by start-ups or established organizations. George and Bock (2011, p. 99) note that “emphasizing the entrepreneurial aspect of business model development and change productively focuses attention on the opportunity-centric nature of business models.” Here the entrepreneur acts as the designer or architect responsible for reinventing the business model (Zott & Amit, 2015). For example, McDonald and Eisenhardt (2020) show the importance of business model design for entrepreneurial success in nascent markets.

More specifically, we will leverage the external enablement framework as presented by Davidsson et al. (2020) and further discussed by Davidsson, Recker, and von Briel (2022) and Kimjeon and Davidsson (2022), to develop an integrative framework for digital BMI as a foundation for a research agenda taking an external, outside-in perspective that highlights the enablement path and functions systematically and logically. The external enablement framework describes how external enablers influence entrepreneurial action and outcomes by addressing types, characteristics, mechanisms, and roles. The framework starts with enabler types that are classified by their origin, such as technological or socio-cultural. While other environmental frameworks often stop here, the external enablement framework goes further into the enablement process by looking at characteristics, mechanisms, and roles. Characteristics (scope and onset) can influence the actionability and market potential of external enablers. They describe the basic nature of an enabler and are valid across different types of external change. Following, are mechanisms that detail the influence of external enablers by specifying cause-effect relationships (e.g., combination, generation). Finally, the roles (triggering, shaping, and outcome-enhancing) represent higher-order functions at different stages of new venture development. These higher-order functions are derived from the lower-order mechanisms. We will describe the elements of the external enablement framework in more detail in the next section, where we delve into each of them in more detail with respect to digital BMI.

The external enablement framework for digital BMI (Figure 1) helps us introduce and develop a research agenda for digital BMI taking an external enablement perspective. While following the generic external enablement framework of Davidsson et al. (2020), we introduced some specific digital business model notions (underlined text) to guide the development of research questions. Note that at this stage the focus is on the research agenda and not on the framework and we have, therefore, only limitedly adapted it. In the next section, we explain and discuss each core element of our framework for the external enablement of digital BMI and use it to derive specific research questions.

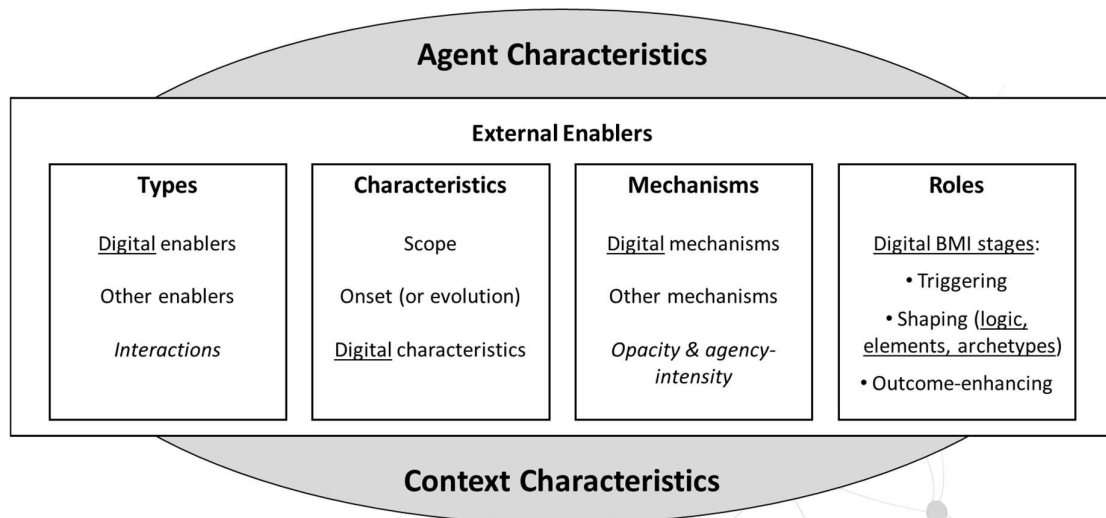


Figure 1. An External Enablement Framework for Digital BMI (core elements are in white) (adapted from Davidsson et al. (2020))

4. A Research Agenda for Digital BMI from an External Enablement Perspective

Below we develop a research agenda for digital BMI from an external, outside-in perspective using the external enablement framework and its core elements of types, characteristics, mechanisms, and roles. In addition, we will end with some broader questions about the external enablement of digital BMI in general.

4.1 Types of External Enablers for Digital BMI

The external enabler types are classified by their origin, which can be technological, regulatory, demographic, socio-cultural, macroeconomic, political, and natural-environmental (Davidsson et al., 2020). While some types have been studied extensively on their own, such as technology, others have received limited attention (Kimjeon & Davidsson, 2022). The benefit of studying different types of environmental change under one concept and framework is that it offers a common language and helps to build cumulative knowledge across and within types (Davidsson et al., 2022). This can be helpful for, on the one hand, studying specific digital technologies and their business models while, on the other hand, advancing research into digital BMI more in general. Examples of types of digital technologies studied so far from an external enablement perspective (although not explicitly in relation to business model innovation) are digital technologies in the IT hardware sector (von Briel, Davidsson, & Recker, 2018) and blockchain in the music industry (Chalmers, Matthews, & Hyslop, 2021).

Identifying different types of digital technologies has been common in digital (business model) innovation research, for example, in the early years, researchers and practitioners would often refer to SMAC technologies to refer to social, mobile, analytics, and cloud computing (e.g., Legner et al., 2017). However, little attention has been paid so far to more systematically identifying different types of digital technologies as **digital enablers**. A first question is what qualifies as ‘digital.’ While this has been discussed in

literature, there is still a lack of clarity about ‘digital technologies’ with many different (but related) terms being used like digitization, digitalization, digital artefacts, digital objects, digital resources (e.g., Gradillas & Thomas, 2023; Henfridsson et al., 2018; Kallinikos et al., 2013; Nambisan, Lyytinen, & Yoo, 2020; Yoo, 2010). Another specific research topic here is, for example, if these types should cover broader categories (e.g., Industry 4.0, Internet of Things or Metaverse) or more specific technologies (e.g., VR headsets or 3D modelling software in relation to Metaverse) (Ancillai, Sabatini, Gatti, & Perna, 2023).

Moreover, it is also important to acknowledge the role **other types of enablers** can play in digital BMI. For example, COVID has played a major role in the further adoption of online business models (e.g., for e-commerce) and digital platform business models (e.g., for food delivery services). In addition, it is important to recognize possible **interactions between enablers** for digital BMI. Firstly, there can be interactions between digital technologies, for example, most mobile phones nowadays leverage cloud technology and make use of artificial intelligence. Secondly, there can be interactions between digital and other enablers for digital BMI. For example, the greater focus on sustainability in manufacturing can further stimulate new business models that leverage Internet of Things technologies (e.g., Piccarozzi, Silvestri, Aquilani, & Silvestri, 2022).

In sum, the types of external enablers for digital BMI draw attention to the following research questions:

1. What are the different types of digital technology (as external enablers) that should be considered for digital BMI (and which not)?
2. What other (non-digital) types of external enablers can play a prominent role in digital BMI?
3. How do interactions between digital enablers – and between digital and other enablers – play a role in digital BMI?

4.2 Characteristics of External Enablers for Digital BMI

The characteristics of external enablers (scope and onset) describe their basic nature and are valid across types of external change (Davidsson et al., 2020). As such the characteristics of enablers are intrinsic to them; they do not depend on, nor vary across the agents who might benefit from them. External enablers’ potential and actionability for digital BMI may vary across their characteristics. In addition, there may be specific characteristics of digital enablers (other than scope and onset) that are relevant, like specificity and relationality (von Briel et al., 2018).

Firstly, the **scope** of external enablers refers to “the range of contexts in which the external enabler has impact and hence potential to enable new venture creation ...” (Kimjeon & Davidsson, 2022, p. 646). Enablers can vary in scope with respect to sectoral, spatial, temporal, and sociodemographic dimensions, which affects their potential and can influence strategic decisions for new economic activities (Davidsson et al., 2020). There are some interesting questions raised when thinking about the scope of digital enablers, both in general as well as for the specific technologies. An overall argument can be made that the scope of digital enablers is generally considered relatively broad, which is also evident from the wide and prominent attention they get. Digital enablers are often positioned as general-purpose technologies as they have the potential for pervasive use, keep improving, and enable complementary innovations (Bresnahan & Trajtenberg, 1995;

Teece, 2018b). However, there may be important nuances there, for example, for sectoral scope we can see quite some differences in how and when information-intensive and asset-intensive industries are affected by different digital technologies. For example, blockchain has a large uptake in the financial sector while its adoption is more limited in the manufacturing industry.

Secondly, the **onset** of external enablers refers to "how external enablers first come into being" (Kimjeon & Davidsson, 2022, p. 646). Enablers can vary in onset with respect to suddenness (or gradualness) and predictability, which affects decisions around timing and can influence outcomes (Davidsson et al., 2020). There are some interesting questions raised when thinking about the onset of digital enablers, both in general as well as for specific technologies. On the one hand, digital technologies develop relatively predictable and gradual, as can be illustrated by the different 'laws' that have dominated over the years, e.g., Moore's Law about processing power or Metcalf's Law about network performance (Schaller, 1997). On the other hand, digital technology can develop relatively suddenly and unpredictably, such as social media or generative AI.

The expansion of onset with **evolution** (Kimjeon & Davidsson, 2022) is also relevant for digital technologies as they often progress through their lifecycle and evolve across various generations. For example, first-generation AI was generally focused on a general problem solver, the second-generation AI targeted expert systems, and the current, third-generation of AI emphasizes machine learning. In addition, digital technologies are known for their 'hype and bust' cycles and fashion waves (e.g., Baskerville & Myers, 2009). Technology trends are generally the domain of industry analysts (e.g., Gartner Trend Insight) or consultancy firms (e.g., Deloitte's Tech Trends). However, research could also support with analyzing the digital technology landscape and identifying trends in their evolution taking into account technological and social forces (e.g., Adomavicius, Bockstedt, Gupta, & Kauffman, 2008).

In sum, the characteristics of external enablers for digital BMI draw attention to the following research questions:

4. Can the scope of digital enablers generally be considered as broad? What important nuances are there in relation to the sectoral, spatial, temporal, and sociodemographic dimensions? How does this influence digital BMI?
5. What makes the onset of some digital enablers relatively predictable and gradual while others are relatively sudden and unpredictable? How do digital enablers evolve from technological and social perspectives? How does this influence digital BMI?
6. Are there any specific characteristics of digital enablers that are relevant for their potential and actionability for digital BMI?

4.3 Mechanisms of External Enablers for Digital BMI

To understand the potential and actionability of external enablers for digital BMI, we first looked at their origin by differentiating between types and by assessing their nature through their characteristics. Next, we look at how external enablers can influence digital BMI through cause-effect relationships where the mechanisms and roles of external enablers come into play. "The mechanisms of external enablers explicate how they can facilitate the initiation, ongoing development, and success of new business ventures" (Davidsson et al., 2020, p. 317). The intended locus of mechanisms is the focal (potential,

emerging) venture, which it can trigger and shape through its offering, organization and process (Davidsson et al., 2022). External enablers can evoke certain mechanisms (and not others) but depend on ventures to realize their potential with possibly different ventures activating different mechanisms. They are relational, connecting the external perspective of the environment to the internal perspective of the organization. As such, the distinction between characteristics and mechanisms of external enablers allows for dynamism and relationality (Davidsson et al., 2020, p. 317).

While **digital mechanisms** generally receive limited attention in digital BMI research that focuses on specific technologies, they feature prominently in digital innovation and transformation literature. Examples of possible digital mechanisms from that literature are connectivity (e.g., Lyytinen, Yoo, & Boland Jr, 2016), virtualization (e.g., Bailey, Leonardi, & Barley, 2011), generativity (e.g., Thomas & Tee, 2022), combination (e.g., Brynjolfsson & Saunders, 2010), convergence (Yoo, Boland, Lyytinen, & Majchrzak, 2012), or network effects (e.g., Shapiro & Varian, 1999). For example, generativity features prominently in digital innovation literature (e.g., Thomas & Tee, 2022; Yoo, 2013; Zittrain, 2006). Zittrain (2006, p. 1980) defines it as ‘a technology’s overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences.’ While Zittrain focussed on the Internet and the PC, Yoo (2013) transferred it to the broader context of digital technologies and innovation. Generativity can result in novelty in terms of the generative architecture or new products or services, and value creation by addressing needs that were previously unmet (Thomas & Tee, 2022). Consequently, generativity, and possibly other digital enablers, can increase the potential and actionability of external enablers beyond what traditional mechanisms can achieve.

The external enablement framework features a default list of **generic mechanisms** (Davidsson et al., 2020) that may also be relevant here and have some overlap with the digital mechanisms, for example, generation is related to generativity. Some digital technologies may influence digital BMI in more traditional ways through these generic mechanisms, for example, a technology like AI can be used to replace humans with machines or algorithms, which relates to the resource substitution mechanism. Moreover, these mechanisms have some relation with business model frameworks used in (digital) BMI research. For example, the Business Model Canvas (Osterwalder & Pigneur, 2010) has, amongst others, key resources as an element where the resource-related mechanisms (access, creation, expansion and substitution) (Kimjeon & Davidsson, 2022) can be applied. As such, we may be able to distinguish between (complementary) digital and traditional paths of enablement for digital BMI.

There is also the question of how the influence of particular mechanisms may vary for particular organizations expressed through their opacity and agency-intensity (Davidsson et al., 2020). **Opacity** addresses how demanding it may be for a particular organization to identify the strategic action potential of an external enabler through a particular mechanism. **Agency-intensity** addresses how difficult it may be for a particular organization to realize the strategic action potential of an external enabler through a particular mechanism. From an external enablement perspective, it makes more sense to attribute opacity and agency-intensity to the enabling mechanisms instead of the agents (Davidsson et al., 2022). As such, the digital enabling mechanisms can be studied in relation to their variety in opacity and agency-intensity. For example, enabling mechanisms offered by generative AI may be relatively homogeneous with respect to

horizontal use cases while being relatively heterogeneous for vertical use cases with variations in the temporal and sectoral scope (e.g., media vs. manufacturing) (Deloitte, 2023). In addition, digital BMI research has so far mainly paid attention to an inside-out perspective through sensing and seizing of digital enablers (e.g., Böttcher et al., 2022; Filser et al., 2021; Foss & Saebi, 2017; Schneider & Spieth, 2013) and, more broadly, the need for digital transformation and capabilities (e.g., Annarelli, Battistella, Nonino, Parida, & Pessot, 2021; Gong & Ribiere, 2021; Ritter & Pedersen, 2020). Future research can also look at the interaction between the opacity and agency-intensity of enabling mechanisms and digital transformation and capabilities.

In sum, the mechanisms of external enablers for digital BMI draw attention to the following research questions:

7. How do digital and other, generic enabling mechanisms impact digital BMI? Can it result in new insights compared to looking at the direct influence of digital technologies?
8. Is it useful to differentiate digital mechanisms from other, generic enabling mechanisms? What are new mechanisms of external enablers relevant for digital BMI?
9. How do opacity and agency-intensity of digital and other, generic enabling mechanisms influence digital BMI and what is the role of digital transformation and capabilities?

4.4 Roles of External Enablers for Digital BMI

To further understand how external enablers can influence digital BMI through cause-effect relationships, we now move from the mechanisms to the roles of external enablers. Roles represent higher-order functions at different stages of new venture development (i.e., triggering, shaping, and outcome-enhancing) and are derived from the lower-order mechanisms (Davidsson et al., 2020). Davidsson et al. (2022, p. 19) clarify that “when discussing how mechanisms and roles are related, it is useful to see mechanisms as causes and roles as effects summarized at a higher level of conceptual abstraction.” For the external enablement of digital BMI, we differentiate between triggering, shaping and outcome-enhancing of digital BMI. It is also here where our external, outside-in perspective comes most closely to the (digital) BMI process or capabilities.

The **triggering role** for digital BMI addresses how external enablers can entice prospective entrepreneurs or innovators to initiate the creation of (new) digital business models because they more or less correctly anticipate some (but not necessarily all) of the mechanisms those enablers can provide. Digital BMI can take place in a new or emerging venture (as a start-up or within an organization) as part of venture triggering, i.e. initiate the creation of a new venture, or pivot triggering, i.e., change the direction of an emerging venture significantly (Davidsson et al., 2020; Davidsson et al., 2022). It can also take place in a business unit of an established organization (e.g., Warner & Wäger, 2019), which we refer to as transformation triggering. This involves adapting an existing business model or generating and introducing a new business model within an established context. The latter introduces the complexity of (temporally) managing two business models simultaneously – the traditional business model as well as the digital business model - till the new one is integrated with the old (as a hybrid business model) or takes

over from the old one (Markides, 2015). An example here is online retail, which most traditional retailers initially launched separate from their traditional business but have now integrated into their mainstream business (often referred to as omnichannel).

The **shaping role** of digital BMI deals with the use of available digital and other enablers and mechanisms to design and innovate new or existing business models. It can relate to changes in the overall value logic, the dimensions of the business model, or business model archetypes. Changes to the value logic of the (digital) business model are often captured by high-level notions like digitization and digitalization (e.g., Caputo et al., 2021; Gradillas & Thomas, 2023; Trischler & Li-Ying, 2023) or digital transformation and disruption (e.g., Hess, Matt, Benlian, & Wiesböck, 2015; Schallmo et al., 2017; Verhoef et al., 2021). It can also relate to changes in the underlying dimensions of the business model: customer, value proposition, organizational architecture (internal and external), and financial (revenue and cost) model (e.g., Bouncken et al., 2021; Fiel, 2013; Osterwalder, 2004; Trischler & Li-Ying, 2023). In addition, it can relate to abstract (digital) business model patterns or archetypes, individually or as part of classifications or taxonomies (e.g., Osterwalder & Pigneur, 2010; Weking, Hein, Böhm, & Krcmar, 2020). Examples are AI business models, Industry 4.0 business models, digital platform business models, and crowdsourcing business models.

The **outcome-enhancing role** of digital BMI relates to achieving better outcomes with digital enablers and mechanisms. It is important to realize that this cannot only be the result of anticipated mechanisms but also from other effective mechanisms, which may have been activated by chance (Davidsson et al., 2020). Differentiating between the triggering and outcome-enhancing roles of digital enablers and mechanisms is important to understand because, on the one hand, there may be those that are explicitly considered for digital BMI but may have ultimately a limited to no effect and, on the other hand, there may be those that are not taken into account but may have a major impact (Davidsson et al., 2022). For example, the advances in cloud computing have been a major, complementary enabler for many newer digital enablers of business model innovations (e.g., artificial intelligence, extended reality, or blockchain) but are often not taken explicitly into account anymore.

Of direct relevance for the outcome-enhancing role is whether digital (and other) enablers result in new business models that are viable and sustainable. One way to think about viable business models is that digital enablers and mechanisms can drive value creation through novelty (Leppänen, George, & Alexy, 2021; Zott & Amit, 2007, 2008). Of particular interest here is the disruptiveness of new business models (e.g., Markides, 2015; Snihur, Thomas, & Burgelman, 2018), as they can severely impact traditional industries. For example, online streaming has obliterated video rental through easy access to a fast catalogue with an ‘all you can eat’ subscription model.

Ultimately, the viability and sustainability of the business model is about the performance of the business model (e.g., Van de Ven, Lara Machado, Athanasopoulou, Aysolmaz, & Turetken, 2023) and how it contributes to the organization’s growth, competitive advantage, organizational performance, or market capitalization (e.g., Leppänen et al., 2021; Menter, Göcke, Zeeb, & Clauss, 2023; White, Markin, Marshall, & Gupta, 2022). Special consideration should be given here to not only focus on outcomes

for the firm (profit) but also outcomes for society (people) and the environment (planet) (Broekhuizen et al., 2021)

In sum, the roles of external enablers for digital BMI draw attention to the following research questions:

10. When and how do digital and other enablers and mechanisms trigger digital BMI? Will this be caused by the creation of a new venture or the pivot of an emerging venture by a start-up or established organization? Or will this be by the transformation of an established organization?
11. What business model value logic, dimensions and patterns are shaped by digital and other enablers and mechanisms for digital BMI? How does it adapt existing business models and/or lead to new business models?
12. When and how do digital and other enablers and mechanisms enhance the outcomes of digital BMI through viable and sustainable business models resulting in higher organizational performance? What is, specifically, the influence of novelty on value creation and performance, and when does disruption come into play?
13. How does the external perspective on digital BMI through the roles of external enablers and the internal perspective through the (digital) BMI process and capabilities come together?

4.5 External Enablement of Digital BMI in general

In this paper, we use the external enablement framework (Davidsson, Recker, & Briel, 2020; Davidsson, Recker, & von Briel, 2022; Kimjeon & Davidsson, 2022) to construct an integrative framework for digital BMI (as depicted in Figure 1). This integrative framework takes an external, outside-in perspective on digital BMI and systematically and logically outlines the enablement path and functions. We have introduced certain specific digital BMI concepts into the more general external enablement framework for this purpose. However, we have made only limited modifications to the framework in general or for our specific context, as our focus was on formulating a research agenda. This process, nonetheless, yielded some more general insights about external enablement in the context of digital BMI and beyond.

Digital enablers often refer to broader technology trends, such as AI, Metaverse, Industry 4.0 or IoT (e.g., Ancillai, Sabatini, Gatti, & Perna, 2023; Kanbach, Heiduk, Blueher, Schreiter, & Lahmann, 2023; Weking, Desouza, Fielt, & Kowalkiewicz, 2023), rather than the specific digital technologies underlying these trends, for example, for Metaverse consists of mix of different kinds of software, hardware, and infrastructure (Weking et al., 2023). This raises questions about the level of abstraction for specifying (digital) technology and other enablers. With an external enabler being defined as “a single, distinct, external circumstance” (Davidsson, 2015, p. 683), there is a need to understand better what single and distinct means. Moreover, with a focus on environmental “changes,” and digital technology continuously evolving at a lower level, one must ask what are relevant, significant changes at a higher level? For example, a higher-level change within the context of Generative AI was the introduction of a conversational interface (the “chat” of ChatGPT), which made it possible for this technology to be used differently and more easily. In addition, we see more specific, lower-level changes in

capabilities with the ongoing progression of the Generative Pre-trained Transformers (GPT) models, for example, from GPT 3 to 3.5 to 4.

The external enablement framework provides a default list of generic mechanisms that elaborate on the influence enablers have on entrepreneurial action and outcomes, encompassing improvements related to supply, demand, or value appropriation (Davidsson et al., 2020; Kimjeon & Davidsson, 2022). However, this list, which may have gaps and overlaps, is not based on a conceptual analysis that considers mutual exclusivity and collective exhaustiveness (Davidsson et al., 2022). This raises questions about whether the current list of mechanisms could become more systematic and whether more specialized studies, like those on digital enablers and mechanisms, could give rise to new, generic mechanisms or have their own list of mechanisms for their specific context. In this study, we introduced digital mechanisms to complement the generic mechanisms. While these digital mechanisms have been less prominent in the digital BMI literature so far, they feature heavily in digital innovation and transformation literature (e.g., generativity, combination, connectivity, virtualization). We can already see that some of the digital mechanisms are relatively close to the generic list (e.g., generativity, combination) while others may be more specific for a digital setting (e.g., connectivity, virtualization).

After an extensive review of the literature on environmental change, Kimjeon and Davidsson (2022) concluded that the external enablement framework is broadly applicable and superior to other integrative terms or frameworks like external shock, environmental jolt, disruption, or PEST[EL/LE]. Their main arguments pertain to looking at the integration of a wide variety of enabler types, the emphasis on the enabling impact for new economic activity, and highlighting the functions of enablement (mechanisms, roles). While, external (digital) enablers of (digital) business model innovation have been studied before, in particular as external antecedents or factors (e.g., Ancillai et al., 2023; Foss & Saebi, 2017; Spieth, Breitenmoser, & Röth, 2023; Wirtz, Müller, & Langer, 2022; Zhang et al., 2021), these approaches often lack the detailed insights into the path and functions of enablement that the external enablement framework provides. Nevertheless, given the specific attention that technology innovation has received in the past and digital innovation more recently, an external enablement framework for digital BMI could benefit from theoretical insights related to environmental changes from these and other research areas. For example, while Kimjeon and Davidsson (2022) extended the external enablement framework with evolution –the “pace and pattern by which the EE develops over time” (p. 646) – as characteristic, there is little further detail on what evolution could entail. For technological innovation, ideas about technological trajectories – for example, the technology S-curve – can provide further insight into strategic choices for entrepreneurs such as whether to focus on exploration or exploitation (Gans, Kearney, Scott, & Stern, 2020).

In sum, the external enablement of digital BMI draws attention to the following research questions, which require a more specific external enablement study:

14. What influences the level of abstraction at which external enablers are specified and what are the implications? What does this mean for enablers such as digital technology that are continuously evolving, especially at lower levels?

15. How can the list of generic mechanisms become more systematic to better guide research and practice, and how can more specialized (digital) studies give rise to new, generic mechanisms or additional, specific (digital) mechanisms?
16. How can other concepts, frameworks or theories with a focus on external, environmental change complement the external enablement framework, in particular for (digital) technology innovation?

5. Conclusion and future research

In this paper, we introduced and developed a research agenda for digital BMI (Table 1) by taking an external, outside-in perspective (Figure 1) based on the external enablement framework (Davidsson et al., 2020). By looking at how external enablers influence digital BMI through their types, characteristics, mechanisms, and roles, we address the enablement path and functions. As such our outside-in perspective goes beyond merely identifying external factors for digital BMI. This integrative framework brings together different but related research topics for digital BMI and introduces and develops a set of research questions for further advancing digital BMI research. We also see this framework contributing to a cumulative tradition, in particular bridging the gap between more generic digital business model research and research into new business models driven by specific digital technologies or innovations.

Future research can further develop and evaluate the external enablement framework for digital BMI and the research agenda through several future research directions. First, a systematic literature review of (digital) BMI research could help to further integrate different research areas, topics and theories, similar to what Kimjeon and Davidsson (2022) did for the original external enablement framework. A quick win could be a meta-review of existing systematic literature reviews of (digital) BMI research. Second, a broader and deeper look at digital innovation and transformation literature could support a further elaboration of the digital aspects of our framework. For example, the framework could distinguish between the technical process of digitization and the sociotechnical process of digitalization, which refers to applying digitizing techniques to broader social and institutional contexts (Tilson, Lyytinen, & Sørensen, 2010). Third, the framework would benefit from empirical studies, in particular at the aggregate level, looking at what may affect a variety of digital BMI attempts by several, different actors following a specific digital enabler like AI. This can also, for example, complement related work on business model taxonomies for specific digital enablers (e.g., AI business models), which often have limited details on the enablement path or functions.

External Enabler Elements

Digital BMI Research Questions

Types <ul style="list-style-type: none"> Digital enablers Other enablers Interactions 	<ol style="list-style-type: none"> 1. What are the different types of digital technology (as external enablers) that should be considered for digital BMI (and which not)? 2. What other (non-digital) types of external enablers can play a prominent role in digital BMI? 3. How do interactions between digital enablers – and between digital and other enablers – play a role in digital BMI?
Characteristics <ul style="list-style-type: none"> Scope of digital enablers Onset (or evolution) of digital enablers Specific characteristics of digital enablers 	<ol style="list-style-type: none"> 4. Can the scope of digital enablers generally be considered as broad? What important nuances are there in relation to the sectoral, spatial, temporal, and sociodemographic dimensions? How does this influence digital BMI? 5. What makes the onset of some digital enablers relatively predictable and gradual while others are relatively sudden and unpredictable? How do digital enablers evolve from technological and social perspectives? How does this influence digital BMI? 6. Are there any specific characteristics of digital enablers that are relevant for their potential and actionability for digital BMI?
Mechanisms <ul style="list-style-type: none"> Digital mechanisms Other, generic mechanisms Opacity and agency-intensity 	<ol style="list-style-type: none"> 7. How do digital and other, generic enabling mechanisms impact digital BMI? Can it result in new insights compared to looking at the direct influence of digital technologies? 8. Is it useful to differentiate digital mechanisms from other, generic enabling mechanisms? What are new mechanisms of external enablers relevant for digital BMI? 9. How do opacity and agency-intensity of digital and other, generic enabling mechanisms influence digital BMI and what is the role of digital transformation and capabilities?
Roles <ul style="list-style-type: none"> Triggering digital BMI Shaping digital BMI Enhancing outcomes of digital BMI 	<ol style="list-style-type: none"> 10. When and how do digital and other enablers and mechanisms trigger digital BMI? Will this be caused by the creation of a new venture or the pivot of an emerging venture by a start-up or established organization? Or will this be by the transformation of an established organization? 11. What business model value logic, dimensions and patterns are shaped by digital and other enablers and mechanisms for digital BMI? How does it adapt existing business models and/or lead to new business models? 12. When and how do digital and other enablers and mechanisms enhance the outcomes of digital BMI through viable and sustainable business models resulting in higher organizational performance? What is, specifically, the influence of novelty on value creation and performance, and when does disruption come into play? 13. How does the external perspective on digital BMI through the roles of external enablers and the internal perspective through the (digital) BMI process and capabilities come together?
External enablement <ul style="list-style-type: none"> Of digital BMI And more in general 	<ol style="list-style-type: none"> 14. What influences the level of abstraction at which external enablers are specified and what are the implications? What does this mean for enablers such as digital technology that are continuously evolving, especially at lower levels? 15. How can the list of generic mechanisms become more systematic to better guide research and practice, and how can more specialized (digital) studies give rise to new, generic mechanisms or additional, specific (digital) mechanisms? 16. How can other concepts, frameworks or theories with a focus on external, environmental change complement the external enablement framework, in particular for (digital) technology innovation?

Table 1. A Research Agenda for Digital BMI from an External Enablement Perspective

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