Entrepreneurial ecosystems and public policy in action: a critique of the latest industrial policy blockbuster

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Entrepreneurial Ecosystems: A Critique of the Latest Industrial Policy Blockbuster

Abstract

Efforts to develop entrepreneurial ecosystems (EEs) have proliferated in recent years, marking it out as the latest industrial policy 'blockbuster'. This paper reports the findings from a comprehensive empirical analysis of policy approaches deployed under this conceptual umbrella, enabling us to posit a basic typology of different EE policy frameworks. The findings suggest the concept is fraught with conceptual ambiguity and is predominantly (and rather crudely) used to promote 'more' entrepreneurship. The research suggests the concept is a "messy metaphor" open to wide-ranging misinterpretation and misuse by policy makers. Eradicating network failures, avoiding crude policy isomorphism and tailoring bespoke interventions are suggested policy recommendations.

1.Introduction

The recent Global Financial Crisis (GFC) acutely demonstrated that, contrary to engrained neo-liberal orthodoxies, markets were far from infallible and that without strong government intervention economies may have collapsed (Bailey and Tomlinson, 2017). This rejuvenation led some observers to proclaim "industrial policy is back" (Rodrik, 2010, p. 1; Criscuolo et al, 2019).[1] Underscoring its return to fashion**,** a growing body of evidence since the GFC documents the crucial importance of industrial policy in advancing technological development, fostering entrepreneurship and productivity growth (Block, 2008; Mazzucato, 2015).

A new market-oriented industrial policy approach taking a 'leading role' in the post-GFC era is that of *entrepreneurial ecosystems* (henceforth EEs).[2] This concept (and associated terminology) is now widely deployed by governments around the world, becoming a ubiquitous feature within public policy (Isenberg, 2014; Stam, 2015; Brown and Mason, 2017) and scholarship (Alvedalen and Boschma, 2017; Malecki, 2018). According to some, the 'crux' for modern place-based industrial policies is to appreciate the dynamics of the regional ecosystems and to leverage these to the region's advantage (Bailey et al, 2018). That said, while government policy is often portrayed as a central facet underpinning successful ecosystems, obtaining precise details of supportive policies has thus far "proven elusive" (Feldman and Lowe, 2018, p. 337-338). Given the need to avoid the pitfalls of previous inefficient industrial policy interventions (Warwick, 2013), and following in the tradition of

[1] Herein we align with the following broad definition of industry policy as "government policies directed at affecting the economic structure of the economy" (Stiglitz et al, 2013, p2).

[2] Given industrial policy is typically delineated into vertical and horizontal variants (Baliey and Tomlinson, 2017), EEs can be viewed as a "horizontal" or "a-sectoral" industrial policy approach facilitating "firm entry and resource deployment" (Lazzarini, 2015, p. 99).

other seminal policy critiques (Martin and Sunley, 2003), this paper provides a much-needed critique of EEs as a policy construct and examines its application within public policy.

While originally conceived as a metaphorical device for describing how localised business environments function (Moore, 1993), the EE concept has been heralded as a systemic mechanism for analysing and nurturing local economies by putting entrepreneurship centre-stage (Isenberg, 2010; 2014). With striking parallels to the ubiquitous clusters concept (Martin and Sunley, 2003), this latest conceptual 'fad' (Martin, 2015) has similarly captivated the policy-making community (Isenberg, 2014; Stam, 2015; Spigel, 2017). Given its origins in the practitioner community (Isenberg, 2010), it is fair to say that EEs have become as much of a policy construct as an academic concept for scientific study (Malecki, 2018). [3] Organisations such as the OECD, World Bank, World Economic Forum and Kauffman Foundation have all proactively promoted the concept as a new *modus operandi* for future market-oriented industrial policy (Mason and Brown, 2014; WEF, 2014; Mulas et al, 2017). Given its regional focus, sub-national and urban actors have also widely embraced the ecosystem concept (Markley et al, 2015; Isenberg and Onyeman, 2016; Motoyama and Knowlton, 2016).[4]

The emergence of this placed-based policy-oriented concept stems from increasing evidence amassed on the importance of localised factors underpinning entrepreneurship (Feldman, 2014; Feldman and Lowe, 2018) [5], which has 'shifted' the debate on the establishment of new firms towards more holistic perspectives such as EEs (Schäfer and Henn, 2018). Indeed, EEs have quickly established themselves as the "word du jour" within regional

[3] The work of Daniel Isenberg in particular has been instrumental in propagating of the concept into the policy making sphere (Brown and Mason, 2017).
[4] There is now a consultancy ranking start-up ecosystems in cities across the world (Startup Genome, 2017).
[5] See Müller (2016) for a good review of the recent empirical literature.

entrepreneurship (Lowe and Feldman, 2017, p. 2). Yet, despite growing academic interest and policy appeal, spatial scholars – bar Stam (2015) - have been slow to critically examine the concept from a policy perspective. While a growing evidence base exists on the dynamics of EEs (Malecki, 2017; Cavallo et al, 2018)[6], little or no research has critically (or comparatively) examined the nature of public policy approaches utilised under this conceptual umbrella (Alvedalen and Boschma, 2017).

This paper aims to fill this gap. It does so by unpacking the rationale for, and nature of, public policies designed to nurture EEs across a range of institutional contexts. The paper's contribution is threefold. First, it sets out a nuanced critique of the EE concept as a policy construct. Second, drawing on a combination of policy documentary analysis and interviews with policy makers, it examines the use and application of the EE concept within public policy. Third, it offers some indicative policy recommendations how to effectively develop EEs, although this deliberately avoids a normative approach outlining how practitioners can (or should) operationalise the concept. To our knowledge, this is the first systematic attempt to examine and take stock of policy frameworks deployed under this emerging conceptual policy lens, enabling us to offer a new typology of different EE policy frameworks.

The paper is structured as follows. First, we unpack the concept empirically and review the rationale for policy intervention. Second, we outline the methodology deployed in this study. Third, we highlight how the EE concept is being adopted and applied within public policy. A policy discussion is then presented, before our concluding remarks and policy recommendations are discussed.

[6] A search using the term 'entrepreneurial ecosystems' in Google scholar in September 2018 revealed a total of some 40,000 papers on this topic.

2. Unpacking the EE concept

2.1 Definitions and Conceptual Antecedents

In order to theoretically unpack the EEs concept, we must first clarify what we mean by EEs. Biological metaphors have been engrained in scholarship since the early writings of economists such as Adam Smith and Thomas Malthus (Hodgson, 2005). Invoking the term from the natural sciences, authors first began using the ecosystems metaphor analogously with their counterparts in the business world around 25 years ago (Moore, 1993). According to some, the multiplicity and labyrinthine qualities of business ecosystems mean they cannot be "decomposable to an aggregation of bilateral interactions" (Adner, 2017, p. 42).

Nowadays, metaphors such as 'ecosystems' are part of the linguistic turn aimed at recontexualising entrepreneurship (Welter et al, 2018, p.324) and are deemed helpful in conceptualising entrepreneurial activity (Bjursell, 2015). At the same time, they can be confusing, especially if applied disparately across scholarly domains and risks "being vague and its boundaries blurry" (Kuckertz, 2019, p. 1). Indeed, a number of scholars have questioned the relevance of biological metaphors, given they ignore the dynamic nature of entrepreneurial agency that can reconfigure EEs (Roundy et al, 2017). The ecosystem metaphor may also over-emphasise equilibrium and continuity, rather than disruption and dynamism (Isenberg, 2016). To some scholars, the metaphor should not be taken too literally as EEs "are man-made systems, rather than natural phenomena" (Alvedalen and Boschma, 2017, pg. 890).

The lack of clarity concerning the metaphor perhaps stems from numerous competing definitions of the concept (see Cavallo et al, 2018; Malecki, 2018). These have led to a degree of confusion about what comprises the key constitutive 'elements' of EEs (Spigel and Harrison,

2018). Broad depictions of EEs as a "set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship" can appear somewhat opaque (Stam, 2015, p. 1765). A more fine-grained definition widely applied in both policy and scholarly studies depicts EEs as "a set of interconnected entrepreneurial actors, institutions, entrepreneurial organisations and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment" (see Mason and Brown, 2014, p.5). The uniting theme straddling various definitions is the assumption that entrepreneurs act as pivotal 'agents of change' within localities (Feldman, 2014). Rather than viewed in isolation, entrepreneurship under most definitions is viewed systemically as a spatially, relationally and socially embedded phenomenon.[7]

According to Acs et al. (2017), the use of the ecosystem metaphor within entrepreneurship draws on a long and varied intellectual lineage of related concepts from the regional development and strategic management literatures. Innovation and management scholars have also used the term to denote innovation platform ecosystems such as Android (Adner, 2017).[8] In this paper, however, we focus specifically on the spatially-oriented systemic concept of EEs.[9] Several scholars claim EEs have also been subject to considerable interpretive flexibility (and indeed ambiguity), largely due to these varied antecedents and uses across disciplines (Brown and Mason, 2017; Spigel and Harrison, 2018). Indeed, owing to these diverse origins and definitional ambiguities, the concept has been labelled a

[7] Interestingly, Malecki (2018) notes only a handful include spatial parameters (such as a 30-60 mile radius) whilst delineating ecosystems.

[8] Oddly, these scholarly communities do not interact despite their common conceptual heritage. Interestingly, innovation scholars have been as equally critical of the lack of definitional precision around the term innovation ecosystems (Oh et al, 2016).

[9] This paper also focuses on the central role of growth-oriented entrepreneurship, rather than more prosaic necessity entrepreneurship whilst unpacking the EE framework.

conceptual 'umbrella' depicting a variety of theoretical perspectives on the geography of entrepreneurship (Spigel, 2017). Others have been less kind, depicting the EE concept as 'chaotic' owing to the imprecise manner of its use within empirical studies and public policy (Stam, 2015; Brown and Mason, 2017).

Several key authors examining EEs have drawn parallels to other important strands of literature. Most notable among these have been strong comparisons with the clusters concept. Most contemporary work on EEs is co-terminus to prior work on industrial clusters and shows strong connections between the two concepts (Spigel and Harrison, 2018). This is perhaps unsurprising given the strong spatial interdependencies shaping entrepreneurial activity as previously noted. Spigel and Harrison (2018) claim the EE concept draws on three core principles of cluster/agglomeration theory: i) the presence of other firms is a source of competitive advantage; ii) knowledge outside the firm is important; iii) close proximity facilitates firm competitiveness.

While these are undoubtedly core theoretical building blocks underpinning the EE literature, other authors have identified important parallels between EEs and the regional innovation system literature (Alvedalen and Boschma, 2017; Brown and Mason, 2017). While few entrepreneurship scholars invoke this construct, it is perhaps a closer intellectual companion to the EE concept than clusters *per se* (Brown and Mason, 2017). Highlighting the inter-relationships and interdependencies between institutional actors, the innovation systems literature investigates how networks of localised actors "are involved in the generation, diffusion and use of innovations" (Alvedalen and Boschma, 2017, p. 892). Proponents of this systemic perspective stress the importance of close geographical proximity and relational embeddedness of firms and other actors, which helps diffuse tacit knowledge

and generates innovation (Maskell and Malmberg, 1999). This strikingly resembles the manner in which the EE literature views how network actors foster and spawn entrepreneurial activity in close geographic proximity. Ironically, despite being rooted in the Schumpeterian tradition, the factor "conspicuously absent" from the systems of innovation literature was the centrality of entrepreneurship (Acs et al, 2014, p. 478).

Perhaps because of the connections to previous concepts, scholars have avoided asking difficult questions about what precisely the EE perspective contributes to these related ideas, and how it adds value both empirically and conceptually to our understanding of the entrepreneurial process. As others have noted, the somewhat 'fuzzy' (Markusen, 1999) indeterminate nature of the concept is perhaps one of the main reasons why policy makers themselves have deployed the term rather indiscriminately (Stam, 2015). Importantly, these ambiguities suggest that industrial policies under the EE rubric may mean "different things to different people" (Pack and Saggi, 2006, p. 267) potentially creating opportunities for "misconceived policy interventions" (Brown and Mason, 2017, p. 26).

2.2 Main components of EEs

While disagreement and ambiguity surround the intellectual antecedents of the EE concept, a stronger consensus exists concerning some of its core constituent parts. Indeed, the majority of the now burgeoning empirical literature has tended to focus on examining and measuring the main components and drivers underlying the functioning of EEs (Malecki, 2017; Cavallo et al, 2018; Goswami et al, 2018). While the primary focal point of an EE under this systemic lens is the entrepreneur, there are a heterogeneous range of actors, institutions and processes that coalesce to shape entrepreneurial behaviour (Mason and Brown, 2014). Early work by Isenberg (2010) first mapped six main domains delineating an ecosystem: policy,

finance, culture, human capital, support and markets. This underscored the crucial role of key institutional actors within EEs such as banks, universities, large firms, business accelerators/incubators, innovation centres, venture capital and business angels. Whilst a useful starting point, some observers dismissively claim these represent a "long laundry list of relevant factors", rather than a proper mechanism for explaining causal relationships (Stam, 2015, p. 1764).

Some of the actors noted above often act as important 'regional anchors' (Colombelli et al, 2019) fostering localised entrepreneurial collaboration between the public and private sectors, with the explicit purpose of promoting knowledge fertilisation and commercialisation (Bailey et al, 2018). [10] Block's highly influential work examining the so-called 'hidden' development state, including publicly-funded R&D agencies such as the US Defence Advanced Research Project Agency (DARPA) and programmes such as Small Business Innovation Research (SBIR), vividly illustrates the key role anchor organisations play in developing leading-edge technologies (Block, 2008) whilst promoting the growth of small innovative high-tech SMEs (Block and Keller, 2009).

While these 'public spaces' undoubtedly add to the richness of innovation ecosystems (Schrank and Whitford, 2009, p. 535), some have criticised the EE literature for failing to properly explore inter-actor relationships shaping ecosystems (Brown and Mason, 2017; Spigel, 2017). Despite the importance of these relational connections within EEs, with rare exceptions (Motoyama and Knowlton, 2017), most empirical studies have focused on a single organisational actor. Perhaps the actor most heavily scrutinised has been universities, which

[10] Japan's Kohsetsushi Centers, Germany's Fraunhofer Institutes and the Manufacturing Extension Partnership are well known examples of such regional anchors (Brandt et al, 2018).

are typically shown to play a role in spawning new firm formation within local economies (Hayter, 2016; Wright et al, 2017). This myopic focus is a crucial issue, especially given the importance attached to so-called 'network failures' within industrial policy more widely[11]. Network failures are "ubiquitous and persistent" (Brandt et al, 2018, p. 296) and arise when a more or less idealized set of relational-network institutions fail to sustain desirable activities or to impede undesirable activities (Schrank and Whitford, 2011). Plus, industrial policy projects which generate the most impact are typically the ones which "get the relationships right" thereby mitigating network failures (Brandt et al, 2018, p. 289).

Other important types of key institutional actors, such as business incubators, accelerators and banks, receive much less attention in the EE literature (Hochberg, 2016). Given their important 'match-making' role in building connections between start-ups, new investors and customers (Business Finland, 2018; Clayton et al, 2018), accelerators perhaps warrant closer empirical inspection. There are significant variations of accelerators (Pawels et al, 2016), however, suggesting that there is likely to be considerable divergence in how they perform within different contexts (Gonzalez-Uribe and Leatherbee, 2017; Goswami et al, 2018; Brown et al, 2019).

In addition to the importance ascribed to certain institutional actors, the EEs literature has also started to examine the complex relational 'processes' facilitating entrepreneurship. Early work noted the powerful role played by a small number of rapidly growing successful entrepreneurial firms - so-called 'blockbuster entrepreneurship' (Napier and Hansen, 2011) - which confers major benefits to ecosystems in terms of 'demonstration effects' and

[11] Usefully, more recent work has begun to look at interactions between universities and other local actors in the EE (Ghio et al, 2017).

experiential learning for spin-offs (Brown and Mason, 2017). These often take the form of privately-owned companies valued at over $1bn, the mystical and much desired 'unicorns' (Acs et al, 2017). Such firms and entrepreneurs provide crucial role models and often become mentors and investors to smaller entrepreneurial ventures. Another important process is the role played by 'dealmakers' who are often former entrepreneurs or lawyers with fiduciary ties who provide invaluable mentoring to entrepreneurs, mediate relationships and make connections to enable new firm formation (Feldman, 2014; Clayton et al, 2018). To date, these key processes have tended to represent a small part of the EE literature rather than a core constituent part. The recent adoption of social network analysis within empirical studies could be a useful mechanism for exploring these complex relational actors and processes further (Neumeyer et al, 2018).

Another gap in the EEs literature is the lack of a dynamic or evolutionary perspective (Mack and Mayer, 2016; Alvedalen and Boschma, 2017). Attempts have been made to categorise different varietal 'types' of EEs (Brown and Mason, 2017; Spigel and Harrison, 2018) and while these models provide useful 'analytical snapshots' of different archetypes, they fail to fully capture a temporal perspective of how EEs function and develop over time, including the role of policy. Consultants have attempted to crudely rank EEs using a basic life-cycle model to depict the linear evolution of EEs into four distinctive phases of activation, globalisation, expansion and integration (see Figure 1 below), suggesting rather crudely that all EEs will eventually evolve into more rounded and developed ecosystems (Startup Genome, 2017).

[Insert Figure 1 about here]

Despite firm-level life-cycle models being harshly (and justifiably) criticised for being too linear and reductionist (Levie and Lichtenstein, 2010), some scholars have (perhaps disingenuously) incorporated them into their work (Mack and Mayer, 2016). Interestingly Mack and Mayer's (2016) case study of Pheonix, Arizona speculates how policy may have to evolve in parallel with the ecosystem. They claim that encouraging more new entrepreneurial entrants in the early life of an EE is important, whilst developing networks and connections to other ecosystems increases in importance as EEs mature. Similarly, Brown and Mason (2017) note that public policy is often most proactive in nascent 'embryonic' ecosystems. Unfortunately however, studies have yet to empirically explore how policies towards ecosystems actually manifest themselves and evolve over time.

2.3 Policy Rationale

As policy makers increasingly succumb to the EEs concept, it is important to examine *a priori* the justification for policy intervention under this approach. Traditionally, the rationale for industrial policy was predicated on the role of market failures (Schrank and Whitford, 2011; Stam, 2015), whereby economies are faced within sub-optimal allocative efficiency. Market failure theory suggests that governments intervene to fix markets by investing in areas characterized by positive or negative externalities, the classic rationales for intervention being positive externalities (e.g. R&D), abuse of market power, asymmetric information and public goods such as infrastructure. Arrow (1970) delineated between 'absolute' market failures and 'relative' failures in which markets persistently underperform.

As a rationale for government intervention, market failure arguments have received sustained criticism however (Zerbe and McCurdy, 1999). The principal alternative to market failure arguments is the aforementioned 'network failure' (Brandt et al, 2018). Through the

EE lens, the rationale for public policy also often hinges on rectifying similar "systemic failures" (Stam, 2015). A classic example of this type of network failure arises when ecosystems produce a lack of connectivity between entrepreneurs and investors. Indeed, a recurrent problem facing informationally opaque start-ups is a lack of capital, which in turn inhibits their growth potential (Cassar, 2004). Often in geographically remote or peripheral regions a lack of informal angel investors or venture capitalists restricts good ventures from accessing financing due to associated network failures (Nightingale et al, 2009). This scenario could provide justification for policy intervention to overcome this network failure by providing publicly funded co-investment schemes to leverage investment. While a policy rationale based on rectifying network failures such as this seems perfectly legitimate, it does however ensure that under such a viewpoint almost any 'systems' failure can be used *ex ante* as grounds for policy intervention.[12]

From a conceptual perspective, some take issue with the rather *dirigiste* policy prognosis. Stam (2015) notes that under the EE perspective, entrepreneurs are granted a central position and through their actions they sustain successful ecosystems thereby decreasing the role of the state. Therefore, in some respects EEs represent the *de facto* "privatization of entrepreneurship policy" (Stam, 2015, p. 1761). Isenberg (2016) holds that policy makers are misinterpreting the true meaning of the EE concept due to what he calls the 'creation mistake'. He observes that EEs are often viewed as something that can be purposively 'created', resulting in policy makers conflating particular institutional actors (such as a mentor networks and incubators etc.) with the ecosystem itself (Isenberg, 2016). Yet intrinsic to the EEs concept is their relatively self-organised and self-sustaining nature,

[12] Although as Rodrik (2009, p. 2) rightly notes market failures are (similarly) "rarely documented with any precision".

arguably making them impervious to external control or influence by public policy. Plus interventions within EEs could easily have adverse effects and disrupt their equilibrium (Colombo et al, 2018).

Despite these theoretical arguments, policy makers implicitly ascribe themselves a central guiding role in orchestrating EEs in many contexts (Feldman and Lowe, 2018). Indeed, some scholars claim that state intervention can "add resources to an ecosystem" (Spigel and Harrison, 2017, p. 164), but under what circumstances do these activities add genuine value to the functioning of an EE? It would appear that the strong role bestowed on the state, as embedded within policies oriented towards EEs, is potentially at odds with the conceptual underpinnings of these complex phenomena.

3. Methodology

This article draws on two main sources of empirical evidence: documentary analysis and interviews. *First*, a comprehensive review of policy documentation pertaining to the 'ecosystems' concept was undertaken during Spring 2018. Policy documents are recognised to be a good proxy for understanding 'social facts' (Atkinson and Coffey, 1997) and the 'institutional logic' of public policy (Brown et al., 2017). Thus they are an important part of understanding the rationale for specific policy activities and related support approaches by examining the way language is used to construct discourses (Fraser and Davis, 2019).

The documentary analysis involved identifying and scrutinising formal policy documents relating to EEs. To be eligible for inclusion in the review, documents had to be written in English, available through official national/regional government websites and had to specifically refer to one of more of the following search terms: "ecosystem*", "entrepreneur* ecosystem*", "business ecosystem*", "innovation ecosystem*". No specific

geographies were targeted, as one of the purposes of the review was to determine the scale of adoption of the concept. The review identified almost 400 relevant documents from across 46 different countries.[13] Whilst many of these were OECD countries, the evidence collated covered a range of developing economies across Central and South America, South-east Asia as well as the Middle East, demonstrating the proliferation of the EE concept worldwide.

The documents were coded by both authors independently, drawing on a coding framework developed from the extant literature reviewed earlier in the paper. This framework included: (i) the use of the ecosystems concept; (ii) its alignment to other policy areas; (iii) the nature of policy interventions and implementation processes; and (iv) perceived effectiveness and policy coherence. After completion of coding, both authors came together to review and synthesise the documentary analysis.

Second, the research involved semi-structured interviews. In order to triangulate findings from the documentary evidence base (Patton, 1990) and explore emerging issues in more detail a number of interviews were conducted during Summer 2018 with policy makers charged with implementing different EE policies. The interviewees were identified purposively, drawing on both relevant policy documents (e.g. authorship or document 'ownership') as well as the authors' networks of policy contacts.[14] Twenty individuals were contacted and sixteen agreed to participate. These participants were senior officials involved in government ministries and economic development agencies across a range of OECD and

[13] These included: Argentina, Australia, Austria, Belgium, Canada , China, Chile, Colombia, Czech Republic, Denmark, Estonia, Faroe Islands*, Finland, France, Germany, Greece, Greenland*, Hong Kong, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Jordan, Latvia, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Portugal, Poland, Russia, Scotland*, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America. The * denotes regions with devolved administrations and autonomy on economic development issues.

[14] The authors are particularly grateful for the help received from Jonathan Potter and Dan Isenberg in identifying relevant interviewees.

developing economies, with the specific task of embedding the EE concept in their work. Each participated in a semi-structured interview using the same framing as the documentary analysis (see above), with the purpose of 'sense checking' findings from the documentary analysis. We attempted to mitigate interviewer bias by avoiding imposing our own references frames on the interviewees using broad open-ended questions. Interviews were conducted by the researchers via VOIP and where consent was provided were digitally recorded and transcribed upon completion. Interviews were, on average, 40 minutes in length. Interviewees were guaranteed anonymity, thus all quotations are anonymous. Each author independently read and re-read the transcripts, identifying key words, themes and larger concepts, before coming together to continue iterative interpretation to promote analytical rigour (Guba and Lincoln, 1994).

Through the collection of connected but distinctive forms of data, qualitative approaches can be combined to triangulate findings and highlight "commonalities and disparities between the 'stated' and the 'unstated' motivation and drivers of actors and organisations" (Fraser and Davis, 2019, p. 213-214). Together, the evidence base underpinning this paper provides a strong vantage point for reviewing the rapidly developing policy landscape surrounding EEs policy approaches.

4. Entrepreneurial Ecosystems and Public Policy: Empirical Findings

Having interrogated EEs from a conceptual perspective we now examine how the concept is operationalised and deployed within public policy. As per our analytical framework, our findings and discussion are structured around four key issues: (i) conceptualisation and application of the EE concept; (ii) the nature of policy focus, associated interventions and implementation approaches; and (iii) policy coherence and perceived effectiveness.

4.1 Conceptualisation and application of the EE concept

The EE term has proliferated rapidly across the policy-making community over the last five years and is now appearing ubiquitously in policy documents, governmental websites and entrepreneurship programme campaigns. Many countries specifically reference organisations such as the OECD, Kauffman and the World Economic Forum as promoters of the concept. This is the case across both advanced economies, as well as a growing number of middle-income and developing economies such as Colombia, India, Jordan and Lebanon. Across the OECD, many countries appear to be pro-actively using the EEs concept including Australia, Canada, Ireland, the Netherlands, Poland the UK and Nordic countries such as Denmark and Finland. Our interviewees outlined the rationale behind this widespread adoption, noting the EE concept *"makes enormous common sense*" and so is so intuitively appealing that "*we can't really say no to it*".

Upon interrogation of policy documents, it became clear that despite adoption of the EE concept and associated terminology there was seldom an explicit or clear explanation of the concept, let alone a rationale for what the adoption of an ecosystem perspective entailed for industrial or entrepreneurship policies. Most documents discussed up front the need to 'strengthen' or 'develop' an ecosystem. For example, the Indian government claimed it is "*imperative that we create a vibrant entrepreneurial ecosystem in India that creates wealth, employment, and economic growth that the country needs*" (Government of India Planning Commission 2012, p. 13). Meanwhile, in Russia the goal is to "*foster a stronger tech entrepreneurship ecosystem*" (OC&C, 2018). Yet there was often little reflection on what was meant by the term ecosystem. Interestingly, in most policy documents, the 'ecosystem' term was almost universally used without a proper definition. Even in documents that included

extensive glossaries of different entrepreneurial terminology, a definition or basic understanding of the 'ecosystem' term was conspicuously absent (see, for example, Office of the Chief Economist, 2017).[15]

As a result of this 'opaqueness', there is quite a large degree of interpretative latitude in terms of how the concept is deployed. When this issue was explored with policy makers during interviews, there was recognition that the ecosystem term and conceptualisation was often implicitly conceived as a "*way of thinking"* and "*something that shapes what we do, but that we don't ever really specifically talk about – it operates behind the scenes."* As a result, many documents merely referenced a long list of institutional actors constituting the 'ecosystem', such as start-ups, accelerators, incubators, universities etc. Plus, ecosystem 'maps' often adorn many of these documents (see OC&C, 2018) and websites.[16]

Within policy documents, the EE term is widely pre-fixed with various other terms, the most common being 'start-ups'. The Irish government claim that policy is strongly focused on "*the creation of a strong start up ecosystem*" (Department for Jobs, Enterprise and Innovation, 2014, p. 6), while the Lebanese government has focused on building an ecosystem for new firms and SMEs.[17] Start-Up Estonia emphatically declares on its website that "*we need to have a strong start-up ecosystem*" to grow the next Estonian success stories[18] and the Municipality of Tel Aviv in Israel "*sees the continued growth of its startup ecosystem a top priority*".[19] This focus on new ventures was often conflated with innovation, as seen in Italy where the government has strongly focused legislation towards "*the development of an*

[15]One rare exception being Maine in the US: https://www.maine.gov/decd/reports-pubs/docs/CNBEVENTS_LeadershipMaineBooklet_vPDF_060415%20(1).pdf
[16] A Danish example being: https://inno-overblik.dk/
[17] https://www.economy.gov.lb/public/uploads/files/6833_5879_4642.pdf
[18] http://www.startupestonia.ee/startup-ecosystem
[19] https://www.tel-aviv.gov.il/en/contactus/Documents/english%20format_booklet-hitech-WEB3.pdf

ecosystem of innovative start-ups" (Italian Ministry of Economic Development, 2016, p. 3), as well as Russia in their efforts to "*develop an innovative ecosystem and support high tech start-ups*".[20] Entrepreneurs and local practitioners in support organisations also frequently pre-fix the ecosystems label with 'start-ups' and 'innovation' when referring to EEs. For example, in New Zealand there is the belief that if "*we create healthier start-up ecosystems, we can generate more successful startups*" (New Zealand Angel Association, 2017).

In terms of policy alignment, at a national level EE policies were for the most part operated by industrial policy makers to help examine and develop their national economies. As one policy maker explained, "[*we consider EE to cover] all that's happening in the public policy that influences entrepreneurship*". However, EEs are also frequently linked to innovation policies in some countries. Australia, China, Ireland and Italy specifically refer to the term 'innovation ecosystems' within their policy literature (see Department of Industry, Innovation and Science, 2017). For example, the Irish government discusses the need to develop their ecosystem of research and technology centres[21] and the Canadian government note how they "*can leverage the many advantages that stem from a strong, stable and vibrant science, technology and innovation ecosystem*".[22] Given some of the definitional ambiguities detected in the use of the concept, it is perhaps unsurprising that it is aligned to different policy areas. The lack of explicit integration within national regional policy is perhaps somewhat surprising, given the fact that many EEs are delineated by geographical parameters.

There are many localised activities and initiatives that could be classified as EE-informed policies undertaken by regional and local governmental actors. In countries such as

[20] https://www.rvc.ru/upload/iblock/db4/Report_RVC2016_ENG.pdf
[21] Interestingly, Italy and Ireland both adopt both the start-up and innovation ecosystem terminology (Italian Ministry for Economic Development, 2017).
[22] https://www.ic.gc.ca/eic/site/113.nsf/eng/h_07657.html

Estonia and Poland, local policies are undertaken and funded by EU regional policy and the use of the concept at a local level has primarily been designed to aid economic development. In the UK, national industrial policy makers have also strongly encouraged use of the concept within Local Economic Partnerships (LEPs) in England and Wales. Indeed, the majority of Strategic Economic Plans produced by UK LEPS have been informed by the systemic EEs approach. In other parts of the UK such as Scotland, it heavily informs the work of the Scottish Government and its economic development support agencies where an ecosystem perspective is "*becoming embedded*" according to policy makers. This is also the case for many local urban initiatives operated in cities like Brisbane and Sydney in Australia, where the role of EEs are strongly promoted by policy makers (Queensland, 2014; City of Sydney, 2016). Even in less developed economies, work undertaken by the World Bank uses the ecosystem concept specifically in the context of high-tech industries in cities such as Beirut (Mulas et al, 2017).

4.2 Nature of Policy Focus and Associated Interventions

Central to the EE concept is the focal role attributed to entrepreneurs. Unpacking how policy makers attempt to foster entrepreneurship is therefore a key aspect shaping policy approaches. There are a number of commonalities across different policy contexts, as well as recurring omissions.

Given the definitional matters discussed above, it perhaps comes as little surprise that much of the policy focus is on new venture creation. Again, this suggests that despite the systemic nature of the concept there is a dominant tendency to concentrate policy efforts on singular entrepreneurial actors (or a small subset thereof). Indeed, the overwhelming majority of EE initiatives typically focus on support to assist the development of new start-

ups. Such entrepreneurial entrants are promoted in a vast array of different ways, including start-up grants, innovation grants, informational services (e.g. business plan advice), mentoring, access to finance schemes and visa programmes. Often a core focus within EE policies is a focus on the provision of equity investment. Indeed, the goal of New Zealand's Investment Venture Fund is to build a "*vibrant early stage investment ecosystem*".[23] In terms of physical infrastructure development, business incubators and accelerators now feature widely across most EEs. For example, public sector accelerator programmes such as the VIGO programme operated by TEKES in Finland. These take various forms, but in most embryonic EEs tend to be publicly rather than privately funded, such as the Start-Up Chile business accelerator which offers equity-free seed capital and shared office space to cohorts of start-ups (Gonzalez-Uribe and Leatherbee, 2017).

Many of the above initiatives are marketed and publicised through national start-up campaigns. Nearly all advanced economies have these ubiquitous programmes (e.g. Start-up Canada, Start-Up Denmark and Start-Up Estonia etc.), which offer virtually identical services. In the main, most of these initiatives are generic support measures to encourage entrepreneurship, rather than customised programmes tailored to the unique circumstances within their respective entrepreneurial environments. This core focus on new venture creation was reinforced by many of the policy makers interviewed, who noted that there will "*always be a focus on start-ups*".

Another recurring feature of policy efforts designed to stimulate entrepreneurship across many ecosystems is a strong emerging focus on promoting high-growth firms (HGFs) or scale-ups. While this has been noted as a key theme within entrepreneurship policy more

[23] http://www.nzvif.co.nz/media/news-articles/creating-our-own-silicon-valley/

broadly (Brown et al, 2017), the focus on scale-ups within EEs is seen as a critical ingredient to generate the types of 'blockbuster' entrepreneurship which can generate the types of spillovers highlighted earlier. In Australia there is now a distinctive focus on the development of scale-ups due to their perceived economic importance and recognition that they "*participate in a multifaceted ecosystem that includes many partners and stakeholders*" (Office of the Chief Economist, 2017, p. 101). A focus on scale-ups tends to involve qualitatively different types of support instruments given the differing support needs of firms who are experiencing rapid growth. Many of these types of initiatives tend to be less transactional (e.g. grants and loans) and more focused on peer-based support and management development.

Scale-up programmes are thus becoming almost as commonplace as start-up programmes within some advanced economies, reflecting the central importance attached to these firms. Again, these programmes are often a mixture of private and public actors who provide services to assist the rapid growth of companies. This is the case in Denmark, which operates Scale-Up Denmark. [24] Within this initiative, an ecosystems perspective is strongly embedded in their work connecting start-ups to larger companies to help provide entrepreneurial mentoring to growth-oriented smaller companies. In the UK, the privately funded Scale-Up Institute aims to campaign for and support scale-ups. As part of the Scale-Up Institute's work, they have developed specialist courses to help regional actors hone their respective local EEs and to develop "*their ecosystems for scale-up businesses*" (Scale-Up Institute, 2017, p. 84). These programmes often stress factors such as building local growth

[24] See https://scale-updenmark.com/

sectors, engaging local business leaders, linking businesses and universities and developing interventions that are peer-based and account managed.

While a focus on targeting scale-ups was evident in more advanced EU countries (e.g. UK, Belgium, Scandinavia), in less resilient economies such as Chile, Estonia, Mexico and Russia there seemed a much stronger focus on promoting a broader culture of entrepreneurship. In these types of countries the government often promotes entrepreneurship through information and support measures under campaigns like Start-Up Estonia, Start-Up Mexico and Start-Up Russia. The remit of Start-up Mexico is, for example, "*the promotion of innovation, entrepreneurial culture and economic development"*. On the whole, the systemic perspective seems less well rooted in these locations. More apparent in these contexts are initiatives which target universities to help foster entrepreneurship education activities with a view to altering longer-term perceptions of entrepreneurship. Most initiatives do not seem to be spatially differentiated or customised, especially in countries like Poland, where policy makers remarked that "*policy comes from the top*". A good example of top down policy making being the flagship Skollkova Innovation Centre in Moscow established at the behest of former President Dmitry Medvedev, which claims to be "the Russian government's most ambitious endeavour to support start-ups to date" (OC&C, 2018, p.27).

In terms of recurring omissions within policy, a distinct lack of genuinely systemic initiatives designed to help foster connections between different entrepreneurial actors was observed. In the main, there seemed to be an overriding policy focus on targeting single actors such as entrepreneurs, universities and business incubators with policy support. While some of these interventions may prove beneficial, they will not in their own right help increase connectivity across an ecosystem.

There are exceptions of course.[25] A good example of a genuinely systemic initiative examined is the UK's Future Fifty programme which offers a bespoke peer-based series of mentoring and advisory services specifically designed to connect promising high-tech scale-up firms to other key entrepreneurial resources such as the stock market and specialist government services. Designed to support and grow "*the next generation in our tech ecosystem*"[26], this unique cohort-based programme has helped to spawn entrepreneurial successes (so-called 'unicorns') such as Skyscanner, Deliveroo and Darktrace, raising some $5.5bn in venture capital and achieving five IPOs. Although not equity-based, the Future Fifty programme is probably closer to the private sector-led Y Combinator model than the vast majority of public sector variants within the EE policy landscape.

Whilst less systemically oriented, other interesting programmes include the Hiyaku Next Enterprise Programme operated by the famous Ministry of Economy, Trade and Industry (METI) in Japan. This enables Japanese start-ups with cutting edge technology to spend time in the world's most dynamic EEs like Silicon Valley, attempting to "*bridge the Japanese start-up ecosystem, start-ups and entrepreneurs with those in Silicon Valley*".[27] This seems a highly innovative approach, particularly as research shows how "transnational entrepreneurs" confer multiple benefits from simultaneously operating across EEs (Brown et al, 2019). Public-private partnerships are also creatively using a competitive grant scheme to foster connections across EEs in US cities like St Louis, Missouri (Motoyama and Knowlton, 2016). Some localised initiatives to help promote the functioning of emerging ecosystems such as Manizales-Mas in Colombia have also proved to be successful (Isenberg and Onyeman, 2016).

[25] Indeed, other scholars have similarly noted good examples of effective targeted support in urban areas such as Edinburgh (Spigel, 2016).
[26] https://technation.io/programmes/future-fifty/
[27] See http://www.meti.go.jp/english/press/2017/0105_001.html

4.3 Policy coherence and perceived effectiveness

Having reported on the qualitative nature of the use of EE within public policy we wish to comment upon its perceived level of coherence and effectiveness. Both the documentary analysis and interviews showed that policy makers have keenly embraced the use of the ecosystem concept; their overall perception is that it is a positive tool for informing industrial policy. From a conceptual standpoint, many felt that the construct was "*very useful as a perspective, but could do with more specific guidelines what you can actually do*". Others noted the need "*to make it more accessible*".

A murkier picture emerged **i**n terms of the perceived effectiveness of EEs for informing and assembling bespoke interventions. Local practitioners charged with operating and implementing scale-up programmes or local partnership-based regional ecosystem initiatives broadly support it as a mechanism for informing policy. Many of these local practitioners are acutely aware that policy is more likely to fail if they do not "*take account of local interdependencies*". The perceptions of national policy makers, on the other hand, seem somewhat more circumspect. Being one stage removed from the mechanics of the policy implementation process, national policy makers and indeed politicians seem yet to be fully convinced of its cost-effectiveness. Interestingly, in Estonia it was explicitly rejected by politicians for its perceived "*amorphous*" qualities.[28]

On the whole, quantitative evaluation evidence assessing the effectiveness of ecosystem-related interventions is extremely rare. Where hard evaluation evidence exists, it

[28] Interestingly, in the Estonian context it was basically seen as indivisible from other horizontal industrial policies designed to help develop the general business environment.

shows that public sector interventions supporting ecosystems are broadly effective in catalysing start-ups through loans, funding and mentoring, but are less successful promoting networks and interconnections across the ecosystem (Business Finland, 2018). Evidence on the success of bespoke initiatives such as accelerators is also somewhat mixed, but tends to stress the importance of softer aspects associated with these organisations (Gonzalez-Uribe and Leatherbee, 2017; Business Finland, 2018; Roberts et al, 2018).

5. Policy Discussion

Our empirical work detected a number of key commonalties across different policy jurisdictions as well as some glaring absences. Previously, scholars identified anomalies in the usage of EEs, whereby policy makers over-engineered due to the 'creation mistake' (Isenberg, 2010; 2016).[29] Arguably, similar misapprehensions or 'mistakes' seem to be permeating EE policies, three of which are highlighted below.

5.1 *Conceptual Ambiguity and Policy Misconceptions*

A key finding is that policy makers are encountering profound conceptual ambiguity surrounding EEs, creating something of a '*comprehension mistake*'. While increasingly utilised, there appears to be significant diversity in how the concept is both perceived and adopted. The evidence from our interviews suggests that a lack of knowledge or common language has fostered misconceptions about the concept of EEs. This was starkly demonstrated in the frequent use of the term in the specific context of 'start-up' ecosystems. This illustrates that many policy actors perceive the term to be connected with specific constitutive elements of an ecosystem, rather than viewing ecosystems as an integrative

[29] Indeed, our research found a similar belief that policy was in some special cases attempting to artificially 'jump start' an ecosystem 'from scratch'.

whole. Perhaps a causal factor underlying this conceptual ambiguity concerns a lack of detailed knowledge about EEs as a policy construct. Interviewees repeatedly mentioned that there was a lack of practical instruction of how to intervene and that more guidance is needed to "*make it more accessible*". So while many policy makers view it favourably, the concept is largely seen as an opaque one, with few explanatory instructions attached.

Another important observation to be drawn is the manner in which policy makers translate the EE concept into policy action. This may be generating a '*volume mistake*'. For many policy makers, the concept is primarily synonymous with the foundation of new start-ups. Start-ups have the advantage of being tangible and quantifiable, whereas enhanced connectivity within ecosystems is much more nebulous and difficult to measure. Faced with limited knowledge about the proper operationalisation of the EEs concept, many policy makers are using it as a kind of 'default option' to foster and promote 'more' entrepreneurship. The root causes of this reside in the miscomprehension noted above coupled with path-dependencies within the policy-making process (Shane, 2009; Isenberg and Brown, 2014). A crude volume-led approach is most evident in less well-developed institutional contexts (see below). However, it is also strongly evident in advanced economies like Japan and South Korea (Hemmert et al, 2019).

A third key observation - the '*systemic mistake*' - concerns the lack of genuinely holistic or systemic interventions. There seems to be a profusion of public sector policy initiatives geared towards developing singular aspects of ecosystems, such as targeting start-ups, the creation of business incubators/accelerators, universities, business angel networks etc. While constituent parts of an ecosystem, these actors are not necessarily closely interwoven with other parts of EEs (see Business Finland, 2018). By contrast, so-called systemic instruments

(Wieczorek and Hekkert, 2012) are designed to improve the functioning of the entire ecosystem. In some fully functioning EEs, certain organisations such as business accelerators and intermediaries such as dealmakers play these types of important 'brockerage mechanisms' (Brown et al, 2019) or 'match-making' roles (Clayton et al, 2018). In less-developed EEs, however, these types of crucial bridging mechanisms are often absent or anaemic. Overall, these 'boundary spanning' initiatives were largely absent within the public policies examined.

While a lack of genuine systems thinking imbued most of the policy frameworks examined, useful efforts have been expended to help foster relational connections across some advanced ecosystems. In places like Denmark, the Netherlands, the US and the UK this typically involves bringing various 'stakeholders' together through strategy building exercises. While these *ad hoc* policy initiatives are useful, there is a lack of concrete policies deliberately fostering inter-linkages between key entrepreneurial actors such as start-ups with other parts of the EE. Evaluation evidence notes this as one of the key weaknesses of policy interventions (Business Finland, 2018). An exception noted earlier is the highly innovative peer-based Future Fifty programme funded by the UK government. While on paper this model is proving effective in the UK context, it is important to recognise that it may not be amenable to policy transfer to other less suited EEs.

Health warnings around policy isomorphism seem particularly salient given the varied and socially embedded nature of different local economies (Feldman and Lowe, 2018). It could be possible that "the nature of the local region, its existing institutions, and its ecosystem" may cause certain types of programmes such as accelerators to work well in some areas but not in others (Hochberg, 2016, p. 48). There seems to be some evidence of this

regarding accelerators in developing economies, where start-ups in Africa are often unable to absorb the levels of funding available.[30] Echoing others, a "one-size fits all" (Brown and Mason, 2017, p. 26) policy prognosis is unlikely to succeed as imported ideas often "backfire" (Rodrik, 2014, p. 204).

5.2 *Typology of Policy Frameworks*

The preliminary nature of the proceeding analysis precludes us from forming a definitive classification system of different policy approaches. However, given that taxonomies help scholars to theorise around new concepts (Martin and Sunley, 2003), three broad types of policy landscapes appear to coalesce under the EE conceptual umbrella.

First, in *emergent ecosystems* the perceptual ambiguity and misuse of the concept was strongest. Many of these countries lack the basic institutional infrastructure to foster a strategic approach towards EEs and national start-up campaigns and entrepreneurship education dominate the policy landscape, often in a rather scattergun and untargeted approach. Policy is public sector-led and very top-down. Countries like Estonia, Chile, China, Mexico, Poland and Russia fall into this grouping.

Second, in *developing ecosystems* policy makers are grappling with the concept but are 'institutionally thicker' than the first group.[31] In these contexts, start-ups are still viewed as the primary conduit for entrepreneurial success, but some are experimenting with policies to develop scale-ups. Policies are creating a strong public sector-led 'support ecosystem' towards supporting start-ups. Although public sector-led initiatives dominate, some

[30] https://nextbillion.net/how-much-do-accelerators-help-entrepreneurs-raise/

[31] Ash Amin's theory of 'institutional thickness' seems a useful concept to further explore EEs (see Zukauskaite et al, 2017).

developing ecosystems involve co-investment programmes with the public sector.[32] Countries and regions resembling these traits include Australia, Belgium, Ireland, Finland, New Zealand and UK regions like Scotland.

In the final group of *advanced ecosystems,* policy makers have fully grasped the EEs concept. In these economies, intermediaries and connectors in the ecosystem are more sophisticated, with a stronger role for private sector actors, often with a strong external orientation. Within these contexts, policy is typically quite 'light touch' and focuses heavily on boundary-spanning initiatives and enhancing connectivity across multiple ecosystems. Many US states, major capital cities (e.g. London, Berlin and New York) and small countries like Denmark, the Netherlands, Israel and Sweden resemble this policy archetype. Even in this group of countries, however, genuine systemic approaches remain rare.

5.3. *Policy Recommendations*

Despite its attendant shortcomings, valuable policy lessons can be garnered from the preceding analysis. Throughout the paper we have deliberately and intentionally avoided a normative approach towards prescribing how practitioners can (or should) operationalise the concept. This owes to the fact that every ecosystem is different so a "one-size fits" all approach would inevitably be counterproductive (Mason and Brown, 2017, p.27). That said, we feel there are general principles regarding policy and recommendation which are broadly applicable for the different varietal types of EEs delineated above.

In terms of first principles, despite being a market-oriented form of industrial policy, overcoming protracted problems within ecosystems such as "network failures" is likely to

[32] Organisations such as SITRA in Finland and Scottish Enterprise in the UK undertake these types of co-investment programmes (Grilli and Murtini, 2014).

require a strategic role for the state. When formulating new types of policy interventions it seems that 'relationships' and 'context' matter. In terms of the former, future policy efforts may wish to pay closer attention to fostering the relational connections between different EE actors. Eradicating 'network failures' and promoting inter-actor relational connections should be given a much stronger prominence within policy frameworks, rather than single actor-focused interventions. A focus on harnessing synergistic relational connections between SMEs and other EE actors was strongly evident within successful systemic initiatives. Building stronger networks can also build community logic, trust and ultimately resilience within an ecosystem (Roundy et al, 2017).

Another core principle and key policy message is the need to resist policy replication. The fact that local contextual factors fundamentally shape regional ecosystems contrasts with the dominant approach within policy frameworks which relies heavily on policy isomorphism and crude emulation of the 'usual suspects' adopted elsewhere (e.g. start-up programmes, university commercialisation schemes, incubators, accelerators, co-investment equity funds etc.). Simply transplanting these types of entrepreneurial actors/activities which operate effectively in favoured places such as Silicon Valley, New York, London or Berlin and replicating them elsewhere is unlikely to prove effective[33]. The corollary is the need for much greater local customisation when formulating effective policy measures. Therefore, it is strongly incumbent upon policy makers to design and tailor interventions according to the innate specificities of their local EEs (Miles and Morrison, 2018)[34], rather than relying on a

[33] Brown et al (2019) provide a good discussion of policy replication and accelerators.
[34] Miles and Morgan (2018) similarly rally against crude policy transfer and suggest alternative approaches for rural EEs such as "economic gardening" to help support existing local SMEs.

crude 'tool-kit' of actions and interventions developed by policy makers in dissimilar economic contexts.

Following on from this, clearly policy frameworks will need to be customised to fit the nature and needs of the local EE. Turning to the typology highlighted early, the primary role of policy makers in so-called "emergent" EEs is to try to reduce informational asymmetries and offer incentive mechanisms to stimulate entrepreneurship. In these types of anaemic entrepreneurial environments, policy makers need to ensure that entrepreneurial actors have sufficient information, linkages and resources to be able to establish new ventures. Interventions should enable access to finance, access to markets, access to knowledge and skills. As work in Manizales in Colombia has shown, "aligning the leaders" and gaining buy-in from various local stakeholders within this emergent EE was central to propelling the region towards an upward entrepreneurial trajectory (Isenberg and Onyemah, 2016, p. 66).

In terms of *developing* EEs which have quite strong existing levels of entrepreneurial activity the focus should be much more targeted and relationally-focused. In terms of targeting, whilst start-ups have overwhelmingly dominated the EE discourse to date, developing growth-oriented SMEs is probably of much greater significance as they spawn far greater entrepreneurial spillovers (Brown et al, 2017) whilst also benefiting the most from industrial policy interventions (Criscuolo et al, 2019). Therefore, moving the focus of policy targeting away from start-ups to fostering scale-ups seems logical (Shane, 2009). Such interventions should avoid transactional support (grants, tax incentives, soft loans, etc) and instead offer softer forms of relational support via peer-based networks. The UK's Future Fifty programme is an excellent example of this type of connective and relational support.

Indeed, many of the scale-up programmes examined such as Scale-Up Denmark appeared successful and tend to be very cost-effective[35].

Finally, in terms of *advanced* EEs as a broad rule of thumb policy ought to be much more laissez-faire and outwardly-focused. Fostering multi-scaler connectivity with other entrepreneurial actors such as accelerators and other specialist investors such as VCs may help these types of EEs. A good example of this is famous Yozma Fund in Israel. Given that the Fund required involvement of reputable foreign financial institutions (generally a VC company), this triggered effective learning processes and know-how within the local Israeli start-up community whilst spawning more indigenous sources of VC (Wonglimpiyarat, 2016). Similarly, some scholars advocate the need for policy initiatives to encourage the mobility of entrepreneurs and other entrepreneurial actors such as accelerator managers to link different EEs together (Schäfer and Henn, 2018). The Hiyaku Programme operated by Japan's METI is one such outwardly oriented example.

6. Conclusions

While there is now an expanding literature examining EEs, this is the first attempt to systematically examine and categorise policy frameworks deployed under the auspices of the concept, thereby enabling us to offer an empirically grounded typology of different policy frameworks instigated under the ecosystem rubric. This is an important contribution to the EE literature owing to the manner in which the concept has pervasively permeated a range of different institutional actors such as think tanks, policy makers, economic development actors

[35] Typically, these programmes like the Scottish Enterprise Companies of Scale programme offer bespoke support services on leadership, business strategy, overseas market entry and peer-based mentoring for a small number of high growth firms but offer no financial assistance (OECD, 2013).

and entrepreneurs alike. Indeed, as a result of this study, it is hoped the paper can help lead to a more rigorous and carefully considered policy making in this area.

The paper attests to the fact that the EE concept is being utilised ubiquitously and capriciously in wide array of contexts at various spatial scales for analysing, informing and intervening to promote entrepreneurial activity. Whist this notoriety marks it out as the latest industrial policy "blockbuster", popularity alone by no means guarantees its "profundity" (Martin and Sunley, 2003, p. 7). Our review suggests that due to multiple definitions and variegated conceptual interpretations the EEs concept remains a very "messy metaphor". Similarly, our findings found a large degree of conceptual ambiguity and policy incongruence between the underlying systemic nature of the EE concept and its operationalisation within public policy. The over-reliance on start-ups under this conceptual umbrella reflects pervasive path-dependencies within the entrepreneurship policy sphere.

Ultimately, whether the EE concept becomes a policy panacea (or placebo) remains an open question. Inevitably, this paper only scratches the surface of how public policy operates in this highly variegated, complex and rapidly moving policy domain. More detailed research using innovative finely-grained research methods will be required to properly unpack these issues further. We hope this paper encourages other scholars to subject the latest industrial policy 'blockbuster' to further empirical scrutiny.

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