Introduction: Helping birds to fly: Introducing start-up incubation ecosystems

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INTRODUCTION

Start-up firms play a critically important role in the development of our economy. Through the process of creative destruction (Schumpeter, 1934), the new replaces the old, and soon, a significant share of economic activity will be performed by firms that do not exist today. Start-ups create jobs, improve economies, increase social mobility, facilitate innovation, and generate other benefits (Aldrich & Ruef, 2006). They serve as engines of regional development (Fritsch & Mueller, 2004) and bring to life innovations that contribute to resolving global challenges (Fini, Rasmussen, Siegel, & Wiklund, 2018). Indeed, the promotion of entrepreneurial activity is often a key ingredient in economic and social development policies (McCann & Ortega-Argilés, 2016). However, start-ups do not occur and develop in a vacuum. Just as no man is an island, no start-up is an island. Instead, they grow in close interaction with their surrounding environments, leveraging existing resources, and engaging in exchange with other parties (Gnyawali & Fogel, 1994; Van de Ven, 1993). The types of resources and relationships established during the early years have a formative influence on the development, growth and performance of start-ups (Beckman & Burton, 2008).

More recently, the notion of an entrepreneurial ecosystem has become a famous analogy for understanding the role of the environment in entrepreneurship (Malecki, 2018; Mason & Brown, 2014). The analogy stems from the similarity between the life and development of living organisms in natural ecosystems and those of start-ups in entrepreneurial ecosystems. Living beings represent complex structures that need constant energy supplies obtained from their environment to survive and grow. Their environments constitute multi-layered systems that provide them with external energy that is passed on from one trophic level to the next (i.e., solar energy, plants, herbivores, and predators) until decomposers return nutrients to the environment. This large community of interdependent living beings, together with the nonliving components of the environment,

make up an ecological system or ecosystem. Similar to natural ecosystems, entrepreneurial ecosystems comprise complex and diverse networks of organizations, individuals, and other environmental components that interact to influence entrepreneurial activity and economic functioning in a particular context, region, or locality. A fundamental feature of ecosystems, either natural or entrepreneurial, is that each organism/organization must use some energy/resources that they receive from other organisms/organizations to survive.

Like organisms in natural ecosystems, innovative new firms, often referred to as start-ups, are embedded in an ecosystem which helps or hinders their access to resources and thus influences their development and impact (Spigel & Harrison, 2018; Spilling, 1996). Many initiatives have been implemented to support start-ups, such as incubators (Bergek & Norrman, 2008), accelerators (Shankar & Shepherd, 2018), outside assistants (Chrisman & McMullan, 2004) and government funding mechanisms (Rasmussen & Sørheim, 2012). These initiatives aim to provide “life energy” in the form of various resources for start-ups to survive, grow and contribute to social and economic impact. Studies often look at these support mechanisms in isolation, while their effectiveness depends on the context in which they operate (Brown, Gregson, & Mason, 2016). Different natural ecosystems, for example, a tropical evergreen forest and a desert, differ in both the numbers and types of species as well as in physical components such as vegetation, soil type, rainfall, and temperature. Such contextual differences make it hard to compare populations in different locations because the variation in species richness and abundance is influenced by indigenous environmental factors (Naeem et al., 1999). Similarly, when comparing firms in two different ecosystems, the variations in the number and success of start-ups is partly due to differences in various framework conditions, available resources, and support mechanisms. While firms in poorer ecosystems with weaker prospects for growth seem to be less successful at first sight, they may be quite effective in adjusting their goals and means to their environment. By the same token, policymakers must consider the characteristics of a particular context before setting economic goals or emulating practices of ecosystems with entirely different resource profiles. Hence, the ecosystem analogy is valuable to entrepreneurship research because it conceptually addresses the need for more knowledge on how start-ups interact with and are in turn influenced by, their environment (Audretsch, Cunningham, Kuratko, Lehmann, & Menter, 2019).

Drawing on extant entrepreneurship ecosystems literature (Acs, Stam, Audretsch, & O'Connor, 2017; Autio, Nambisan, Thomas, & Wright, 2018; Spigel, 2017; Spigel & Harrison, 2018; E. Stam, 2015; F. Stam

& Spigel, 2016), this book seeks to conceptualize, provide empirical examples, and discuss different aspects of start-up incubation ecosystems (SUPIEs), defined as *a set of interdependent actors and factors that interact in a system to provide a nurturing environment for the creation and successful development of start-ups*. The distinct value of this concept is that it directs attention to the incubation of start-ups as a critical activity and function within entrepreneurship ecosystems. As a concept, incubation has mainly been studied in conjunction with incubators (Hackett & Dilts, 2004; Mian, Lamine, & Fayolle, 2016). Incubators, however, are only one of the many elements and organizations within an ecosystem that take part in the process of incubating start-ups. Typically, start-ups receive value-adding contributions from several external actors, such as universities, Technology Transfer Offices (TTOs), investors, government agencies, other start-ups, as well as large firms. The multitude of actors involved in start-up development implies that incubation at the ecosystem level should be conceptualized in a more holistic, cooperative, collective, and distributed way. However, while scattered evidence suggests that incubation is a crucial process at the level of entrepreneurial ecosystems, we have limited insight into its nature, sources, antecedents and performance implications. The concept of SUPIE directs attention to the role ecosystems play in incubation, i.e., the formation, validation and early development of start-ups.

A better understanding of SUPIEs is vital for entrepreneurship policy, practice, and research. The existing literature provides limited knowledge on what kind of support, how much support, and in what context it is likely to result in the creation and growth of new firms with a positive impact on social and economic progress. It is difficult to emulate a thriving ecosystem such as Silicon Valley, as organizations and individuals are more comfortable to study in isolation, and the domain where their interactions take place, where resources flow from one actor to another to create value for both, is intricate and often invisible to the researcher's and policymaker's eyes.

Conceptualizing SUPIEs: How Much Help Do Birds Need to Fly?

A key idea in SUPIEs is the process of incubation. The term incubation is also an analogy from biology related to keeping an organism under optimal conditions to develop. An egg incubator is a device creating perfect conditions for eggs to hatch, and the term business incubator has become well-established to describe organizations dedicated to helping start-ups develop and grow (Bergek & Norrman, 2008; Bruneel, Ratinho, Clarysse, & Groen, 2012; Grimaldi & Grandi, 2005). The literature on incubation

initially focused on the creation of sheltered environments for start-ups, often in terms of physical infrastructure below market prices (Bruneel et al., 2012). The usefulness of this approach has been questioned because such sheltered environments are not necessarily well suited to prepare start-ups for future success in the market. Incubators are increasingly offering a broader set of support services including training, coaching, networking, and access to financing (Bergek & Norrman, 2008; Bruneel et al., 2012). The broadening scope of incubation activities reflects that not all start-ups develop in the same way or need the same amount of protection and the same type of external resources to find their place as a standalone business.

The analogy of how young birds hatch and become independent in natural ecosystems can be used to illustrate the diverse incubation needs of start-ups. The early development of birds, i.e., the period from laying an egg until the young bird separates from its parents, varies a lot primarily based on the particular species. Their maturity at hatching has important implications for how their parents should care for the nestlings and what kind of environment they need to survive and grow. At the one end of the spectrum are *precocial birds*, e.g., domestic chicken, duck, or megapodes, which hatch with eyes open, covered with down, and leave the nest within a day or two after hatching. Precocial young birds require limited parental care as they can walk, run, swim, and feed self-sufficiently just a few hours after the breakout. At the other end of the spectrum are *altricial birds*, e.g., songbirds, which hatch with their eyes closed, have little or no down and are incapable of leaving the nest to join their parents whom they rely on for food. In between the two ends of the spectrum, there are several different levels of independence. For example, semi-precocial birds can leave the nest soon after hatching, but they stay at the nest and are fed by their parents for a while.

Similar to young birds, the needs of start-ups during incubation, i.e., roughly from drafting a business idea until the firm establishes itself on the market, may be very different depending on the nature of the firm. For example, academic spin-offs that commercialize new to the market technologies may be more similar to altricial chicks, as they typically have many liabilities and require more support (e.g., in the form of financial resources and business/entrepreneurial competencies) and longer incubation times before they gain sustainable returns (Rasmussen, Mosey, & Wright, 2011; Vohora, Wright, & Lockett, 2004). Scalable software start-ups, in contrast, may be more like precocial hatchlings, since they are more independent right from their birth and can develop relatively quickly, find business partners, customers, and their place in the market. Other characteristics, such as a high level of human capital among the

founders (Colombo & Grilli, 2005), can also make a start-up resemble a precocial arrival. Hence, there is not one optimal type of SUPIE because new ventures have different preconditions, pursue different goals, and face various organizing problems.

There are further parallels between the birth and growth of young birds and those of start-up firms. For example, filial imprinting, a theory borrowed by entrepreneurship scholars from ethology, is typical of precocial birds and primarily occurs during the first day or first hours after hatching. Because of imprinting, young birds such as ducklings start following the first large moving object, ideally their mother (incubator organization), to minimize threats from the surrounding environment, such as adverse weather, predators (competition) and the lack of nutrition (resources). Similarly, environmental conditions at founding have been found to imprint upon a new venture in ways that affect growth and survival (Mathias, Williams, & Smith, 2015). As chicks grow and develop, they will undergo another imprinting, one that provides recognition of their species, so that they can establish proper social interactions with their kind later in life. Likewise, new ventures build legitimacy and acquire resources by conforming to their environment (Vestrum, Rasmussen, & Carter, 2017; Zimmerman & Zeitz, 2002). Moreover, the decision of birds is influenced by the breeding experience of their conspecifics when they select breeding habitats. For example, cliff-nesting seabirds tend to recruit to the previous year's most productive cliffs and to emigrate from the least productive ones (Danchin, Boulinier, & Massot, 1998). In a similar fashion, innovative start-ups tend to locate close to universities to access knowledge spillovers (Audretsch, Lehmann, & Warning, 2005).

Conceptualizing SUPIEs: How Does the Environment Help Birds to Fly?

Analogies from birdlife show that birth and survival in natural ecosystems bear many similarities with how SUPIEs are conducive to the creation and development of new ventures. The optimal conditions for firm growth are likely to depend on the type of the start-up and that of its environment, like different types of young birds need different kinds of support from their parents in different habitats. The concept of entrepreneurial ecosystems has been critiqued for drifting away from the assumptions of the original inspiration in natural ecosystems (Isenberg, 2016). In the following paragraphs, we outline five key points that can be translated from the biological analogies to the SUPIE context and then link them to the main topics discussed in the chapters. It is proposed that SUPIEs, similar to natural ecosystems, are *multilayered*, *spontaneous*, *connected*, *complex*, and *multipurpose*.

First, in nature, there is a healthy interdependence among organisms at different levels of the ecosystem. Each trophic level absorbs energy obtained from the level below it and also transfers some of it to the next level – this upward energy flow is often depicted in an ecological pyramid that illustrates the relative abundance of biomass among trophic levels (Trebilco, Baum, Salomon, & Dulvy, 2013). Similarly, resources from different layers of the ecosystem are of crucial importance for start-ups and the functioning of SUPIEs. While all ecosystem layers (micro, meso, and macro) contain essential elements, the chapter by *Sardeshmukh, O'Connor, and Smith*, for instance, shows that the essence of the ecosystem is the middle layer, where the interactions and interdependencies among individuals and organizations create something more than the mere sum of bilateral relationships. The intermediate ecosystem level is the domain where we can understand the relationship between the parts and the whole. Some start-ups may need a more sheltered environment initially, obtain more resources from other actors at the meso-level, while others are born with better-developed capabilities or can make better use of the resources available in their immediate microenvironment. The chapter by *Breivik-Meyer* reviews the literature on organizational sponsorship and aims to improve the understanding of the mechanisms supporting start-ups, and how they are aligned with the needs of these firms.

Second, the components valuable to start-ups in a SUPIE may be in place for reasons other than supporting the development of firms. In nature, the ultimate goal of individual organisms is to survive and reproduce, but at the same time, each is used by other organisms that also want to survive and reproduce. Red-billed oxpeckers, for example, eat everything (tick, dead skin, blood, etc.) they can collect on large African mammals, whose primary purpose is not feeding birds. The role or usefulness of the components of an ecosystem depends on the perspective taken, or the purpose and needs of the particular organism analyzed. In our case, while some actors of a SUPIE may intentionally support start-ups, like a business incubator or tax break scheme for start-up investing, most of the components and actors do not. For example, a particular new technology/digital platform or an expanding market may provide excellent opportunities for start-ups to succeed, but they may be in place for different reasons. The chapter by *Ratinho*, for example, suggests a more holistic approach to start-up support including both the antecedents of entrepreneurial activity (e.g., entrepreneurial competence development) and policy tools that shape the broader environment not necessarily targeted at start-ups. The chapter by *Lesniak and Sorheim* provides an intriguing account of how an entrepreneurial ecosystem emerged spontaneously, as a result of bottom-up processes, rather than a product of an overall plan. Their case

supports the view that ecosystems are not centrally controlled and cannot be created or designed – they can only be affected, influenced or facilitated (Isenberg, 2016). The spontaneous nature of SUPIEs is further elaborated in the chapter by *Rasmussen, Benneworth, and Gulbrandsen*, who advocate a broader understanding of why universities should be motivated to contribute to start-up incubation.

Third, the boundaries of a natural ecosystem are hard to define because adjacent ecosystems are often connected through flows of energy, materials, and organisms (Banks-Leite & Ewers, 2009). The same applies to conceptualizations of SUPIEs, where the flow of financial, human, and other resources can easily cross the boundaries of an individual ecosystem. Hence, both natural and start-up incubation ecosystems are often defined based on the interest or interpretation of the researcher. For example, a biologist may choose to study the ecosystem of a pond, forest, or mountain. Similarly, entrepreneurship researchers can also focus on smaller environments such as a group of students and professors as shown by *Lesniak and Sørheim*, and larger ones such as a town or region. Among the chapters in this book, SUPIEs are linked to, for instance, universities (chapters in *Part III*), cities (*Landoni*), and regions (*Velt, Torkkeli, & Saarenketo*). Ecosystems are always in contact with adjacent ecosystems, and their boundaries are often difficult to define, both in theory and practice. The chapters in this book illustrate this nicely. *Nguyen, Mariussen, and Hansen* scrutinize the boundaries of the SUPIE concept by comparing it to other similar theoretical approaches, such as entrepreneurial ecosystems and (regional) innovation systems. The chapter by *Landoni* indicates that there might be separate SUPIEs centred around different universities within the same city. Some ecosystems cross national borders to provide an optimal combination of resources, as shown by *Velt et al.* However, it is difficult to claim that there are national ecosystems because there is too much variation within a country to identify a standard set of ecosystem properties.

Fourth, in natural ecosystems, there is more than one type of food source for most organisms. Food chains can be so complicated, intersecting, and overlapping that they resemble a “food web” (Pimm, Lawton, & Cohen, 1991) rather than a linear sequence of organisms. This analogy implies that a broad array of different actors and factors at different levels of the ecosystem need to be included to capture the whole essence of SUPIEs. Still, studies looking at one actor or a fragment of the system are necessary to understand the role of individual SUPIE components; several chapters in this book study specific actors within a SUPIE. *Kolvreid and Isaksen* study the role of the government and banks, *Nordling, Thomas, Pugh, and Hermann* examine the contribution of multinational companies, while *Jensen, Nguyen, and Hansen* as well as *Straub, Bican, and Brem* investigate

the outcomes and business models of incubators. While essential, studies of individual actors cannot be seen as representing the entire system. For example, an incubator organization is only one element of a broad range of actors and factors providing an environment for start-ups. A couple of chapters study the behaviour and characteristics of a group of support organizations. *Novotny*, for example, proposes a taxonomy for ecosystems networks, i.e., groups of actors whose resources are typically used in combination by start-ups, and suggests that the main task of the university TTO is to bridge these isolated networks and facilitate the flow of different types of resources to spin-off firms. *Theodoraki and Messegem* show that the interactions of start-up supporting organizations are characterized by both cooperation and competition, i.e., coopetition, depending on the phase of firm development. *Bellavitis, Sargent, and DaSilva* point to the differences between the main types of start-up support organizations and suggest that nascent entrepreneurs should be guided towards particular ones that may best meet their needs and stage of development.

Finally, because of their inherent complexity and variation, it is hard to grasp the purpose and performance of ecosystems in general. Natural ecosystems have a certain level of biodiversity (species richness), productivity (rate of generation of biomass) and stability (resistance to environmental perturbations); these dimensions are in close connection with one another. Their performance or rather functioning can be quantified by measuring the magnitudes and dynamics of ecosystem processes (Naeem et al., 1999). SUPIEs can be evaluated by their ability to create and develop successful start-ups, and some chapters in this book study the performance of start-ups. *Johnson, Masyn, and McKelvie*, for instance, point out that start-ups can have different goals compared to other firms; thus, researchers assessing their performance should go beyond continuous measures such as sales and employment, and consider survival outcomes such as failure, merger, and acquisition. *Billström* draws attention to the broader, societal impact of some spin-off firms, which by diffusing innovative technologies can bring about long-term benefits for the society. Yet, similar to the success of populations and species in natural ecosystems, start-up success is also highly dependent on SUPIE processes, on the effective and efficient distribution, absorption, and recombination of resources. *Grande and Carlsson* suggest that the cooperation between supporters and start-ups is more burdensome but also more important in a rural/nature-based context than in urban/high growth industries. A rich start-up support system that includes several sources and types of resources is more likely to result in a more stable ecosystem that permanently and reliably provides new firms with the required life energy. So, in addition to productivity (high rate of start-up generation), diversity (multiple types and sources of support)

and stability (resistance to external economic shocks) are also important attributes of successful SUPIEs.

OUTLINE OF THE SUPIE HANDBOOK

The chapters of the handbook are divided into three main groups: (1) holistic or multi-level approaches that try to capture the essence and/or study several layers and outcomes of SUPIEs; (2) start-up support mechanisms and organizations such as incubators, accelerators, co-working spaces, government agencies, banks, and multinational companies; and (3) university-based ecosystems and the role of universities in SUPIEs.

The chapters in *Part I* aim to understand the goal and functioning of the whole system of start-up incubation. Their methods are varied; some are conceptual or literature-based, while others build on empirical data primarily from Scandinavian countries. They cover several SUPIE elements at a time, a larger geographical area, different outcomes, or use a multi-level approach demonstrating the various dimensions of SUPIEs. The chapter by *Nguyen, Mariussen, and Hansen* studies the role of smart specialization in establishing sustainable entrepreneurial ecosystems and in connecting innovation policies with SUPIEs. The authors also contrast the different systems approaches to entrepreneurship and innovation and regard SUPIE as the core of ecosystems of various magnitudes. *Sardeshmukh et al.* develop a multi-level view of SUPIE to explain the bottom-up emergence of ecosystem resources through the “transactional configurations” between the micro (individuals) and meso (organizational forms) levels that give rise to “coalesced” attributes at the macro ecosystemic level. *Ratinho*, drawing on nascent entrepreneurial ecosystem literature also suggests that entrepreneurship support manifests itself at three domains: the institutional level shapes the environment in which entrepreneurs operate; at the organizational level start-ups obtain resources; while at the individual level they develop entrepreneurial skills. *Good and Knockaert* compare technology transfer ecosystems at eight Scandinavian universities to identify the key micro-, meso- and macro-level drivers that affect the overall organizational design of ecosystems in a university context. Geographical considerations are also important when analyzing SUPIEs. The elements and resources of a peripheral/rural SUPIE can differ from those of urban/high growth areas, which have important implications on how nature-based start-ups are (and should be) incubated in rural ecosystems (*Grande & Carlsson*). There is no limit in scale, either lower or upper, to the SUPIE concept, which can refer to environments as small as a university class (as shown by *Lesniak and Sorheim* in *Part III*) and ones that reach over national borders.

Regarding the latter, the chapter by *Velt et al.* examines the qualities of a transnational SUPIE and finds that born-global start-ups perceive less observable elements, such as talent and knowledge, as the most critical for their development. SUPIEs are complex and diverse, thus when researchers want to evaluate their performance, they have to understand the goals (potential outcomes) and nature of the firms they comprise and use descriptive and exploratory plots before applying more sophisticated multivariate statistical procedures (*Johnson et al.*).

Part II includes a literature review and empirical data from Brazil, France, New Zealand, Norway, the U.S., and several other countries, to deal with organizations engaged in start-up incubation and support. These chapters show that start-up support mechanisms are complex and support organizations are heterogeneous, and their differences are mainly based on the development phase and needs of their clients and stakeholders. The incubation (or sponsorship) process can include services related to “buffering”, “bridging”, and “boosting” provided by private, government, academic and non-governmental organizations, to different types of firms, at different stages of development, having different goals such as emergence, survival, and growth (*Breivik-Meyer*). Start-up development organizations are quite diverse and can be classified as (traditional and university) incubators, (traditional and corporate) accelerators, co-working spaces, or hybrid, each having different peculiarities, business logic, clientele and goals (*Bellavitis et al.*). There is an increasing need for establishing financially sustainable or self-sufficient incubators, which can cover expenses with their own revenues (*Straub et al.*). At the same time, support organizations simultaneously compete and cooperate, however, their “coopetition” strategies change during the incubation process from competition-dominated through equal to cooperation-dominated relationships (*Theodoraki & Messeghem*). In addition to financial sustainability, there is a growing need for “conscious” support organizations that place a stronger emphasis on incorporating social and environmental concerns into their business models and practices (*Kassel et al.*). The incubation process can be targeted at firms and individuals; the outcomes of the latter may manifest through founders’ champion behaviour (*Jensen et al.*). This section also concerns the role of powerful SUPIE-shaping institutions, i.e., the national government, banks, and large (multinational) firms. While multinational companies appear to successfully amalgamate the interests of the local community, such as developing local business ecosystems, with their own growth and market development motives (*Nordling et al.*), government finance and good advice seem to have a weak relationship with firm births and successive outcomes, especially compared to those of banks (*Kolvereid & Isaksen*).

Finally, relying on data from Italy, Japan, Norway, and South Africa, the chapters in *Part III* present a special case of SUPIE, i.e., university-based ecosystems. The role of universities in academic entrepreneurship and SUPIEs is often associated with the activities of the Technology Transfer Office, but TTOs seem to be limitedly useful in bridging firms with non-academic/private ecosystem actors, which would be vital in integrating spin-offs into SUPIEs (*Novotny*). Individual factors also play an essential part in university-based ecosystems. Entrepreneurial academics and students can provide life energy in the form of information, role models, and inspiration for emerging SUPIEs (*Lesniak & Sørheim*). Furthermore, students' real-life entrepreneurial experience and those of their important others (*Åmo et al.*), and the principal investigators' commercialization experience (*Modic & Yoshioka-Kobayashi*) impact start-up intention and formation. Universities can encourage the internationalization of spin-offs by fostering an internationally oriented organizational culture (*Jørgensen & Novotny*) and can generate societal impacts by creating and coordinating other support organizations in the academic entrepreneurship ecosystem (*Billström*). The decisions and strategies of spin-off firms in urban SUPIEs will be shaped by both university-level and city-level factors (*Landoni*). However, even fundamental questions such as why universities support spin-offs and what these firms need are not easy to answer, as shown by *Rasmussen et al.*; the authors propose that it is wider stakeholder network benefits (at the ecosystem-level) that will make the university–firm relationship valuable for both.

Figure I.1 presents the chapters in a multi-level wheel diagram, which shows the focus of the studies (whole ecosystem, start-up support organizations, or the university) as well as the different levels of the ecosystem (individual, organizational, and framework conditions) they pertain to. The chapters in the bottom circular sector (*Part I*) are broader in scope, reach across several SUPIE dimensions and even outside of SUPIEs. The chapters on the right (*Part II*) deal with classic start-up development organizations, while the ones on the left (*Part III*) regard universities as fundamental sources of start-up activity.

TOWARDS A RESEARCH AGENDA ON SUPIEs

The chapters of this handbook provide a first important glimpse into the nature, functioning, and make-up of SUPIEs. The SUPIE concept attempts to move beyond the “nature *versus* nurture” dichotomy, i.e., the artificial juxtaposition of whether firm behaviour is determined by the environment, at firm birth or later stages, or by internal characteristics.

Note: some chapter titles have been shortened to better fit in the figure.

Figure I.1 *The chapters of the handbook and the levels of SUPIE*

We are convinced that there is much more to learn about SUPIEs. We, therefore, hope others will further examine, scrutinize, and develop our perspectives, through qualitative or quantitative methods, and conceptual development. Below we explain and discuss why other scholars should join us in such an undertaking.

The handbook, similar to existing literature, shows that entrepreneurial ecosystems consist of layers, or sub-systems, within systems. Indeed, the very concept of ecosystem, as used in the natural sciences, is flexible and can include everything from the surface of a rock to the surface of our entire planet. Arguably, this is a strength of the concept, particularly when applied to understand entrepreneurship, since new venture creation occurs

in many different contexts and settings and is influenced by variables at many different levels of analysis. However, it has also been argued that the ecosystems approach to entrepreneurship is atheoretical (Spigel & Harrison, 2018). Indeed, the very flexibility of the ecosystem concept may hinder theoretical progress since it is not clear what the object of study is. In ecology, it is acknowledged that ecosystems can cover many orders of magnitude. In our view, this is a fruitful way of thinking about SUPIEs. Thus, when the key unit of analysis is a start-up venture, we argue that a SUPIE is the “innermost” ecosystem residing between the start-up venture and its external environment. The SUPIE concept directs attention to the importance of ecosystem influences in shaping the first formative period of new ventures, which have enduring implications on the survival and growth of these firms. Similar to child development, e.g., the positive relationship between early childhood nutrition and subsequent academic performance (Glewwe, Jacoby, & King, 2001), firms that do not get the necessary resources during their “prenatal” and early growth stages, will find it hard to make up for this in later development stages.

Moreover, an implication of the view of ecosystems as systems-within-systems is that SUPIEs are nested within other (types of) entrepreneurial ecosystems residing at higher levels of analysis or order of magnitudes. However, the interactions and flows between different types of ecosystems, with varying orders of magnitude, is something that we do not fully understand. This book provides examples of interactions between individuals and organizations within SUPIEs, but there is a need to understand better the interactions between different types of ecosystems, where the ecosystem is treated as the unit of analysis. What is the key role and function of SUPIEs in such a perspective? Based on the chapters in this handbook, we argue that the *raison d'être* of SUPIEs is the generation of a variety of new start-up ventures that subsequently feed other ecosystems, at higher orders of magnitude, with much-needed energy for innovation, entrepreneurship, and business activity. The chapter by *Sardeshmukh et al.*, for instance, shows that as start-ups grow and develop into established and potentially more significant organizations, they may contribute to the emergence of new ecosystemic elements at higher levels. Thus, without well-designed SUPIEs, a vital source of ecosystem energy, i.e., start-up activity, will be missing or reduced, and as a consequence, the energy flow or “food chain” breaks, and the whole SUPIE as well as broader ecosystems that feed on SUPIEs become imbalanced and even collapse.

Accordingly, three essential research directions appear vis-à-vis understanding the role of SUPIEs in the economy. They are related to the *emergence*, *elements*, and *similarities* of different SUPIEs. First, how SUPIEs emerge as a result of bottom-up initiatives and top-down measures is

not clearly understood. Policymakers around the world are trying to emulate thriving ecosystems on their home turf. To what extent this can be done successfully is still an open question. Given the prominence of entrepreneurial ecosystems to present economic policy, exploring further which policy measures work and which do not is a worthwhile endeavour. In particular, it seems necessary to examine how top-down policy best supplements bottom-up initiatives.

Second, from the contributions to this handbook, as well as in reviewing the now extensive literature on entrepreneurial ecosystems, it is clear that there is little consensus on which are the constituent elements of a SUPIE. Establishing robust typologies of such elements appears to be the first vital step to advance the literature. Once that is done, it would be possible to turn to questions related to how ecosystems function and operate, and how individuals, organizations and other elements of the ecosystem interact with each other to form a SUPIE.

Third, the richness and variety of contributions to this handbook show that not all ecosystems are created equal. There is extensive variation across them. What is specific to a particular context, such as a university-based start-up ecosystem or an urban one, and what is generic to ecosystems across contexts constitutes an important consideration. Seeing beyond specificities to focus on generalities is essential to build theories about SUPIEs. We believe that such mid-range theorizing (Hitt, Hoskisson, & Ireland, 1994) is relevant in the context of entrepreneurial ecosystems. However, the term entrepreneurial ecosystem may be too broad to be useful as a unit of theorizing. In other words, entrepreneurial ecosystems seem to be so diverse that it is challenging to establish generalizations across them. SUPIEs, on the other hand, represent a somewhat more homogeneous category that potentially offers a more useful unit of theorizing.

CONCLUDING REMARKS

In the introduction, we showed how the functioning of natural ecosystems helps us understand the challenges of firm birth and development in a particular context. Similar to natural ecosystems, SUPIEs are made up of “biotic” components (individuals and organizations), “abiotic” components (framework conditions such as start-up support programs, education and research, physical infrastructure, cultural and social norms, etc.) and interactions between these components. The concept of an incubation ecosystem is almost contradictory in that it combines the notion of a reasonably controlled environment with a clear purpose, i.e., an incubator, with a self-organizing and self-sustaining environment, i.e., an ecosystem.

However, we believe this inherent contradiction nicely illustrates the challenges faced by policymakers aiming at promoting SUPIEs. In our view, a well-functioning SUPIE cannot be designed top-down because it relies on the interplay of a large variety of actors who contribute in different ways and have different motivations. However, it seems clear that a SUPIE can be influenced and supported, just like natural ecosystems can be nurtured. The chapters in this book show that start-ups and their founders are assisted, get help, obtain resources, and interact with many individuals and organizations in their ecosystem. Moreover, different types of actors and support organizations exist, all vital for the process of incubation at the ecosystem-level. Due to this process of incubation in the ecosystem, start-ups and their founders can overcome initial challenges and establish a venture that, without this process, would not have been established, or faced stricter barriers impeding their development.

The book covers a wide array of topics that illustrate the different aspects and types of SUPIEs. However, SUPIEs have to face current global trends and Grand Challenges that will change their role and operation in the future. For example, digitalization has transformed many industries and provides new opportunities for entrepreneurship. SUPIEs conducive for digital start-ups may be different for instance, because geographical co-location is less critical. Also, digital technologies influence how start-ups interact with and get access to resources from various stakeholders. Crowdfunding and social media provide new tools that are capable of connecting a large number of stakeholders for access to resources and thereby change the nature of SUPIEs for many new ventures. Next, the issue of sustainability, for instance, related to the UN sustainable development goals, is gaining more and more attention among the public, policymakers, and industry, which creates both new demands and new opportunities for start-ups. A popular concept is related to the transition to a circular economy in which resources are not extracted, used and disposed of as waste, but remain productive through extended use and regeneration. SUPIEs aiming to support such a transition and the opportunities for start-ups emerging, will need to be different from many of the examples presented in this book. Hence, this volume represents a starting point for our understanding of SUPIEs, but there are ample opportunities for extending this work.

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