



Draft. Comments Welcome

Coopetition and Symbiosis

Revisiting two buzzwords of the “Innovation Ecosystem” Metaphor

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Abstract

Should we be more critical and nuanced when it comes to the metaphorical, notional and representational worlds that define innovation ecosystem? Through a deconstruction of two important ecosystem metaphor, we reveal a pronounced disaccord between the normative charge of respective notions on the one hand, and the potential realities implied by more critical research. However, we do not call for a complete abolishment of the ecosystem metaphor, for three reasons: First, the literature is developing quickly, and becoming more nuanced and aware of its limitations. It should have a chance to develop and to take on board criticism, such as one on hand. Second, even though we find many reasons to believe that existing metaphors, notions and representations might lead policymakers to look exactly in the wrong direction, and to underestimate the risks associated with (innovation) ecosystems, the term itself is here to stay, at least for the foreseeable future. Political actors have to live with it, by changing the way it is used and understood, and by taking a more radical approach towards implementation and regulation, taking into account the fact that the structures we call “ecosystems” in the business context are small and rather unimportant elements of larger ecosystems. Third, and finally, we believe that a key challenge of coming years is to find technical solutions to ecological problems without falling into the trap of a belief in techno-fixes. While the main transformative questions are political and distributive, technology will need to play a role, and we need terms that open an arena for agonistic struggles about this role. Ecosystem terminology might play a role in this respect.

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1. Introduction¹

“Innovation ecosystems” seem to be everywhere. Every company tries to become, build or at least become part of one. Every region or city, indeed every constituency up to the European Union (EU) tries to foster or establish them. And academics in nearly all business schools and business departments try to understand them, mostly to help organizations and policymakers to deal with the frenzy that has developed around the term. Most of this research assumes that it should be instrumental in the establishment of such ecosystems. It shares the strong belief of corporate actors (and policymakers) in the necessity of the respective institutional and organizational architectures of “co-evolution”, “coopetition”, “cooperative competition”, “circularity”, and “commons-based knowledge management”, to name just some of the buzzwords associated with “ecosystems”. These structures are seen as indispensable instruments to achieve a certain set of given objectives (such as “innovation” or the development of “sustainable” business models). Neither do they ask whether these ecosystem objectives are indeed rational objectives, nor whether ecosystem instruments are indeed conceived rationally. The question they try to answer is how to optimize ecosystem architectures. One might call this a specific form of “instrumental rationality”.

Apart from the research community, this article mainly addresses those public or state actors at the EU, nation state, federal state, regional, or communal level, without which “ecosystems” would not be able to exist. Every ecosystem relies on public infrastructures or public funds, at least to some extent. Many are directly set up by public agencies. Others rely on public managers to orchestrate the first steps of setting up such a system. Publicly-funded research institutions and universities often play a decisive role. Even those ecosystems that appear mostly private (such as the ones in big tech companies) or intra-organizational often rely strongly on direct and indirect forms of public support.

Because they are of the essence, the state actors that enable ecosystems are under increasing pressure to support different forms of “innovation ecosystems”, by offering them space, real or monetary resources, a regulatory framework or other support. Regretfully, the kind of instrumental rationality typical for many ecosystem discourses has also infiltrated the discussions on the appropriate dimensions and forms of this support. It is mostly about how to be instrumental in establishing ecosystems, not whether or in what form ecosystems are an idea worth following up on. In an explicit attempt to confront the specific “instrumental rationality” that hides behind the terminology of “innovation ecosystems”, much of the research about it, and much of the discussion on the role of state actors, this article takes a more critical look. By analyzing the use of two “buzzwords” in the field (and, along the way, the complicated lineage of the ecosystem metaphor, which has evolved and is evolving constantly) it aims at helping policymakers to develop a more nuanced approach towards the ideologies that form part of it.

Few people question the way the term “innovation ecosystem” is normatively charged. Still, it is a combination of two words that might evoke two very different, opposing reactions, depending on the perspective of the observer. For practitioners, (liberal) politicians, public sector representatives and for a large part of the business school academia, both terms represent an attempt to describe something positive: “Innovation” stands for a precondition and essential element of the success of every major business organization, and for the most promising strategy to deal with the multiple

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transformative pressures confronting our societies, ranging from climate change and loss of biodiversity to increasing inequality and political fragmentation, to the opportunities and hazards of new technologies.

For most people in business and business research, the term “ecosystem” stands for institutional and organizational set-ups in which such innovation can take place more effectively, purposeful and in line with the requirements of a “transformative” technological, social, and economic environment that requires speedy solutions and agile decision-making. “Ecosystems” are the locus in which market societies develop their full potential, by combining different elements that have proven to be instrumental in processes of innovation and problem solving. Within this mainstream view, what is contested are the exact actor constellations, institutional arrangements, and mechanism designs needed to actually achieve transformative goals: What is the relative role of public and private initiative, of market mechanisms and public support, of competition and cooperation? In how far is it necessary to go beyond classic dichotomies such as private and public or competitive and cooperative? Which private, public and hybrid actors are needed, and what is their respective role? In how far do actors need to change to be productive elements of “ecosystems”, for example by coming less profit- and more impact-orientated (in the case of businesses), less regulatory and more entrepreneurial (in the case of public administrations), less political and more policy-orientated (in the case of politicians), or less interested in pure understanding and criticism and more in problem solving (in the case of science, which is expected to become “transformative” in a very specific, instrumental sense).

For critical scholars, in contrast, both the term “innovation” and the term “ecosystem” represent highly ambivalent attempts of liberal societies to create narratives of progress. These scholars point to the fact that only recently the term “innovation” has been used with a positive connotation, as a capitalist notion of a form of change that is a precondition for business success *and* social well-being. For over two thousand years, innovation had been a word with a rather different, mostly negative connotation. In the modern age, and before the onset of the industrial revolution, it was mostly a synonym for rebellion and heresy. In early capitalism, the term was used to villainize “social innovations” such as communism and socialism.² Only after the Second World War, and inspired by scholars such as Schumpeter (Schumpeter and Swedberg 2021), innovation has been described as a key element of capitalist dynamics. More and more, the term became closely and inextricably linked to the narratives of progress that characterize liberalism and capitalism. In critical science, however, these narratives are more and more seen as being responsible for the ecological and social problems of our days. At the latest with Horkheimer and Adorno (1969) it has become a standard critical position that the terminology of progress has to be deconstructed and denounced as an attempt to camouflage the double-edged nature of capitalist change. More recently, this position has been integrated forcefully in research on the radical implications of climate change and other anthropogenic emergencies. Authors such as Latour (2018) and Tsing (2015) forcefully argue that only by abandoning narratives of innovation and progress mankind can survive in the ecological ruins capitalism has created. They describe capitalism as a regime that does not only depend on surplus labor, but that skims surplus, rents and profit from the productive and highly complex webs of life that many call ecosystems. As these webs of life are in imminent danger of being destroyed fundamentally, they should be the focus of attention. And as these webs of life are made of actor-network-constellations (for an introduction, see Latour 2007; Haraway 1984) that will not be able to perform or even rationally process anthropocentric ideologies of “progress” and “innovation”, these should be seen much more critical.

² The history of the term innovation is discussed in Godin 2015.

Against this backdrop, it is not surprising that critical scholars question the (inflationary) use of the term (innovation) “ecosystem” (and the increasing use of biological metaphors) for business environments. They point to the fact that it is inadequate to liken the complex networks of animate and inanimate entities that enable life on our planet to the rather simplified representations of the organizational and institutional forms of business networks. Especially in a time in which our whole attention should be focused on understanding and preserving “webs of life”, one should be careful not to downplay their complexity and importance.

Building research on innovation and business networks on a “flawed analogy” (Oh et al. 2016) might also hinder progress in understanding and developing environments in which businesses can successfully develop new products and solutions. In fact, contributions such as Oh et al. (2016) represent another, quite general and business-orientated critique to the use of the ecosystem metaphors. Based on a detailed reading of the literature, they show that these metaphors are rarely translated into clear definitions, concepts and theories, and that they are usually characterized by an “over-emphasis on market forces” (Oh et al. 2016, p. 1).

Critical examinations of the (innovation) ecosystem terminology such as Oh et al. (2016), Ritala and Almpantopoulou (2017), or Mars et al. (2012) provide important insights into the potential, limits, and risks of the concept and its terminology. We build on these insights, but choose a slightly different route of inquiry. We choose two “buzzwords” that are often used in discourses in and around innovation ecosystems: Coopetition and symbiosis. We then look at these two expressions from two perspectives: A more practical perspective of the use of these terms in applied business research (including in the field), and a critical perspective that tries to uncover aspects that might be hidden underneath the metaphors and buzzwords of innovation ecosystems. This critical perspective is informed by three strands of the social sciences literature: The literature that treats recent socio-technical changes as the emergence of a new form of surveillance or platform capitalism (Zuboff 2020; Srnicek and Schäfer 2018), the literature that re-visits global value chains and processes of capitalist extraction against the backdrop of the politico-ecological conditions of the Anthropocene (Tsing 2015; Latour 2018), and a dialectics of enlightenment perspective (Horkheimer and Adorno 1969).

Our aim is to help policymakers to become more critical and nuanced when it comes to the metaphorical, notional and representational worlds that define innovation ecosystem. In this way, we contribute to the deconstruction of the ecosystem metaphor. We reveal a pronounced disaccord between the normative charge of the notions and narratives of innovation ecosystems and the (highly under-researched) problems that fundamentally question current structures. However, we do not call for a complete abolishment of the ecosystem metaphor, for three reasons: First, the literature is developing quickly, and becoming more nuanced and aware of its limitations. It should have a chance to develop and to take on board criticism, such as one on hand. Second, even though we find many reasons to believe that existing metaphors, notions and representations might lead policymakers to look exactly in the wrong direction, and to underestimate the risks associated with (innovation) ecosystems, the term itself is here to stay, at least for the foreseeable future. Political actors have to live with it, by changing the way it is used and understood, and by taking a more radical approach towards implementation and regulation, taking into account the fact that the structures we call “ecosystems” in the business context are small and rather unimportant elements of larger ecosystems. Third, and finally, we believe that a key challenge of coming years is to find technical solutions to ecological problems without falling into the trap of a belief in techno-fixes. Put differently, we need to have ecologically sensible socio-technological *change* without believing in technological *progress*. While the main transformative questions are political and distributive, technology will need to play a role, and we need terms that open an arena for agonistic struggles about this role. Ecosystem terminology might play a role in this respect.

The next section looks at coopetition and symbiosis from a more general point of view, explaining the terms and putting them into context. Section 3 looks at the use of these terms in applied business research and, to some extent, in the field. We look at the academic literature mainly by reviewing meta-studies, as the field has been growing quickly and has produced too many contributions to be reviewed individually. However, we also refer to some of the most prominent and mostly cited works, relying on Google Scholar citation counts and the Web of Science Database. Section 4 looks at the terms from a more critical perspective, making use of the three strands of literature mentioned above. Section 5 concludes.

2. Coopetition and Symbiosis

The term “coopetition” is a portmanteau combining two terms that are usually seen as antidotes: competition and cooperation. The first uses and origin of the term are a little unclear. Quite frequently, Raymond Noorda, CEO of Novell, is credited with inventing it. The term experienced a first boom after the publication of a correspondent book that was seen as a call for rethinking the opportunities that cooperation among competitors can offer (Brandenburger and Nalebuff 1997). Recently, it is increasingly used to describe organizational interactions in “innovation ecosystems” *and on* (material, virtual, and hybrid) platforms.

Coopetition can be described as the simultaneity of cooperation and competition, at different levels, within and among different organizations. A major function of the term is to question mainstream approaches to modelling economic processes. The latter often rely on *competition on markets* as the main coordinating mechanism, setting it in opposition to *cooperation within organization*. This neoclassical view has been very influential in many areas, including in organization studies and the research on capitalist institutions. Contrasting the way mainstream economists integrate cooperative elements in their models with the way coopetition is modelled by mathematicians might be used to illustrate this. In mainstream economics, coopetition can be modelled in the context of a mixed duopoly market (see, for example, Ngo and Okura 2008). Coopetition is a double-edged sword, as the benefits of unfettered competition are reduced through cooperation. There is a tension between different principles that can only be attenuated, but not avoided. In contrast, López-Gómez and Molina-Meyer (2007) present a mathematical model that shows “that strategic alliances in competitive environments (coopetition) might provoke an explosive increment of productivity and stability through a feedback mechanism promoted by cooperation”. Such a description is much more akin to the views that can be observed in the field, where coopetition is often described as a *Deus ex Machina*, such as in the following example:

COOPETITION IN BLOCKCHAIN PROVIDES COMPANIES INVESTIGATING NEW BLOCKCHAIN INITIATIVES AND CONSORTIA THE OPPORTUNITY TO QUICKLY AND COST-EFFECTIVELY ESTABLISH UNIQUE POSITIONS WITHIN A STILL-EVOLVING MARKETPLACE BY LEVERAGING THEIR COMPLEMENTARY STRENGTHS. FOR NEW BUSINESSES, COOPETITION IN BLOCKCHAIN ENABLES THE FASTER DEVELOPMENT OF NEW TECHNOLOGIES AND SOLUTIONS THAT CAN HELP THEM TO TAKE ON LARGER, MORE ESTABLISHED COMPETITORS WHILE, AT THE SAME TIME, DISRUPTING THE MARKET IN WHICH THEY ARE PLAYING.

PAWCZUK ET AL. 2019, P. 2

Terms such as coopetition (or cooperative competition) address a basic problem in societies that attach high importance to market forces: functioning competition requires cooperation between actors, but the relationships among them are characterized by conflicts. In recent decades, this basic problem has gained increasing importance, for several reasons:

- First, there has been an increasing dominance of competition as a social regulatory principle. Even if this development is critically questioned (e.g. in connection with the Covid 19 pandemic), it remains influential. As competition intensified, cooperation became increasingly difficult.
- Second, network-based forms of production have gained in importance. In corresponding structures, there is often an intensification of competition *and* cooperation at the same time. All in all, there was an increasing blurring of organizational boundaries. This in turn poses challenges for actors who moderate the basic conflict between competition and cooperation. Both companies and other actors such as trade unions use demarcation lines to combine internal cooperation with external competition. However, such demarcations are increasingly at odds with new technological possibilities and value creation architectures.
- Third, this development, which is not new in itself, has been reinforced in recent years by digital platforms. These platforms capitalize on the need for cooperation and network structures in the digital sphere and are shielded from competition by their sheer size (owing to economies of scale and scope). They allow a mix of cooperation (for example the joint use of efficient means of payment, appraisal and accounting in online sales) and competition at the cost of becoming excessively powerful and often monopolized structures.

In combination, these developments have led many to question whether there might be better ways and forms to combine the desire for competition with the need for cooperation. “Innovation ecosystems” are seen as places where trust in the existence and stability of these new ways and forms is particularly pronounced.

The term coopetition is closely related and complementary to another buzzword of the innovation ecosystem field, symbiosis. While coopetition largely describes a horizontal relationship (that compete on a more or less level playing field), symbiosis refers to a much larger set of relationships and to much more fundamental and essential interactions. It is also much more closely linked to the idea of an ecosystem, because it shares the origin as a biological term. Most importantly, the concept of symbiosis is needed alongside coopetition to capture the role of “ecosystem leaders”, such as large platform providers or incumbent tech firms.

3. Use in applied business (research)

In applied business research (and also in the field itself), the terms coopetition and symbiosis are instrumentally used as means to achieve certain effects in innovation ecosystems. Forming cooperative or symbiotic structures is often described as a precondition for innovation and business success. Being in symbiosis with other entities of ecosystems is seen as a quintessential feature of ecosystems, in particular those with larger players. The general thrust is to see coopetition and symbiosis as something that can be created, controlled, and managed, in spite of the sporadic reference to problems of complexity.

3.1 Coopetition

The discussion on coopetition gains traction in the 1990ies, around the same time in which “business ecosystems” (Moore 1993) become a much debated topic. In large parts of the business literature, coopetition is mostly seen as a desirable feature of innovative and business-friendly environments (Brandenburger and Nalebuff 1997), a “winning strategy” (Yami et al. 2010). Reviews of the literature (Bouncken et al. 2015; Bengtsson and Kock 2014) usually remark critically that the term is not clearly specified and used very loosely. But even more critical reviews illustrate that, usually, some “positive” outcome can be expected when engaging in coopetition. For example, in a systemic survey of 142 articles selected from an overall body of 593 contributions, (Bengtsson and Raza-Ullah 2016) identify seven outcome dimensions: “innovation performance”, “radical vs. incremental innovation”, “Knowledge sharing, creation, acquisition”, “economic, financial market and competitive firm performance”, “maintenance/failure of relationships”, “trust”, “commitment, learning, and goal fulfillment”. While things can go wrong along some of these dimensions (such as when firm performance suffers or relationships are not maintained) coopetition has the potential to improve on a mere competitive situation when done in the right way. The challenge is not so much in the concept per se, but the processes that need to be managed. These are described as “challenging” and “complex” (Bengtsson and Raza-Ullah 2016, Figure 5), but controllable, even though the more elaborate treatments do refer to issues such as “ambiguity” and “paradox”.

More recently, these general statement are often framed with reference to the challenges of the so called platform economy, especially in the field. The models of platform-based company cooperation currently being discussed under the keyword "coopetition" suggest using digital technologies to offer new solutions to the tension between cooperation and competition. Against the backdrop of the dominance and increasing concentration of large and powerful platform operators, numerous hopes are pinned on distributed company platforms using “coopetition”. The corresponding consortia thus promise solutions for acute problems that arise with the development of a specific platform economy. In particular, they represent possible alternatives to privatized, proprietary infrastructures (Staab 2019), which can pose considerable problems not only for society but also for established businesses, the survival of which is threatened by excessively powerful platform providers. The corresponding decentralized architectures are seen as representing a sensible alternatives to big tech.

In addition, coopetition is often described as a promising form of coordination in costly and research-intensive high-tech sectors, such as Biotech or Information and Communication Technology (Basterretxea et al. 2019). Already the title page of one of the standard references (Brandenburger and Nalebuff 1997) contains numerous hints to its inevitability and describes it as:

1. “A revolutionary mindset”
2. “A strategy that is changing the game of business”

Empirical case studies deal primarily with large, multinational companies and the development of successful, cooperative arrangements, for example between Samsung and Sony, Amazon, Toyota and GM, Renault and Nissan, Toyota, Peugeot and Citroen, Apple and Nike, IBM and Seagate or between different airlines (Basterretxea et al. 2019). Coopetition also appears in the context of trade union work, for example in trade union coordination in multi-employer relationships (Helfen and Nicklich 2014, p. 182), as a form of cooperation between employee companies in certain sectors or as a new principle of organizational cooperation in companies that assign entrepreneurial functions to their employees and teams. Coopetition is often accompanied by certain types of “modern” work organization; it shares various characteristics of project-based work, such as the flexibilization and subjectification of work activities or control via target agreements.

While the opportunities of coopetition dominate the literature, more and more studies also address challenges for companies and their stakeholders. Despite their cooperation, competitors must strike a balance between knowledge sharing and self-protection (Basterretxea et al. 2019). Coopetitive forms of organization are constantly threatened by distrust and the possibility of opportunistic behavior by individual participants. In order to overcome mistrust, a combination of personal relationships, standards, incentive systems and competition rules is usually used. So far, the need for trusting cooperation and an informal exchange has been the main prerequisites for formal cooperation in this context. Ultimately, coopetition has often been described as a type of relationship work (Luo 2007, p. 143).

3.2 Symbiosis

Similar to coopetition, the term symbiosis has entered the business literature before “innovation ecosystems” have been all around. The main reason is that symbiosis is a key concept in any research on “socio-economic ecosystems”, which have a longer history in business administration. While it is usually assumed that, as an academic construct, “innovation ecosystems” have been preceded by “business ecosystems” (Granstrand and Holgersson 2020 describe them as being rooted in the business ecosystem concept of Moore 1993) the term symbiosis is also and in particular important in the specific literature on “industrial ecosystems”, which have been a focus of the literature referring to symbiosis (Mirata and Emtairah 2005; Behera et al. 2012).

In studies on “business ecosystems” more generally, symbiotic relationships are usually described as more or less productive relationships between a keystone species and symbionts. Yoon et al. (2022) provide a systematic review on symbiotic relationships in these systems. Critically reviewing this review, a number of interesting observations emerge.

- First, and reflecting the increasing contextualization of ecosystems with problems of the “platform economy” mentioned above, the authors tend to describe ecosystem as platforms, or as emerging from the logic of the needs of platform architectures. In spite of recurrent references to older contributions based on Moore (1993), the big internet platforms almost seem to serve as role models of ecosystem symbiosis.
- Second, the role of large incumbents is generally described in a rather positive, enabling way. Yoon et al. (2022), for example, based on their detailed analysis of 67 articles selected from 826 contributions, identify only (!) positive effects from “keystone species” on “symbionts” (Yoon et al. 2022, Figure 3), and only one negative potential (“parasitic”) effect from symbionts on the larger actors.
- Third, while the literature acknowledges the existence of mutualistic, commensalistic, *and* parasitic relationships, the focus clearly seems to be on the first two. Parasitic relationships,

3. Use in applied business (research)

which in real world ecosystems are neither bad nor good, but parts of an ecological equilibrium, are seen as something that needs to be avoided.

Finally, the authors see a quite natural tendency for symbiotic relationships to develop away from problems and towards solutions. A move towards mutualism is even seen as something intrinsic to the process of co-evolution characterizing ecosystems (see the quote below).

“MUTUALISM IS THE IDEAL TYPE OF RELATIONSHIP BECAUSE EVERY PARTICIPANT IS BENEFITTING FROM THE RELATIONSHIP. FOR THIS REASON, OTHER TYPES OF SYMBIOSIS, SUCH AS COMMENSALISM AND PARASITISM, EVENTUALLY LEAD TO MUTUALISM THROUGH THE CO-EVOLUTION OF SYMBIONTS TO PURSUE THE MUTUAL BENEFITS FROM SUCH A RELATIONSHIP [34,35]. SYMBIOTIC RELATIONSHIPS CONTRIBUTE TO THE BUSINESS ECOSYSTEM BY POSITIVELY INFLUENCING EVERY PARTICIPANT IN THE FORM OF CO-EVOLUTION SINCE THE HEALTH OF SYMBIOSIS AFFECTS EACH SYMBIONT’S BUSINESS PERFORMANCE”

YOON ET AL. 2022, P. 11

Studies on “industrial ecosystems”, which had a considerable influence on industrial policies within the European Union (EU), speak very directly of “industrial symbiosis” as a concrete form of translating ecosystem dynamics to the business world. A somewhat special feature of this literature is that it more directly asks how public intervention and “design” can help establishing forms of collaboration that qualify as symbiosis. In contrast to the more business-orientated literature, that at least pays lip service to the complexity and associated non-linearity of ecosystem dynamics, the studies of industrial symbiosis very directly admit that their interest in symbiosis is largely instrumental and technocratic. Behera et al. (2012), for example, based on a study of Eco-Industrial Parks (EIPs), reach the following four main policy conclusions:

1. ‘Self-organized’ symbiosis networks may be insufficient for EIP transition
2. Research and development (R&DB) framework for ‘designed’ industrial symbiosis can be devised
3. ‘Designed’ industrial symbiosis networks are viable.
4. Policy instruments like national EIP programs, the presence of public facilitators and enabling frameworks are critical factors “for retro-fitting conventional industrial complexes into EIPs”

In recent years, the term “industrial ecosystem” has been more and more replaced by the term “entrepreneurial ecosystem” (and now “innovation ecosystem”). Most descriptions in the literature on these systems give symbiotic relationships a key role, and instrumentalize them to promote entrepreneurship, which is often assumed to be a solution to pressing social, ecological and economic problems. In fact, much of the literature on “entrepreneurial ecosystems” can be read as attempt to bridge the gap between the *relatively* normative literature on “entrepreneurship” with the *relatively* positivistic literature on ecosystems. Quotes from two frequently cited articles can illustrate this. Cavallo et al. (2019), for example, introduce their paper in the following way:

ENTREPRENEURSHIP HAS BEEN WIDELY RECOGNIZED AS THE ENGINE OF COUNTRIES’ ECONOMIC GROWTH ... TO DATE, THE EXTANT LITERATURE IN ENTREPRENEURSHIP HAS MOSTLY BEEN CONCERNED WITH THE CHARACTERISTICS AND BEHAVIOURS OF INDIVIDUALS OR FIRMS.... THIS IS STILL THE CASE, DESPITE THE LONG LEGACY OF MANY DISCIPLINES... WHERE A STRONG EMPHASIS HAS BEEN PLACED ON THE IMPORTANCE OF THE RELATIONSHIPS BETWEEN ENTREPRENEURS AND THEIR LOCAL ECONOMIC AND SOCIAL CONTEXTS. ... AS A RESULT, A NEW CONCEPT THAT GOES IN THE DIRECTION OF OFFERING A “SYSTEMIC VIEW OF ENTREPRENEURSHIP” HAS RECENTLY EMERGED, KNOWN AS THE ENTREPRENEURIAL ECOSYSTEM (EE).

CAVALLO ET AL. (2019, PP. 1291–1292)

4. Critical Perspectives

Stam and van de Ven (2021) take a similar route:

“...POLICYMAKERS CONCERNED WITH ECONOMIC DEVELOPMENT HAVE SOUGHT TO IDENTIFY POLICY ‘LEVERS’ WITH WHICH TO ENCOURAGE HIGHER LEVELS OF ENTREPRENEURIAL ACTIVITY RESULTING IN ECONOMIC GROWTH AND JOB CREATION BORROWING FROM BIOLOGY, THE METAPHOR OF AN ENTREPRENEURIAL ‘ECOSYSTEM’ IS INCREASINGLY USED BY SCHOLARS ... AND PRACTITIONERS ... FOR UNDERSTANDING THE CONTEXT FOR ENTREPRENEURSHIP IN PARTICULAR TERRITORIES (COUNTRIES, REGIONS, CITIES).”

STAM AND VAN DE VEN 2021, PP. 809–810

Against the backdrop of a rather normative conceptualization of research objectives, it is not surprising that the literature on business, industry, entrepreneurial and innovation “ecosystems” is increasingly choosing examples and applications with a relationship to the solution of actual ecological problems, or appears in journals and academic outlets known to deal with issues of sustainable development (see, for example, Parida et al. 2019; Asgari and Asgari 2021; Min et al. 2021). Increasingly, terms like “circular economy ecosystem” or “circular ecosystem” pop up (Aarikka-Stenroos et al. 2021). We will come back to this observation in part 5 below.

4. Critical Perspectives

The above meta-analysis of meta-studies and of selected individual contributions shows that a substantial number of contributions of the rapidly growing body of literature on cooperation and symbiosis in business environments can be mainly described as “beating-the drum” for new forms of networking and collaboration. These forms are more and more described as “ecosystems” of different kinds. Over time, different “terms” accompany the ecosystem metaphor to a different degree, such as “business”, “industry”, “entrepreneurial”, “innovation” and, more recently, “digital”. By now, a somewhat confusing multitude of ecosystems has been constituted (see Acs et al. 2017; Hakala et al. 2020; Pilinkienė and Mačiulis 2014 for attempts to sort things out).

However, the preceding analysis also shows that an increasing number of articles also appears to be based on an in-depth review of previous contributions, more ambitious empirical inquiries, and on theoretical frameworks that leave room for tensions, paradoxes, and critical distance. Nonetheless, much if not nearly all existing applied literature is characterized by a neglect of several phenomena that are emphasized by studies on the new type of accumulation regime associated with digital technologies, by a relatively uncritical attitude towards progress narratives, and by an unawareness towards the non-human elements of real-world ecosystems.

An interesting feature of much of the literature and discussion on cooperation and symbiosis, also in particular in the specific circumstances of innovation ecosystems, is that power relationships between actors are rarely discussed. If at all, they appear only at the margin. Only few studies address power imbalances in ecosystems directly (see, for example, Cutolo and Kenney 2021). This is surprising, as one could expect them to be of crucial importance:

- The incentives of the orchestrators of many ecosystems, large tech companies, seem to be clearly set: Being close to newcomers allows them to screen potential competitors, avoid disruptions through better technologies, and integrate the best ideas into their own business models.
- Competition among ecosystems (in which innovative start-ups choose those in which they can flourish best with big tech interference) is hindered by the fact that newcomers have a clear

financial interest in establishing relationships to incumbents. There appears to be a rather high risk of collusion.

- Even in ecosystems that are set-up by more neutral (often public or semi-public) actors large tech companies are often present and highly influential. In a study on public-private innovation ecosystems, Asplund et al. (2021) show that, apart from other problems, value creation is often biased “towards incumbent firms and complement challenges”. Moreover, “the need for exploitation knowledge can lead to a biased recruitment of incumbent firms by public leadership.” (Asplund et al. 2021, p. 12)

The buzzwords and metaphors reviewed above might play a crucial role in this respect. The term “symbiosis”, for example, can be easily used to camouflage asymmetric power and business relationships or outright abuse that allows the incumbents of big tech to suppress smaller newcomers and innovations that do not suit their own interest. The literature sometimes refers to these asymmetric structures, but often only to emphasize their net benefit (for an early example, see Baumol 2010). In a similar way, the term co-competition might euphemize attempts to override competition rules and to create closed jobs that disable so called “open innovation” exactly in those spheres that have been established to foster it.

In an even more pronounced manner, discussions about co-competition and symbiosis in business-related ecosystems neglect and ignore critical discourses on progress (Horkheimer and Adorno 1969). On the surface, this might not be very surprising, because much of the business literature is by nature firmly rooted in liberal narratives of change and growth. Upon a closer look, the lack of distance to the paradoxical nature of progress is worth mentioning: Especially because concepts such as symbiosis and co-evolution play such a crucial role, ecosystems have always been recognized as complex constructs characterized by highly non-linear-dynamics and path dependency. The kind of plannable and controllable progress that many envision seems to be rather unlikely in such a context. And the kind of instrumental rationality dominating discourses about innovation ecosystems seems to be highly inconsistent with ecosystem dynamics. The term ecosystem should at least open perspectives on ways co-existence that are not directed in some way, but are about survival and adaption.

It is interesting how the business community and business research have responded to such criticism. Quite recently, a term has gained extreme prominence that appears to heal many of the problems that emerge when ecosystems are too much seen as instruments of progress: Resilience (see, for example, Linnenluecke 2017; Schuster and Stork 2021). On the surface, emphasizing resilience does the trick of bridging the gap between ecosystem logic and business logic, by increasing the weight of the prior and emphasizing abilities usually associated with webs of life. Beneath this surface, however, critical distance remains of the essence. Among many other problems, calling for resilience on all levels (individual, organizational, industry, economy, society, ecosystem) might be inconsistent with the very idea of an ecosystem, where *individually non-resilient* individuals and collectives link into a system to ensure survival. It downplays the potential benefits of precarious constellations (as described convincingly in Tsing 2015). And it shares more of a neoliberal flavor that might be expected at the outset (Joseph 2013).

Rather than morphing from one ecosystem metaphor to the next, business administration scholars should take a serious look at the anthropology and political ecology (Latour 2018) of the “possibilities of life in capitalist ruins”, as Tsing (2015) puts it. This would be a first step to heal the two major weaknesses and dangers of the existing literature on human-made “ecosystems”: Their excessive trust in “innovation” and “progress” discussed in the paragraph before, and the lack of attention they pay to the fact that “innovation ecosystems” are themselves only small parts of larger webs of life.

5. Concluding Remarks

We reveal a pronounced disaccord between the normative charge of the notions and narratives of “business/innovation/industry/digital/entrepreneurial/circular ecosystems” and the potential risks laid bare by more critical perspectives. On the one hand, some of the normative notions of applied “ecosystem” research seem to be partly vindicated by the institutional and organizational features and logics observed in the field. On the other hand, we find many reasons to believe that existing metaphors, notions and representations might lead policymakers to look exactly in the wrong direction, and to underestimate the risks associated with “innovation ecosystems”, such as the increasing power of platform operators, the abuse of data, or their ecological footprint.

Against this backdrop, it might look reasonable to abolish the metaphorical world of ecosystems altogether. For three reasons, we would rather refrain from such a radical advice for policymakers.

- First, the literature is developing quickly, and becoming more nuanced and aware of its limitations. It should have a chance to develop and to integrate criticism such as the one on hand. Some of this criticism is actually already taken on board, and used to defend the “eco” in ecosystem (Ritala and Almpantopoulou 2017). Even the question of the reliance of man-made “ecosystems” on actual ecosystem services might be discussed more seriously in the future, as attempts to create “circular (economy) ecosystems” lack any credibility if they do not put webs of life first.
- Second, even though we find many reasons to believe that existing metaphors, notions and representations might lead policymakers to look exactly in the wrong direction, and to underestimate the risks associated with (innovation) ecosystems, the term itself is here to stay, at least for the foreseeable future. Political actors have to live with it, by changing the way it is used and understood, and by taking a more radical approach towards implementation and regulation, taking into account the fact that the structures we call “ecosystems” in the business context are small and rather unimportant elements of larger ecosystems.
- Third, and finally, we believe that a key challenge of coming years is to find technical solutions to ecological problems without falling into the trap of a belief in techno-fixes. Put differently, we need to have ecologically sensible socio-technological *change* without believing in technological *progress*. While the main transformative questions are political and distributive, technology will need to play a role, and we need terms that open an arena for agonistic struggles about this role. Ecosystem terminology might play a productive role in this respect. For example, all the talk about coopetition on digital platforms can play a role in thinking about networks without proprietary and privatized platform architectures.

Rather than abolishing the ecosystem metaphor and its narrative elements altogether, policymakers should answer pressures to help in the establishment of respective structures with critical questions, and then help those who give the best answers: Have you thought about the ecological footprint of your “ecosystem”? Are you aware of the fact that it is merely a small and rather unimportant actor in a much bigger, more important network? And what are your plans to take into account the entanglements between “your” and the “real” ecosystem. Are you aware of the asymmetric power relations that characterize platform and surveillance capitalism? Will tech save us? Do you believe in progress *or* in the need for progressive solutions to socio-ecological problems? What does it mean to be progressive?

6. References

- Aarikka-Stenroos, Leena; Ritala, Paavo; Thomas, Llewellyn D. W. (2021): Circular economy ecosystems: a typology, definitions, and implications. In : *Research Handbook of Sustainability Agency*: Edward Elgar Publishing, pp. 260–276.
- Acs, Zoltan J.; Stam, Erik; Audretsch, David B.; O'Connor, Allan (2017): The lineages of the entrepreneurial ecosystem approach. In *Small Business Economics* 49 (1), pp. 1–10. DOI: 10.1007/s11187-017-9864-8.
- Asgari, Amir; Asgari, Reza (2021): How circular economy transforms business models in a transition towards circular ecosystem: the barriers and incentives. In *Sustainable Production and Consumption* 28, pp. 566–579. DOI: 10.1016/j.spc.2021.06.020.
- Asplund, Fredrik; Björk, Jennie; Magnusson, Mats; Patrick, Adam J. (2021): The genesis of public-private innovation ecosystems: Bias and challenges ☆. In *Technological Forecasting and Social Change* 162, p. 120378. DOI: 10.1016/j.techfore.2020.120378.
- Basterretxea, Imanol; Charterina, Jon; Landeta, Jon (2019): Coopetition and innovation. Lessons from worker cooperatives in the Spanish machine tool industry. In *Journal of Business & Industrial Marketing* 34 (6), pp. 1223–1235. DOI: 10.1108/JBIM-01-2018-0015.
- Baumol, William J. (2010): *The Microtheory of Innovative Entrepreneurship*. Princeton, N.J., Baltimore, Md.: Princeton University Press; Project MUSE (The Kauffman Foundation series on innovation and entrepreneurship).
- Behera, Shishir Kumar; Kim, Jung-Hoon; Lee, Sang-Yoon; Suh, Sangwon; Park, Hung-Suck (2012): Evolution of ‘designed’ industrial symbiosis networks in the Ulsan Eco-industrial Park: ‘research and development into business’ as the enabling framework. In *Journal of Cleaner Production* 29-30, pp. 103–112. DOI: 10.1016/j.jclepro.2012.02.009.
- Bengtsson, Maria; Kock, Sören (2014): Coopetition—Quo vadis? Past accomplishments and future challenges. In *Industrial Marketing Management* 43 (2), pp. 180–188. DOI: 10.1016/j.indmarman.2014.02.015.
- Bengtsson, Maria; Raza-Ullah, Tatbeeq (2016): A systematic review of research on coopetition: Toward a multilevel understanding. In *Industrial Marketing Management* 57, pp. 23–39. DOI: 10.1016/j.indmarman.2016.05.003.
- Bouncken, Ricarda B.; Gast, Johanna; Kraus, Sascha; Bogers, Marcel (2015): Coopetition: a systematic review, synthesis, and future research directions. In *Review of Managerial Science* 9 (3), pp. 577–601. DOI: 10.1007/s11846-015-0168-6.
- Brandenburger, Adam M.; Nalebuff, Barry J. (1997): *Co-Opetition*. New York: Currency.
- Cavallo, Angelo; Ghezzi, Antonio; Balocco, Raffaello (2019): Entrepreneurial ecosystem research: present debates and future directions. In *International Entrepreneurship and Management Journal* 15 (4), pp. 1291–1321. DOI: 10.1007/s11365-018-0526-3.
- Cutolo, Donato; Kenney, Martin (2021): Platform-Dependent Entrepreneurs: Power Asymmetries, Risks, and Strategies in the Platform Economy. In *AMP* 35 (4), pp. 584–605. DOI: 10.5465/amp.2019.0103.
- Godin, Benoit. (2015): *Innovation contested. The idea of innovation over the centuries*. New York: Routledge (Routledge Studies in Social and Political Thought). Available online at <https://www.taylorfrancis.com/books/mono/10.4324/9781315855608/innovation-contested-beno%c3%aet-godin>.

- Granstrand, Ove; Holgersson, Marcus (2020): Innovation ecosystems: A conceptual review and a new definition. In *Technovation* 90-91, p. 102098. DOI: 10.1016/j.technovation.2019.102098.
- Hakala, Henri; O'Shea, Gregory; Farny, Steffen; Luoto, Seppo (2020): Re-storying the Business, Innovation and Entrepreneurial Ecosystem Concepts: The Model-Narrative Review Method. In *Int J Management Reviews* 22 (1), pp. 10–32. DOI: 10.1111/ijmr.12212.
- Haraway, Donna J. (1984): Class, race, sex, scientific objects of knowledge. A socialist-feminist perspective on the social construction of productive nature and some political consequences. In, pp. 212–229.
- Helfen, Markus; Nicklich, Manuel (2014): Gewerkschaften zwischen Konkurrenz und Kooperation? Inter-organisationale Beziehungen in der Facility Services-Branche. In, pp. 181–204.
- Horkheimer, Max; Adorno, Theodor W. (1969): *Dialektik der Aufklärung. Philosoph. Fragmente.* Frankfurt a.M.: S. Fischer.
- Joseph, Jonathan (2013): Resilience as embedded neoliberalism: a governmentality approach. In *Resilience* 1 (1), pp. 38–52. DOI: 10.1080/21693293.2013.765741.
- Latour, Bruno (2007): *Reassembling the social. An introduction to Actor-Network-Theory.* Oxford: Oxford University Press (Clarendon lectures in management studies). Available online at https://www.ufrgs.br/ppgas/portal/arquivos/orientacoes/LATOUR_Bruno._2012.pdf.
- Latour, Bruno (2018): *Das terrestrische Manifest. 4. Auflage 2020, Sonderdruck.* Berlin: Suhrkamp (Edition Suhrkamp Sonderdruck).
- Linnenluecke, Martina K. (2017): Resilience in Business and Management Research: A Review of Influential Publications and a Research Agenda. In *Int J Management Reviews* 19 (1), pp. 4–30. DOI: 10.1111/ijmr.12076.
- López-Gómez, J.; Molina-Meyer, M. (2007): Modeling coopetition. In *Mathematics and Computers in Simulation* 76 (1-3), pp. 132–140. DOI: 10.1016/j.matcom.2007.01.035.
- Luo, Yadong (2007): A coopetition perspective of global competition. In *Journal of World Business* 42 (2), pp. 129–144. DOI: 10.1016/j.jwb.2006.08.007.
- Mars, Matthew M.; Bronstein, Judith L.; Lusch, Robert F. (2012): The value of a metaphor. In *Organizational Dynamics* 41 (4), pp. 271–280. DOI: 10.1016/j.orgdyn.2012.08.002.
- Min, Zhejun; Sawang, Sukanlaya; Kivits, Robbert A. (2021): Proposing Circular Economy Ecosystem for Chinese SMEs: A Systematic Review. In *International journal of environmental research and public health* 18 (5). DOI: 10.3390/ijerph18052395.
- Mirata, Murat; Emtairah, Tareq (2005): Industrial symbiosis networks and the contribution to environmental innovation. In *Journal of Cleaner Production* 13 (10-11), pp. 993–1002. DOI: 10.1016/j.jclepro.2004.12.010.
- Moore (1993): Predators and prey: a new ecology of competition. In *Harv. Bus. Rev.* 71 (3), p. 75.
- Ngo, Duc de; Okura, Mahito (2008): Coopetition in a Mixed Duopoly Market 12, pp. 1–9. Available online at <https://core.ac.uk/download/pdf/6421182.pdf>.
- Oh, Deog-Seong; Phillips, Fred; Park, Sehee; Lee, Eunghyun (2016): Innovation ecosystems: A critical examination. In *Technovation* 54, pp. 1–6. DOI: 10.1016/j.technovation.2016.02.004.
- Parida, Vinit; Burström, Thommie; Visnjic, Ivanka; Wincent, Joakim (2019): Orchestrating industrial ecosystem in circular economy: A two-stage transformation model for large manufacturing companies. In *Journal of Business Research* 101, pp. 715–725. DOI: 10.1016/j.jbusres.2019.01.006.

6. References

- Pilinkienė, Vaida; Mačiulis, Povilas (2014): Comparison of Different Ecosystem Analogies: The Main Economic Determinants and Levels of Impact. In *Procedia - Social and Behavioral Sciences* 156, pp. 365–370. DOI: 10.1016/j.sbspro.2014.11.204.
- Ritala, Paavo; Alamanopoulou, Argyro (2017): In defense of ‘eco’ in innovation ecosystem. In *Technovation* 60-61, pp. 39–42. DOI: 10.1016/j.technovation.2017.01.004.
- Schumpeter, Joseph A.; Swedberg, Richard (2021): The theory of economic development. London, New York: Routledge (Routledge classics). Available online at <https://www.taylorfrancis.com/books/9781003146766>.
- Schuster, Armin; Stork, Werner (2021): Gesellschaftliche Resilienz und Neugier in VUCA-Welten: Neue Aufgaben und Perspektiven für Staat, Verwaltung und Bürger. Darmstadt: Hochschule Darmstadt, Fachbereich Wirtschaft, Zentrum für Nachhaltige Wirtschafts- und Unternehmenspolitik ZNWU (ZNWU Discussion Paper, 8). Available online at <https://www.econstor.eu/handle/10419/247779>.
- Srnicek, Nick; Schäfer, Ursel (2018): Plattform-Kapitalismus Nick Srnicek ; aus dem Englischen von Ursel Schäfer. Hamburg: Hamburger Edition.
- Staab, Philipp (2019): Digitaler Kapitalismus. Markt und Herrschaft in der Ökonomie der Unknappheit Philipp Staab. Berlin: Suhrkamp.
- Stam, Erik; van de Ven, Andrew (2021): Entrepreneurial ecosystem elements. In *Small Business Economics* 56 (2), pp. 809–832. DOI: 10.1007/s11187-019-00270-6.
- Tsing, Anna Lowenhaupt (2015): The Mushroom at the End of the World. On the Possibility of Life in Capitalist Ruins. Princeton, N.J.: Princeton University Press.
- Yami, Said; Castaldo, Sandro; Dagnino, Giovanni Battista (2010): Coopetition. Winning Strategies for the 21st Century. Cheltenham: Edward Elgar Publishing Limited.
- Yoon, Changhee; Moon, Seungyeon; Lee, Heesang (2022): Symbiotic Relationships in Business Ecosystem: A Systematic Literature Review. In *Sustainability* 14 (4), p. 2252. DOI: 10.3390/su14042252.
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