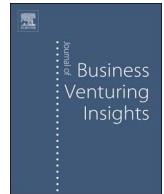




Contents lists available at ScienceDirect

Journal of Business Venturing Insights

journal homepage: www.elsevier.com/locate/jbvi

The resilience of entrepreneurial ecosystems

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ARTICLE INFO

Keywords:

Entrepreneurial ecosystems
Startup communities
Resilience
New venture creation

ABSTRACT

Despite intense scholarly interest in entrepreneurial ecosystems, research has not explicitly emphasized ecosystem-level dynamics or explored sources of variance among ecosystems. We theorize that entrepreneurial ecosystems are heterogeneous in a key, system-level characteristic: resilience. We define entrepreneurial ecosystem resilience and theorize that it is intimately tied to the interaction between micro- and macro-level processes of an ecosystem. We contend that entrepreneurial ecosystems differ in both the diversity of participants, ventures, business models, and support organizations, and their coherence around shared values and activities. The interplay between ecosystem diversity and coherence, in turn, produces resilience. Our theory has implications for scholars, entrepreneurs, and policy-makers.

1. Introduction

“The oak fought the wind and was broken, the willow bent when it must and survived.”

— Robert Jordan, *The Fires of Heaven*

Entrepreneurial ecosystems – communities of agents, social structures, institutions, and cultural values that produce entrepreneurial activity – are receiving growing academic, practitioner, and policy-maker attention and are increasingly viewed as a source of economic growth and revitalization (Arruda et al., 2013; Audretsch et al., 2006; Autio and Thomas, 2013; Breznitz and Taylor, 2014; Neck et al., 2004; Spigel, 2016; Spilling, 1996; Van de Ven, 1993). The accumulation of studies is producing a burgeoning literature identifying the key components of entrepreneurial ecosystems (e.g., venture capital, support organizations; Bahrami and Evans, 1995; Kenney and Von Burg, 1999; Isenberg, 2010) and, more recently, teasing apart the connections among system components (Motoyama and Knowlton, 2017; Spigel, 2017). These studies provide important insights into the building blocks of an entrepreneurial ecosystem (EE); however, most research “overlook[s] the heterogeneous nature of ecosystems” and does not acknowledge that they are “highly variegated” (Brown and Mason, 2017: 11); thus, it is still not clear why some EEs thrive, particularly in response to environmental changes, while others decline or fail to develop. Responding to recent calls for a deeper focus on heterogeneity among EEs (Acs et al., 2017), we theorize about a fundamental aspect of EE variation – *resilience*, which we define as *the degree to which an EE can continuously recover from and adapt to exogenous shocks and endogenous pressures* (Cadenasso et al., 2006). Resilience is both a theoretically and practically interesting property because, as we propose, it is an EE-level characteristic that can determine if an ecosystem is able to respond to disruptions, but depends on an EE balancing the seemingly paradoxical tension between the diversity and coherence of its components. Exploring the interplay between resilience, diversity, and coherence, draws

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attention to previously unexamined ecosystem-level properties of EEs, which creates connections to entrepreneurship, organization theory, and economic geography.

The remainder of the paper proceeds as follows. We first discuss the concept of resilience. Since the intellectual roots of resilience are in ecology and the physical sciences, we conclude this overview with a brief discussion of the appropriateness and dangers of applying theory and findings about resilience from biological ecosystems to EEs. We then develop propositions about two sub-characteristics of EEs: diversity and coherence, which we use to motivate our arguments regarding the heterogeneity of EEs in their resilience. Finally, we conclude with a discussion of the implications of our theorizing for EE scholarship and practice.

2. Resilience in ecosystems and entrepreneurial ecosystems

2.1. What is ecosystem resilience?

Studies of ecosystems find that they differ in a property fundamental to their “health” and that reflects the ability to adapt and change in response to disturbances: resilience (Meerow and Newell, 2015). Ecosystems face disturbances arising from shifting external and internal conditions (Holling and Gunderson, 2002; Cadenasso et al., 2006); however, as ecosystem resilience increases, the magnitude of disturbances from which an ecosystem can recover increases and the time it takes for the strained system to adapt decreases (Limburg et al., 2002). An ecosystem that is resilient is able to “absorb” disturbances and undergo the changes necessary to transform its essential behaviors, structures, and identity into a system that is better able to respond to disruptions (Walker et al., 2004).¹ Thus, a resilient ecosystem can survive disturbances without suffering a significant loss of function and, indeed, can be stronger after a disruption (Holling, 1986).

2.1.1. The applicability of the ecosystem's metaphor to EE resilience

Scholars argue that research on EEs should take “the metaphor of the ‘ecosystem’ seriously” (Auerswald, 2015: 1); however, concerns have also surfaced about the applicability of the biological ecosystem metaphor to entrepreneurial ecosystems (e.g., Isenberg, 2016). These concerns are reflective of a long tradition of debates across social science disciplines about the usefulness and danger of using natural metaphors (Hodgson, 2005).

An early application of the biological ecosystems metaphor to business was made by Moore (1993) who argued that “business ecosystems condense out of the original swirl of capital, customer interest, and talent generated by a new innovation, just as successful species spring from the natural resources of sunlight, water, and soil nutrients” (p. 76; cf. Brown and Mason, 2017). Despite the intuitiveness of this assertion, there are differences between physical and entrepreneurial ecosystems, which have implications for conceptualizing EE resilience.

Biological ecosystems (e.g., forests) most notably diverge from socio-economic ecosystems, like EEs, in that the “agents” in biological systems do not have aspirations regarding the functioning of the system and do not formulate plans to meet them. Thus, a challenge in applying biological analogies directly to EEs is that they do not account for individual agency and that EEs are generated by the experimentation and willful actions of entrepreneurs and other ecosystem participants (Read, 2016). In addition, as we argue in the next section, diversity is a necessary component of EE resilience. The variation that breeds diversity in biological ecosystems is often assumed to be random (or quasi-random); in contrast, EEs are human-constructed systems and their diversity is a result of human intentions, choices, and behaviors (Stam and Spigel, 2017).

Differences in the two types of ecosystems have important implications for EE resilience. First, the prevalence of human intention and agency in EEs suggests that social science theories are better-suited for explaining EE resilience than theories imported from the physical sciences. Second, unlike the non-human components of a biological ecosystem, which are not cognizant of the ecosystem as a distinct conceptual entity, the agents of EEs can be aware of the existence of an EE, as well as its diversity, coherence, and resilience. EE participants can actively take steps to change ecosystem-level characteristics. Thus, while there is a deep stream of research on biological resilience (e.g., Walker et al., 2004), its direct application to EEs is approached with caution and the biological interpretation of ecosystems is not taken literally (Stam, 2015).

Although we should use caution in analogizing between biological and entrepreneurial ecosystems, EE behavior is real, not metaphorical, and thus broad similarities can be identified between the two types of ecosystems. For instance, both biological and entrepreneurial ecosystems are systems of interconnected but distinct agents that exhibit self-sustaining properties and behaviors, such as nonlinear dynamics (Roundy et al., 2016). As we argue, the two types of ecosystems also share two general properties, *diversity* and *coherence*, the interplay of which co-produces EE resilience.

2.1.2. The diversity of entrepreneurial ecosystems

Research in economic geography finds that there are benefits to organizations and regional economies from related variety – that is, firms in similar industries locating in the same geographic area (e.g., agglomeration effects; Boschma and Iammarino, 2009; Frenken et al., 2007). There are also distinct benefits from unrelated variety, the co-location of firms from dissimilar industries. For example, “Jacobs’ externalities,” exist in a localized geographic area when a diverse industry mix improves opportunities to interact,

¹ As the paper's opening quotation suggests, there is an important distinction between resilience and resistance. Resistance represents how unyielding an ecosystem is to disturbances. A highly resistant ecosystem will be unresponsive to disturbances. In contrast, a resilient ecosystem is able to *change and respond* to disturbances. Because resilient ecosystems absorb feedback from their environments, resilience is considered a more adaptive characteristic than resistance (cf. Folke, 2006).

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