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Exploring ecosystemic business models

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1. Introduction

Ecosystems are organizational collectives combining forces to create value offerings to a defined audience. These organizations, or firms, are linked to each other in processes of cooperation and competition simultaneously. Firms increasingly choose an ecosystem strategy over other alternatives to ensure value co-creation and capture (Hannah & Eisenhardt, 2018). Subsequently, ecosystem strategy enables a context in which the firm can build, leverage, and extend, as opposed to merely locating and occupying a strong position (Autio and Thomas, 2018).

An ecosystem is essentially a network of organizations (suppliers, distributors, producers, government agencies, NGOs etc.) involved in the production or delivery of a product, service, or solution. A business ecosystem is characterized by a certain degree of dependence for the ecosystem to function. Research has identified ecosystem offerings as malleable and users as having a broader range of opportunities to define the value offering (e.g., customization) compared to the context of conventional supply chains (cf. Autio, 2022). Ecosystems have less hierarchical arrangements and more independent participants, which pose challenges of orchestration. For example, ecosystem partners should behave in such a way that they contribute to an increased value of the focal participant's offering, but the question of how to persuade ecosystems partners to do so remains, especially if there are less hierarchical arrangements (e.g., licensing agreements, predefined roles). Ecosystem orchestration, in turn, is linked to the value offering that the ecosystem collectively produces, which inevitably arises from the participating firms' business models.

In fact, a new research area is emerging that focuses on networked business models, arguing that most business model conceptualizations to date overlook the systemic participation of diverse actors and overemphasize the role of the firm (Wieland et al., 2017). A networked business model presents a situation, in which it is impossible for a single firm to govern all relevant resources and activities needed for developing, producing, and marketing technology-based services (Palo & Tähtinen, 2011). This poses a need to consider a new business model logic that highlights the properties of ecosystem strategies and open platform logic. In the ecosystem setting, we choose to refer to the underlying interdependence of business models as *ecosystemic business models*.

From a research point of view, business models in ecosystems are still a rather new area (cf. Ritala et al., 2013). An ecosystem's boundaries may be difficult to identify, and most often an ecosystem is defined based on an organization's most critically dependent partners in terms of the organization's future (Iansiti & Levien, 2004). Firms in ecosystems evolve jointly in a process of both competing against and cooperating with each other (Leminen et al., 2020). There is thus an evident need to conduct research on possible business models in ecosystems driven by emerging technology and novel value-creating technological solutions such as the adoption of IoT technologies (Leminen et al., 2018; Leminen et al., 2020). In machine-to-machine (M2M) contexts multiple challenges arise, for instance, how to build trust and commitment, facilitate technology acceptance, and agree on data ownership (Falkenreck & Wagner, 2017). The context thus enables new business models that arise and develop in ecosystems and are based on interdependent relationships with different actors or groups of actors. As noted by Storbacka and Nenonen (2011), business models guide the interaction of actors with other actors and resources.

While the practice of business relationships is well known both empirically and theoretically, the ecosystemic approach to building business is yet in its exploration phase. There is much to study in terms of understanding an emerging ecosystem and its business models (Leminen et al., 2017), as well as how to orchestrate an ecosystem in such a way that it drives value co-creation based on each participating firm's expectations of and prerequisites for (co)value-creation. The aim of the paper is thus to explore the link between business models and ecosystems and to outline the essence of *ecosystemic business models*. We thus formulate the following research questions to guide the study:

1. What are ecosystems?
2. What characterizes networked business models beyond the boundaries of a single firm?
3. How can we conceptualize the ecosystemic business model?

The research design is based on a literature survey and conducted with the aim of identifying business model research beyond the boundaries of the firm. We focus on the networked setting of ecosystems and, subsequently, networked business models. The literature survey resulted in a framework for identification of ecosystemic business models.

The paper is structured as follows. First, we review research on ecosystems and networked business models. Second, we strive at connecting these disperse research streams by presenting a conceptual model for categorizing and identifying ecosystemic business models. Third, we discuss the conceptual framework as well as the contributions and limitations of the paper, followed by suggestions for further research.

2. Perspectives on ecosystems

Originally, the ecosystem concept was established in the biological research arena. Many concepts in biological ecosystem studies provide metaphors for business scholars, for instance, predation, parasitism, symbiosis, decomposition, circulation, and deconstruction of the whole system (Tsujiimoto et al., 2018). Nelson and Winter (1982) described business ecosystems

based on biological ecosystems, highlighting that firms are affected by other firms' activities in the same manner as organisms are affected by other organisms in biological systems. Consequently, firms co-evolve similarly to how interdependent species evolve in an endless reciprocal cycle (Moore, 1993). Business ecosystems has since been used to describe interdependence and co-evolution in contemporary business activities (Moore, 1993; 2013), to indicate the irrelevance of traditional industry boundaries (Iansiti and Levien, 2004) and the rise of interdependence and "symbiotic relationships" (Adner, 2017). Ecosystems have gained tractions especially among scholars of strategic management (cf. Datté et al., 2017), innovation and technology management (cf. Gawer and Cuzumano, 2014), and, more recently, also of industrial networks (Aarikka-Stenroos and Ritala, 2017). The concept has continuously been criticized for lack of clarity regarding where an ecosystem perspective adds, or does not add, value (cf. Adner, 2017). However, scholars agree that ecosystems address important competitive, collaborative, and organizational challenges faced by firms.

Different attempts at categorizing and explaining ecosystems have been made by scholars. Adner (2017) proposes two views of conceptualizing ecosystems, namely the *ecosystem-as-affiliation*, by which ecosystems are seen as communities of associated actors defined by their networks and platform affiliations, and *ecoysystems-as-structure*, by which ecosystems are seen as configurations of activity and defined by a value proposition. The former emphasizes the number of partners or actors linked to a focal actor or platform, network density, and actors' centrality. Such a strategy increases the bargaining power of the focal actor (cf. Jacobides et al., 2006 in Adner, 2017). The latter strategy emphasizes the value proposition, seeking to identify which actors must interact for the value proposition to be created. Inherently, the ecosystem-as-affiliation focuses on actors, whereas the ecosystem-as-structure focuses on activities.

Jacobides et al. (2018) identified three research streams on ecosystems, namely a *business ecosystem stream* (centers on the firm and its environment), an *innovation ecosystem stream* (centers on a particular innovation or new value proposition and the set of actors to support it), and a *platform ecosystem stream* (centers on how actors organize around a platform). These streams of research have different research focus and units of analysis. Studies that take the firm as the unit of analysis emphasize the relationships a firm has to other firms, and these relationships may affect or be affected by the activities in the ecosystem. Studies with innovation as the unit of analysis focus on interconnectedness in innovations upstream (components) and downstream (complements) both within industries and crossing industry borders. Studies focusing on platforms as the unit of analysis focus on the relationship between the platform sponsor and its complementors. Jacobides et al. (2018) continue, that the analytical border to ecosystems is usually set at the product or service system level, indicating that there are no contractual, national, regional, or industrial borders of an ecosystem. This also mirrors the inclusion of non-business actors, such as institutions, user communities, consortiums, NGOs etc. (Tsujimoto et al., 2018), which is rather non-existent in research streams close to ecosystems, such as business network theory (cf. Aarikka-Stenroos and Ritala, 2017). Business networks and business ecosystems differ mostly regarding boundaries, configuration and actor setup, collaboration, and interaction level. The business ecosystem aims to capture a more

comprehensive system of interconnected actors and entities, whereas business networks take interest in relationships and interaction between firms or individuals to achieve specific goals or objectives. The perspective of the ecosystem is thus broader than that of business networks; the interaction and interdependence strive at creating an environment that can be considered beneficial for all actors (Moore, 1993; Gawer and Cusumano, 2014), not only the immediate business network(s) an actor is involved in. Not all actors in a business network share the same goal or engage towards the same goal; this is done only by those firms that are a part of the same activity pattern (Håkansson and Snehota, 2006). Furthermore, for a relationship to exist, it must build on value exchange between the involved actors (ibid.). In networks, formal agreements and economic transfers are complemented with informal mechanisms (trust, knowledge and information sharing, joint problem-solving etc.) (cf. Shipilov and Gawer, 2020). Aarikka-Stenroos and Ritala (2017) propose two interpretations of the interplay between business ecosystems and business networks, namely a) ecosystem as a new layer (resulting in an extension of business network frameworks), and b) ecosystems as a novel perspective to business networks (resulting in an update of business network frameworks). The former depicts that an ecosystem is a “broader societal system environment and layer, in which business networks are embedded” (Aarikka-Stenroos and Ritala, 2017, p. 31). The authors continue to emphasize that all ecosystems comprise networks.

In contrast to networks, firms in ecosystems are not linked via direct interactions but through different forms of interdependencies. Jacobides et al. (2018) summarized such interdependencies based on observations of different types of ecosystems, namely a) business ecosystems depict interdependent actors across industries, b) innovation ecosystems are unique in the sense that they depict a set of actors that must align their activities to realize a (new) value proposition, and c) platform ecosystems depict actors linked to digital platforms. As a summary, due to the high level of interdependence, actors in ecosystems must prioritize alignment to increase value creation (cf. Adner, 2017; Shipilov and Gawer, 2020), which eventually translates into intensified collaborations, alliances, or networks (Ståhl et al., 2022).

3. Interconnected and networked business models

The business model concept has gained interest during recent decades and developed into different research streams (cf. Massa et al., 2017). For instance, business models have been a focal research topic in technology and innovation management (Massa & Tucci, 2014), strategy (Casadesus-Masanell & Zhu, 2013), and more recently sustainability and circular economy (Centobelli et al., 2020). The business model concept is originally designed to help firms capture, visualize, understand, communicate, and share the business logic as well describe possible futures for a firm (Chesbrough, 2007; Osterwalder et al., 2015).

Scholars thus agree that the business model concept relates to the architecture of various value dimensions, such as value creation, value delivery, and value capture (Foss & Sebi, 2017; Teece, 2010). However, there is some debate concerning the level these value dimensions refer to; typically, business models refer to a specific firm and how a single-firm is organized (Spieth et al., 2014), but some scholars regard the business model as firm-centric *and* boundary-spanning (Velu, 2016; Zott & Amit, 2008), highlighting a network of actors, resources, and

activities (Leminen et al., 2018). A design of business models on a networked and interconnected level has been acknowledged by, e.g., Stott et al. (2016), Westerlund et al. (2014), and Wu and Zhang (2009). In fact, Nambisian (2018) propose a shift to an ecosystem perspective on business models (of digital innovations), highlighting that it could lead to a richer understanding of the value creation and appropriation, as such processes include a set of stakeholders (cf. Doganova & Eyquem-Renault, 2009). Interconnectedness and value co-creation is highlighted also by Oliveira et al. (2018) and Storbacka et al. (2013), saying that value delivery is a collaborative effort embodied in the business model; the business model indicates the orchestration of actors and activities related to that value delivery and value creation process. Wirtz et al. (2016) and Josevski et al. (2020) argue that there is a need to further understand business models from the perspective that involves actors participating in the value creation and provisioning of a so-called network-oriented model.

The notion of networked business models has been suggested by, e.g., Bankvall et al. (2017), indicating two main perspectives with different analytical starting points: from a firm perspective, analysis of the firm-centric business model is carried out inside-out, while for the networked, or network-embedded business model, the analysis requires an outside-in approach. Subsequently, in the networked business model, understanding of the business logic at a network-level (or an ecosystemic level) becomes essential. Of note, different concepts are currently in use to depict the interconnected or networked business model (for a summary, see Table 1).

Category	Concept / Term / Label	Applied in
Business model in transition	Reconfiguration of business models towards networked business models	Brennan & Tennant 2018
Network-centric view on business models		Bankvall et al. 2017; Cantu, 2015; Coombes 2022; Daas et al., 2013; Ferreira et al, 2013; Fjeldstad & Snow, 2018; Klimanov & Treytak, 2019; La Rocca & Snehota, 2017; Laya et al., 2018; Leminen et al., 2020; Lind & Melander, 2021; Palo & Tähtinen 2011; Rodriguez-Rodriguez et al., 2015; Solamani et al., 2017, Steinhauer, 2019; Suherman & Simatupang, 2017
	Open business model	Cautela et al. 2014; Storbacka et al., 2012
	Doublesided business model	
	Sustainable business model	Comin et al. 2020
	Platform business model	Fehrer et al. 2018
	Business model as engagement platform	Kullak et al. 2021
	Fluid and flexible business model	Langley et al. 2021; Mason & Mouzas, 2012
Overlapping business model	Mason & Spring, 2011	

	Business model as practiced and as artefact.	Nailer & Buttriss 2020
	Market-centric business model	Spieth et al., 2019
Networks as element of business models		Gaiardelli & Songini, 2020; Haas, 2019; Mazurek, 2018
Modular business model		Hellström, 2014
	Single-firm view, dyad-level view, network-oriented view	Jocevski et al., 2020
Industry-specific business model	IoT business model	Leminen et al., 2018
Business model with a purpose	Sustainability	Proka et al., 2018

Table 1. Different approaches to networked business models

4. Towards ecosystemic business models

Extant literature proposes several definitions of an “ecosystemic” business model. For example, Leminen et al. (2020, p. 5) note that ecosystemic business models “*are beyond [the] organizational boundaries of a single organization*” and continue to point out that the ecosystem business model consists of a network or ecosystem of multiple organizations. Brea (2023, p. 4) views an ecosystemic business model as “*a system of interdependent activities undertaken by the set of actors interacting in an ecosystem that allow the creation, delivery and monetisation of value in a collective manner*”. Interconnected and networked business models by their definitions includes organizations, which are thus interlinked and predefined. Common features are inherently linked to value, and actors sharing the notion of value creation and capture. Nevertheless, research does not adequately reveal how the potential of ecosystemic business models is (to be) realized; currently, research on ecosystems and business models merely indicates that a potential exists (but not how to realize it).

In terms of the value dimension of ecosystemic business models, Westerlund et al. (2014) suggest a ‘value design’ framework to illustrate a firm’s business model. This applies also to ecosystems, or any of its parts, by focusing on value creation and capturing. The value design framework combines business model thinking within the boundary of a single firm, and in a network setting, and, in addition, broadens thinking towards ecosystems. Similarly, Leminen et al. (2018) suggest three concepts, namely *value space*, *value base*, and *value potential*, to understand extant and further potentials not to only create, but to concurrently capture value, in an ecosystem. Value space includes all plausible business models options (within and) beyond the organization. For example, Brody and Pureswaran (2015) identify a variety of plausible business model options in the contexts of Internet of Things (IoT). Value base refers to the actual extracted value in the value space. In other words, the value base indicates the ecosystemic business model option that the firm eventually reaches in cooperation with other organizations, including the business model’s diverse structures and related systems. Lastly, value potential includes the extant and emerging business model options, which have not yet been realized by the participants in the ecosystem. The value potential encompasses all actors, which may create or capture value in the ecosystem, and those actors that are not always active participants. In terms of empirical examples of realized business model potential in ecosystems, some research has been reported, i.e., future business models in the setting of IoT ecosystems

(Leminen et al., 2018) and autonomous vehicle solution ecosystems (Leminen et al., 2022). Understanding business models in ecosystems also calls for understanding the motives of the ecosystem partners; for instance, some studies focus on revealing role taking and role making in both extant (Brea, 2023) and emerging ecosystems (Dedehayir, Mäkinen, & Ortt, 2018; Leminen, Rajahonka, & Westerlund, 2017).

The scattered studies on business models in ecosystems thus provide a challenge for researchers, as there are several concepts in use (networked business model, network-based business model, network-embedded business model), and many ecosystems' business potential is yet to be realized, i.e., there are scarce empirical examples of interconnected business models, or business models that emerge directly from and within a business ecosystem. Table 2 summarizes the empirical literature on business models in ecosystems, categorizing them into approaches: (I) stand-alone, (II) exclusivity, (III) shared, and (IV) common purpose.

Category	Concept / Term / Label	Applied in
Stand-alone approach (I)	<i>Business models:</i> Advanced data assisted solutions	Leminen et al. 2022
	<i>Roles:</i> Butterfly role in product ecosystem	Leminen et al. 2017
Exclusivity approach (II)	<i>Business models:</i> Industry Collaboration business model	Leminen et al. 2018
	<i>Business models:</i> Advanced-data-assisted solutions	Leminen et al. 2022
	<i>Roles:</i> Ecosystem leader	Dedehayir, Mäkinen & Ortt 2018
Shared approach (III)	<i>Business models:</i> Collaborative value creation in an industry-wide ecosystem	Hakanen & Rajala 2018
	<i>Business models:</i> Close loop ecosystems (open systems)	Rajala et al. 2018
	<i>Business models:</i> Horizontal Market business model	Leminen et al. 2018
	<i>Business models:</i> Fully autonomous operation	Thompson et al. 2021
	<i>Business models:</i> Autonomous demarcated solution	Leminen et al. 2022
	<i>Roles:</i> Structural and functional roles in ecosystems	Brea 2023
Common purpose approach (IV)	<i>Business models:</i> Value designs	Westerlund et al. 2014
	<i>Roles:</i> Spider role in industry ecosystem	Leminen et al. 2017
	<i>Roles:</i> A swarm of bees role in peer to peer ecosystem	Leminen et al. 2017

Table 2. Approaches to ecosystemic business models

When combined with the theoretical perspectives on ecosystems, we arrive at a two-by-two matrix (Lowy & Wood, 2004) for categorizing ecosystemic business models (see Figure 1). The matrix functions as a conceptual framework, which can inform empirical studies on ecosystemic business models. It depicts the four approaches in Table 2 in combination with current knowledge of ecosystems (Adner, 2017). The *stand-alone approach* (I) signals that the value proposition is created single-handedly by the firm and the ecosystem's role is diminished either purposefully or unintentionally (by not recognizing its potential). The view on value creation is firm-centric, and the firm is engaged in clear buyer-seller relationships to realize the value offering. The firm's view of the ecosystem is thus focused on resources that the actors possess and that the firm needs; to reach these resources, they must engage in relationships of various kind to access the resources. The *shared approach* (II) regards the value proposition as conjointly created by ecosystem partners, and value creation is thus regarded as a shared and conjoint process in the ecosystem. The focus is on activities among actors in the ecosystem. The *exclusivity approach* (III) stipulates that the value offering is created single handedly by the firm (as in approach I), but in such a manner that the best choice of ecosystem partner is included in the effort. The concepts of strategic partners or first layer and second layer partners become important, as the firm must decide on which actors and which resources to activate in the ecosystem to realize the value offering. Value creation is thus firm-centric but manages to leverage value to a few selected ecosystem partners. The fourth approach, *common purpose* (IV), signals that the value offering is defined jointly by ecosystem partners, not only a focal firm. Value is thus created and captured across the ecosystem in an aligned and collaborative manner.

Fig. 1. Approaches to business models in ecosystems

Ecosystem Perspectives	Ecosystem-as-affiliation	III EXCLUSIVITY APPROACH <i>Value proposition (offering) created single-handedly by firm based on best choice of ecosystem actors to include in the value chain.</i> <i>Value creation mode: firm-centric and indirectly to a few selected ecosystem partners</i>	IV COMMON PURPOSE APPROACH <i>Value proposition (offering) defined conjointly by ecosystem actors, value created jointly by ecosystem actors to include in the value chain.</i> <i>Value creation mode: leveraged indirectly across firms realizing value offering</i>
	Ecosystem-as-a-structure	I STAND-ALONE APPROACH <i>Value proposition (offering) created single-handedly by firm, ecosystem partners involved if needed</i> <i>Value creation mode: firm centric</i>	II SHARED APPROACH <i>Value proposition (offering) conjointly created by ecosystem partners.</i> <i>Value creation mode: leveraged directly across firms realizing value offering</i>
		Firm-centric business model	Ecosystem-centric business model (ecosystemic business model)

5. Concluding discussion

Despite the burgeoning literature on networked and interconnected business models, there is much to be explored in an ecosystem setting, where interaction is based on interdependence and less hierarchical arrangements. The ecosystem is a part of the environment with which an organization interacts. It is not static, but evolves, for instance due to the introduction of new partners, new technology, the discovery of customer needs, or the development of new infrastructures. Consequently, and simply stated, the ecosystem is performed by deliberate, emergent or constrained choices made by an organization; choices, which are linked to its business model (Demil et al., 2018). An ecosystem requires the management of interdependencies between actors and is often orchestrated by a leading organization (Gawer and Cusumano, 2013). Hannah and Eisenhardt (2018) identified ways of navigating ecosystems; firms may follow a positioning logic (driven by the search for bargaining power), a competency logic (driven by existing capabilities), or a bottleneck logic (driven by entering bottleneck components of the ecosystem to create value). Nevertheless, while knowledge on ecosystems increases, we still struggle to understand, design, and realize business potential beyond the boundaries of a single firm.

In this paper, we have explored ecosystemic business models by reviewing literature on (a) ecosystems, and (b) networked business models as a form of interconnectedness among firms in business contexts. Based on a literature survey on the above-mentioned concepts, we have identified four approaches to ecosystemic business models, namely (I) stand-alone, (II) exclusivity, (III) shared, and (IV) common purpose. Building on this proposition, and following Brea (2023) and Leminen et al. (2020), we propose a definition of ecosystemic business models as *collectively shared (a) business logic and (b) business goals, that allows for the creation, delivery, capture, and monetisation of value*. We thus highlight the fact that ecosystemic business models must be a collaborative effort with a shared vision and shared goal, and hypothesize that for ecosystemic business models to generate value, the firm must re-evaluate how it approaches business modelling, internal to the firm or collaboratively with ecosystem partners.

References available upon request.