

ECOSYSTEM HEALTH CHECK

A person is working at a desk. In the background, a laptop screen displays a bar chart with several vertical bars of varying heights. The person's hands are visible in the foreground, holding a pen and writing on a notebook. The overall scene is dimly lit, suggesting an indoor office or study environment.

A SELF-ASSESSMENT TOOL FOR ECOSYSTEM BUILDERS

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This guide is designed to help ecosystem builders in their work by providing validated insights that can be used to check whether an entrepreneurial ecosystem project is on the right track to achieve systemic growth and development. For this purpose, better indicators of change are needed.

We believe that the proposed analytical model is a suitable and easy-to-use tool that will help to:

- Measure the extent of a known situation, confirm or disprove a hypothesis, and provide new perspectives on the current reality in the ecosystem;
- Enhance knowledge, attitude and behavior relating

to specific themes and identify what is known and which measures are taken in respect of various subjects relating to collaboration;

- Establish the baseline (reference value) for use in future assessments to help measure the effectiveness of the projects in strengthening the local ecosystem;
- Give guidance to existing projects and inform them about the metrics that can be included for the various projects;
- Provide input to adjust current interventions or suggest new intervention strategies.

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BACKGROUND INFORMATION ON THE ORGANIZATIONS:

SWISSCONTACT:

[Swisscontact](#) is a leading organization for the implementation of international development projects. We promote inclusive economic, social and environmental development to make an effective contribution towards sustainable and widespread prosperity in developing and emerging economies.

In cooperation with Credit Suisse, Swisscontact launched the [CSSC](#) Initiative that aims to identify best practice approaches to the promotion of entrepreneurship and ecosystem building in emerging markets and to share our insights with the global community.

Swisscontact has been pioneering the use of social network analysis (SNA) to map and better understand the dynamics within entrepreneurial ecosystems. Through our research, we provide guidance on how to grow ecosystems and make sure information travels fast and effectively. While the SNA studies provide in-depth analysis on ecosystem dynamics, the ecosystem health framework presented here has been designed as a comprehensive self-assessment tool for ecosystem builders to measure the health and equity of an entrepreneurial ecosystem over time.

For more information on our SNA approach and in-depth reports on Kigali (Rwanda), Kampala (Uganda) and Phnom Penh (Cambodia).

STARTUP HEATMAP EUROPE:

The [Startup Heatmap](#) aggregates data on start-up ecosystems in Europe and beyond. It offers a versatile dataset of >100 variables at city level, ranging from investments and job creation to meetup activities and purpose orientation. The unique focus on the city as a unit of analysis positions the Heatmap as an ideal partner to ecosystem builders in regional development, municipalities and international collaboration.

The [DEEPSEA Ecosystem Accelerator](#) program has trained more than 180 ecosystem leaders on three continents in a multi-week program. The team behind it consists of practitioners, investors and entrepreneurs. Together with Swisscontact, their mission is to provide ecosystems all around the world with a self-assessment tool to evaluate the health of and growth opportunities for their start-up communities.

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1. ENTREPRENEURIAL ECOSYSTEMS AS COMPLEX ADAPTIVE SYSTEMS

The development of ecosystems is often thought to be a linear process that starts at zero and results in a thriving ecosystem in its final stage if all the necessary conditions are met. The reality is often different. An entrepreneurial ecosystem is, in fact, a complex system that can be understood as a “rainforest” (Hwang & Horowitz, 2012), where many species of plants seem to grow randomly and do not follow any pattern or structure. The richer and more diverse the available resources, the more the rainforest will flourish. Further, while each plant in the ecosystem competes for resources, they also reinforce the existence of others.

This complexity and fine balance between collaboration and competition is also true of entrepreneurial ecosystems. Like rainforests, the concept of complementarity – which denotes the mutually beneficial interplay between different elements in a system, where the presence of one element increases the value of others – is key to the establishment of a strong entrepreneurial ecosystem. In short: An ecosystem is much more than a collection of actors and organizations; it is a network where the whole is greater than the sum of its parts.

“The organizational structure of an entrepreneurial ecosystem shall be mostly horizontal, not vertical. When you help someone, you may not expect them to repay the favor directly, but you do expect that someone else will repay the favor in some other way. It is as if individuals are making a transaction with the system as a whole, based on faith that it ultimately rewards people who are helpful to others.”

Victor Hwang & Greg Horowitz

However, unlike a rainforest, an entrepreneurial ecosystem does not always grow naturally and needs support.

The task for ecosystem builders or development organizations working with entrepreneurship support organization (ESO) is therefore to look beyond the success of the individual and to empower the collective.

While it is widely recognized that a functioning ecosystem must be in place to foster systemic entrepreneurial success, the key question is how to measure the success of entrepreneurial ecosystems and which factors should be included in this evaluation. Although an increasingly academic debate is evolving around this topic, our objective is to present a pragmatic approach for how to monitor whether the ecosystem as a whole is improving over time.

The challenge we face in this context is that our current concepts about metrics are focused on input-output systems, e.g. the level of government investment in innovation versus the value of start-ups created. The weakness of these systems is that they cannot really tell us what is going on in the “black box” in between, i.e. the actual ecosystem. To optimize the workings of the ecosystem, we must identify metrics that help us to understand the information stored in the black box.

An ecosystem building project operates under similar conditions to a start-up: It intends to bring about changes in a complex environment but lacks certainty about which actions will produce the intended results. It follows that the primary objective of ecosystem projects should be to gain validated insights regarding the path that leads to sustainable change instead of focusing on a set of predefined key performance indicators (KPIs).

According to Ries, creator of the lean start-up methodology, there are two basic type of metrics: “Vanity metrics” and “actionable metrics”. Vanity metrics are described as metrics that make you look good to others but do not help you to understand your own performance in a way that informs future strategies. In contrast, actionable

metrics can be described as inputs. They define which actions are necessary to achieve goals with measurable outcomes.

The bottom line is that if we are using vanity metrics without actionable metrics, we are only getting half of the KPI picture. When assessing whether our interventions are successful, we should avoid using “vanity metrics” that are not related to our objectives. Projects often mark their progress by quantifying engagement with direct beneficiaries, when such numbers may not indicate movement towards systemic change. It can be a great ego boost if hundreds of entrepreneurs attend a cohort from a particular pre-accelerator, but this does not mean much if they do not launch a product, acquire new customers or find the right support service for next stage of development.

These sets of metrics work best in tandem; vanity metrics are useful in keeping track of activities in order to increase our accountability and report back results to funding partners, while actionable metrics allow us to understand what is happening and if and how the behavior of the different actors is changing.

2. THE ROLE OF AN ENTREPRENEURIAL ECOSYSTEM

Why are entrepreneurial ecosystems important?

Today, ecosystems play a central role in the definition of business success, especially in view of the increasingly complex strategic decision-making environment. Many researchers show that in the era of digital technologies, global competition is driven by entrepreneurial ecosystems. David Teece (2014)¹, the scholar and entrepreneur who wrote more than 30 books and 200 academic papers on the topic of Strategic Management, suggests that the ecosystem concept could replace the concept of industry in the exploration of new opportunities and risks for businesses and territories.

What does “entrepreneurial ecosystem” mean?

An entrepreneurial ecosystem is not just defined by a cluster of isolated actors; instead, it is characterized by the connections and interdependencies between individuals, groups, organizations and institutions. It takes a holistic view that considers the performance of individual members of the ecosystem as a function of the overall performance of the ecosystem in which they are embedded (Iansiti & Levien, 2004).

An entrepreneurial ecosystem is therefore defined by a flourishing environment fostering entrepreneurship, growth, and development².

It seems clear from academics and practitioners that an ecosystem is made up of different elements interacting with one another over time and having a mutual influence. These systemic features are the bedrocks for the failure or the success of entrepreneurial initiatives (Jacobides et al, 2018).

Some academics believe that each ecosystem centers around the entrepreneur and his/her abilities to innovate

and develop activities that leverage local tangible and intangible infrastructures. The exploration of new opportunities and the exploitation of resources do indeed relate to the environment in which entrepreneurs are embedded. Consequently, it is important to provide an ecosystem with a coherent set of tangible and intangible resources that entrepreneurs can transform into new activities and projects.



To “empower” entrepreneurs, there are attempts by public and private actors to develop supportive systems for entrepreneurs. While most practitioners concede that an ecosystem can never be entirely planned or built and must grow organically, it is also clear that the development of an ecosystem is not a linear and unambiguous process.

To visualize the effects of external support for the start-up ecosystem, we have developed the “Ecosystem Nutrition Cycle”. It starts with an entrepreneurial community, which will itself build impactful start-ups over time. The below chart shows the positive effect on the volume and impact of entrepreneurial activities when institutions are in place to support start-ups. One highly effective approach is to “recycle” entrepreneurs who failed or exited their own start-ups and to ask them to support others who are seeking to establish new businesses. A further

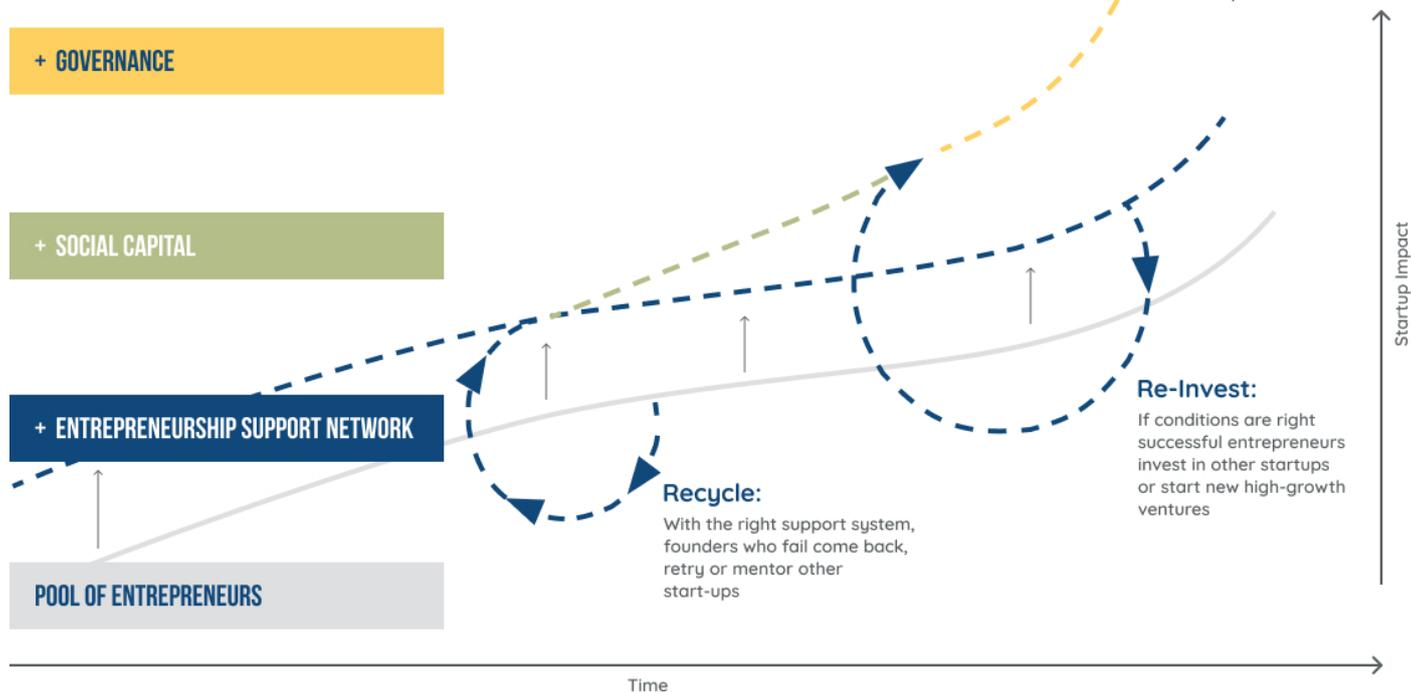
1. <https://www.davidjteece.com/>

2. Growth and development are understood to have two different meanings

in this context. “Growth” refers mainly to an increase in economic dimensions. “Development” signifies a process of gradual transformation along a sustainable path

THE ECOSYSTEM NUTRITION CYCLE

How the ecosystem helps entrepreneurs to outgrow their limits



growth boost can be provided by a supportive environment, defined by the social capital and governance systems that are in place.

Before defining a strategy to intervene in the development of an entrepreneurial ecosystem, it is crucial to consider the nature of the entrepreneurs who are already flourishing in and supporting the ecosystem, as the intervention must be seen as a collaborative effort together with them. A recent work proposes four categories of enterprises that differ significantly in terms of their needs and purpose during their growth path (Hornberger & Chau, 2018):

- **High-growth Ventures** – They enter the market as start-ups but thanks to their rapid growth, soon become large firms with significant potential, strong leadership and significant innovative strength – mainly based on digital technology.
- **Social Enterprises** – Innovative firms that target niche markets or customer segments and mainly focus on solving social or environmental prob-

lems, prioritizing social impact over pure economic growth.

- **Dynamic Enterprises** – Firms operating in traditional industries implementing incremental innovation, efficiency improvements and classic business models.
- **Sustaining Enterprises** – Small family firms or microenterprises selling traditional products and services in the local markets or value chains.

This classification does not refer solely to the needs of these types of enterprises but also to the different challenges they encounter over time, and to the different economic impact they can trigger across the ecosystem. An ecosystem builder must pay attention to these differences and ensure there is alignment between entrepreneurs and resources at the right time.

Depending on the target groups, the ecosystem will indeed follow different development paths. To account for these differences, we suggest setting priorities when mapping your ecosystem's health. You must ask

whether you are focusing on becoming a **high-growth based ecosystem (HGE)** that is seeking to achieve rapid growth fueled by venture capital, or an **inclusive and equitable ecosystem (IEE)**, which focuses on a variety of smaller innovative companies and prioritizes social impact over purely economic growth. There is no reason to believe that one ecosystem is better than the other, but they require different forms of support. For example, if you aim to build globally successful platform businesses, you need to have access to large amounts of risk capital. In contrast, if you are looking to generate social impact, you will not succeed without a well-developed system of beliefs that supports social entrepreneurship.



3. HOW TO DRIVE AN ENTREPRENEURIAL ECOSYSTEM ON A HEALTHY DEVELOPMENT PATH

The creation of entrepreneurial ecosystems has become the ambition of many actors in the field of economic development. However, determining the optimal strategies – at an individual or local level – to create and nourish entrepreneurial communities is difficult. While instruments to support entrepreneurship can soon be created, the main problem is to identify ways of measuring their effectiveness.

An ecosystem building project operates under uncertain conditions, where outputs are not the result of linear strategic choices but of complex interdependencies at system level. In other words: Even the best start-up incubator in the world cannot succeed if there is no investor community that is willing to risk investing capital in start-ups. And no investor community will exist if tax regulations prohibit speculative investments. This

example demonstrates that many elements have to come together to facilitate a successful outcome over time. The main measure of the success of ecosystem interventions must therefore be to validate whether the ecosystem project is on the path to creating sustainable change across a system, instead of focusing on pre-defined KPIs.

How can you measure what is happening in entrepreneurial ecosystems?

In the following section, our objective is to present a pragmatic approach on how to measure the health of an ecosystem and how to monitor whether the ecosystem is improving over time. The practitioner is, however, in need of metrics that help to identify the incremental steps influencing the functioning of an entrepreneurial ecosystem.

We propose a data-driven but practical approach to tracking entrepreneurial ecosystem conditions and developing coherent interventions to improve overall ecosystem health. Applying a multi-level approach to investigate the health of this complex unit of analysis, the ecosystem's components are broken down to allow for the definition of metrics that are measurable and comparable over time.

We have identified two structures that define the functioning of an ecosystem:

- The health of the **COMMUNITY** of entrepreneurs, individuals and firms who make up the population of an ecosystem in a specific region.
- The health of the **ENVIRONMENT** in which these individuals interact. This is defined by the underlying set of rules, institutions, limitations and opportunities that govern the relationship between individuals and their collaboration.



Figure 1: The structures at the core of a healthy entrepreneurial ecosystem.

THE COMMUNITY

There is a large consensus about the importance of looking at the state of the community to identify whether an ecosystem is characterized by a healthy systemic configuration (see Martin, 2010; Isaksen & Trippl, 2016; Bellandi et al., 2019). It is generally accepted that innovation is socially embedded and is the result of continuous interactions and the exchange of knowledge between actors and organizations. But who are these actors and organizations? What role do they play?

Depending on the nature of the set of organizations, actors and intangible factors, it is possible to understand whether an ecosystem is characterized by a favorable systemic structure, allowing for the implementation of

successful innovation processes as well as the creation and adoption of new technologies.

In these systems, multiple local actors generally serve as repositories of a complex set of knowledge that might be at the core of new entrepreneurial activities. However, innovation and entrepreneurship are only achievable if the systemic environment fosters engagement and has an adequate infrastructure to support the different stages of a start-up life cycle.

The status of the community can be mapped by looking at two different dimensions:

- Pool of Entrepreneurs
- Entrepreneurship Support Network

A. Pool of Entrepreneurs



Entrepreneurial success largely depends on the availability of talented entrepreneurs and the diversity of knowledge embedded in people and firms. There are two main aspects to be considered here: The density of specialized knowledge, providing the critical amount of talents needed to support innovation over time (i.e. knowledge and talent); and the diversity of both people and their organizations.

There is clear evidence that diversified ecosystems have a greater ability to embed new technical standards and to introduce technologies and forms of organization that are radically new. This diversity naturally includes scientific backgrounds or technological skills. However, the presence of a diversified set of entrepreneurs in

terms of gender, ethnical and societal backgrounds also makes a difference.

A1. Diversity & Inclusivity

Diversity of knowledge bases, competences and experiences enable an entrepreneurial ecosystem to capture new opportunities embedded in the system (Asheim et al., 2011).

A highly diverse pool of talent ensures knowledge recombination and innovation over time (Menzel & Fornahl, 2010; Isaksen, 2016). It is important to structure ecosystems in such a way that every member of society – no matter what their education, origin, gender, beliefs, sexual orientation, etc. – can participate in them. Further, an ecosystem characterized by a high degree of diversity is generally an ecosystem that incorporates some

formal and informal mechanisms that foster inclusion, knowledge sharing, and the emergence and validation of new ideas.

Diversity within a community of entrepreneurs can be measured by different proxies that depend on the prevailing type of entrepreneurs defining an entrepreneurial ecosystem. In Western Europe, we have observed an unfortunate underrepresentation of women in start-ups, which makes it an important proxy to measure progress in diversity and inclusivity. However, in different settings, other proxies could make more sense, e.g. the proportion of founders from minorities. It can make sense to measure more than one proxy and develop an index based on weighted inputs. However, to allow for an accessible measurement of diversity, it is also possible to focus on the most important factor with regard to your own ecosystem.

Structure	Dimension	Metric	Proxy	
			HGE	IEE
COMMUNITY	Pool of Entrepreneurs	Diversity & Inclusivity	1. Share of female founders 2. Share of foreign-born founders	1. Share of female founders 2. Share of founders from minorities/marginalized communities 3. Share of female PhD graduates

Table 1: Possible proxies for measuring Diversity & Inclusivity

A2. Knowledge & Talent

In addition to fostering the diversity of the talent pool, we must also ensure its density. In entrepreneurial ecosystems, the density of the talent pool triggers network effects and increases the innovative potential of the local environment. Moreover, increasing the innovative potential of an entrepreneurial ecosystem fosters a virtuous cycle that attracts more talented individuals who are inclined to become entrepreneurs, which in turn makes the area even more valuable and attractive.

The density of the available knowledge and talent can be measured using different proxies, once again separated by the main type of entrepreneurs present. For

example, a measure of density can be the number of developers per capita, making it possible to estimate the talent pool available to high-growth ventures. Alternatively, in an inclusive and equitable ecosystem, it might be interesting to measure the level of digital skills among university students as a means of understanding their ability to build digitally empowered start-ups. These proxies give us an idea of how much knowledge and talent are available in relation to the size of our ecosystem.

Structure	Dimension	Metric	Proxy	
			HGE	IEE
COMMUNITY	Pool of Entrepreneurs	Knowledge & Talent	1. Number of developers per capita	1. Share of start-ups with tech product
			2. Share of engineers among founders	2. Start-up Skills
			3. Number of tech start-ups per capita	3. Share of ambitious entrepreneurs

Table 2: Possible proxies for measuring Knowledge & Talent

B. Entrepreneurship Support Network

At the core of a healthy entrepreneurial ecosystem is a rich set of support infrastructures, helping to match actors across sectors and institutions. Their job is to break down traditional silos and increase connectivity within the community.

To measure the quality of the Entrepreneurship Support Network, we must look at the Start-up Support Organizations as well as the Specialization & Diversification of the support network.

B1. Start-up Support

Systemic support might take several forms – from the establishment of incubators and accelerators to measures aimed at attracting venture capital and corporate collaboration partners from industry.

Experienced entrepreneurs or investors who actively foster new entrepreneurship have a key role to play in an entrepreneurial ecosystem. The culture whereby successful entrepreneurs “give something back” to the ecosystem is indeed of key importance for the activation of imitation processes. Such processes evolve into a

form of “self-enforcing loop” once mentors and mentees become peers. In many situations, the mentor often learns more from the mentee than vice versa. At some point in time, they become mentors to each other (Feld, 2020).

It is extremely difficult to measure the quality of the start-up support system as a whole and therefore – as with many complex systems – we must resort to the use of proxies to gain an approximation. One accepted conviction is that the activation of serial entrepreneurs to support early-stage founders is one such characteristic that could help to estimate whether the support system is intact. The assumption is that serial entrepreneurs would not be active in relatively large numbers, or over time, if they were embedded in a dysfunctional support network where their efforts are in vain. Alternatively, one might look at other characteristics that are indicative of a functioning ecosystem, such as the success rate of accelerator programs, e.g. in terms of follow-on funding raised or the acceptance of entrepreneurship courses among the population. It is important that a proxy is chosen that makes it possible to compare objectives and the actual results achieved by the local support network.

COMMUNITY

A

POOL OF ENTREPRENEURS

- Diversity & Inclusivity
- Knowledge & Talent

B

ENTREPRENEURSHIP SUPPORT NETWORK

- Start-up Support
- Specialization & Diversification

Structure	Dimension	Metric	Proxy	
			HGE	IEE
COMMUNITY	Entrepreneurship Support Network	Start-up Support	1. Number of start-ups per capita 2. Share of accelerated start-ups receiving follow-on funding 3. Companies with exits as a share of the total number of companies receiving investments 4. Share of mentors with start-up experience	1. Share of mentors with start-up experience 2. Number of profitable social enterprises 3. Share of people with an entrepreneurial attitude

Table 3: Possible proxies for measuring Start-up Support

B2. Specialization & Diversification

Several studies point to specialization and diversification as important metrics when assessing the innovation capacity of an entrepreneurial ecosystem. As suggested by Isaksen and Trippel (2016), strong industrial clusters show a higher capacity to absorb technological knowledge. This is, for example, connected to the specialized support that a cluster of biotechnology companies can offer newcomers in the field versus an ecosystem that has few or no local champions in their sector.

However, according to literature about economic geography, diversification also plays an important role. A diverse set of industries and therefore lateral support formats allow for cross-fertilization between various knowledge domains. This can be achieved by providing convention spaces and opportunities for university stu-

dents, industry representatives, start-ups and SMEs from all sectors to interact.

To understand whether the Entrepreneurship Support Network has a good balance in terms of specialization and diversification, we can look at the presence and strength of various sectors in the entrepreneurial ecosystem. When there is a good number of start-ups and young firms that have different maturity levels and are specialized in different sectors, we can assume that there is also a diverse support network. In contrast, if a region with a concentration of large banks does not produce any fintech start-ups, it can reasonably be assumed that there is a broken link between industry and the support network. We can therefore use the outputs of the entrepreneurial ecosystem as a proxy for measuring the presence or absence of a balanced support network.

Structure	Dimension	Metric	Proxy	
			HGE	IEE
COMMUNITY	Entrepreneurship Support Network	Specialization & Diversification	1. Investments based on stages 2. Investments based on sectors 3. Diversity of firms based on sectors	1. Share of programs focusing on specialized verticals (sector, technology, interest) 2. Diversity of projects based on business models (for-profit and high-growth vs. NGO & non-profit) and revenue stages

Table 4: Possible proxies for measuring Specialization & Diversification

THE ENVIRONMENT

It is well known that low interaction costs increase networking and knowledge sharing, which in turn make locations attractive for investors and new talent.

Interaction costs are defined in terms of the efforts of a support network as well as the “rules of the game” (North, 1990), i.e. the norms, regulations and cultural practices that prevail in the local ecosystem. These rules provide incentives and increase coordination – ideally promoting the exchange of knowledge, co-learning and innovation (Scott, 2008). To illustrate the effect of formal and informal rules (e.g. routines, trust and also market regulation and bureaucracy) on the innovation capacity of a community, try to imagine a university where business and engineering students are highly competitive and vie with each other due to a year-long feud about who has the better sports team. The fact that casual encounters between students of both disciplines outside of class are rare due to this rivalry significantly reduces the possibility of cross-fertilization of start-up ideas.

Taking this to a more abstract level, Evenhuis (2017) shows that these rules might refer to two different levels. Some refer to the business sphere, defining customs and established forms of trading goods and services, e.g. how to set prices and assign value. Other rules refer to tax rates and incentives, which are set by government or society. Both of these levels have an impact on shaping the socio-economic interactions taking place within the ecosystem and across ecosystems, but they take effect at two different levels.

The status of the “rules of the game” can be therefore mapped by looking at two different dimensions:

- C. Social Capital
- D. Governance

C. Social Capital

The tacit or codified rules at the business level operate mainly between economic players. They range from quality certification of products, tacit working practices, pricing mechanisms across the local value chain,

routines to accelerate transactions, and skills training schemes, to entities that articulate and orchestrate particular interests, such as chambers of commerce, business associations, labor unions etc. At the business level, the rules of the game are mainly subject to geographical limits, and they are not transferable across ecosystems as they are mainly related to the specific characteristics of the local community of businesses and entrepreneurs.

ENVIRONMENT



SOCIAL CAPITAL

- Network Density
- Innovation Culture

In entrepreneurial ecosystems, trust and connectivity are crucial for the definition of a healthy structure. Both relate to the concept of social capital.

Bourdieu (1986) defines social capital as:

‘The aggregate of the actual potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition’.

Putnam (2000) refers to it as:

‘Features of social organizations, such as networks, norms and trust that facilitate action and cooperation for mutual benefit.’.

In line with these definitions, a high level of social capital encourages new entrepreneurial initiatives because of higher levels of connectivity. In other words: With the right norms and trust in place, it is easier to access information or resources from other entrepreneurs.

A much-cited criterion for successful ecosystems is the “give first” rule, where economic actors accept a degree of risk that they may not gain a return on their investment and engage in collaborations with start-ups without knowing whether it will pay off.

To measure Social Capital, it is important to look both at **Network Density** and **Innovation Culture**.

C1. Network Density

In the Community dimension, we looked at the existence of the right set of individuals and firms in the ecosystem. The Network Density metric goes one step further and explores their willingness to collaborate and the corresponding degree of connectivity. It is no use having a great hub for talent if the individual actors do not meet and initiate projects together. Likewise, an ecosystem is unproductive if many international investors have their

headquarters in a city but do not consider investing in local entrepreneurs.

To find a proxy to measure network density in an ecosystem, we can look at meetup activity in a city, as it allows us to understand the willingness of the community to get together and exchange views and ideas. Atomico, the leading European venture fund started by Skype co-founder Niklas Zennstroem, pointed out that locations with a higher number of meetup participants also manage to attract greater investment (Atomico, 2018). Alternatively, ecosystem collaboration can be considered in concrete start-up cases, e.g. by examining whether business angels are active on a variety Boards or whether local incubators support overlapping start-ups. While the idea is not to reach 100% overlap, the synergetic behavior of support actors indicates a higher willingness to collaborate.

Structure	Dimension	Metric	Proxy	
			HGE	IEE
ENVIRONMENT	Social Capital	Network Density	1. Participants in tech meetups per capita 2. Number of tech meetups per capita	1. Participants in tech meetups per capita 2. Number of startup communities / entrepreneur communities

Table 5: Possible proxies for measuring Network Density

C2. Innovation Culture

Many studies exploring innovation culture in ecosystems clearly demonstrate that alliances and partnerships between ecosystem actors facilitate the exploration and exploitation of new technological knowledge. However, there are several risks connected to open innovation, including moral hazard and the opportunity for one of the partners (often the bigger one) to “steal” ideas. Entrepreneurs find themselves in a weak position, as the ability to rapidly find resources to support their innovation strategy is dependent on maximum openness on both sides.

If the environment within the entrepreneurial ecosystem is healthy, there are “soft rules” in place that prevent such behavior and actually incentivize larger players to also engage in an open innovation culture. This can be

a set of rules that all participants in an ecosystem must agree to uphold – e.g. to not steal the ideas of others – or a common belief in the benefits of openness and an understanding that actors can gain more opportunities through collaboration than through competition. Examples of rule setting can often be found at matchmaking events, where organizers request that participants report on follow-up activities. If no information is provided or negative feedback is given, the participant might not be invited to future events.

A common means of measuring Innovation Culture is to survey founders and stakeholders in the ecosystem and ask them directly about their willingness to openly share ideas and to connect and collaborate. There may be some difficulties with data collection if this type of survey was not planned in advance. To measure the

open Innovation Culture in an ecosystem, we recommend reverting to proxies of trust. One way to understand whether stakeholders trust the environment is by asking the simple question: Are they willing to put money in projects here? If there is no trust in the ecosystem, this may be attributable to a lack of established rules or joint beliefs that ensure the smooth functioning of the process. A good metric of trust might therefore be the level of investments, as they entail a higher level of risk and are made based on the hope that future benefits will be realized. For example, we can understand how

much confidence a firm has in working with the ecosystem by the size of the investment it makes there. Even in a subsistence economy, you can observe different levels of trust in the local ecosystem, e.g. when looking at the proportion of small firms that own property. Are they willing to invest some of their hard-earned capital in purchasing a large parcel of land where their shop is located because they believe that its value could increase in the future? Or do they see their position as transitory and hope to leave their current location as soon as possible – saving up money for the next move?

Structure	Dimension	Metric	Proxy	
			HGE	IEE
ENVIRONMENT	Social Capital	Innovation Culture	1. Sum of foreign investments per capita 2. Total VC investments per capita 3. Number of deals EUR >1 million per capita	1. Share of research expenditure on business enterprise 2. Innovation global ranking 3. Foreign direct investment

Table 6: Possible proxies for measuring Innovation Culture

D. Governance

Governance describes the sum of rules and arrangements, defined here as “the pursuit of collective interests and the steering and coordination of society” (Peters & Pierre, 2006, 209). These include laws and regulations but can also encompass public spending and initiatives. The government and other actors with governance powers undoubtedly impose limits on economic behavior and the available opportunities. However, their rules can also have the positive effect of helping to prevent corruption, accelerate business processes or increase economic certainty. Another important aspect of governance is International Connectivity, which not only encompasses the global ambitions of entrepreneurs but also the existence or non-existence of policies allowing for the opening (and closure) of a business, or the granting of special visas for foreign nationals. While International Connectivity can be seen as a function of governance since the most basic questions on market access are regulated by government, there is also an important aspect concerning the “brand perception” of

locations. Do investors and start-ups consider a country or a region to be a favorable destination to invest, set up their business or expand to a second office? The effect of brand perception cannot be underestimated and it is naturally a function of the interplay between policies and economic activities in establishing international relations.

In this respect, **Policies** and **International Connectivity** define the main metrics at the core of new technology creation and adoption, as well as the development and growth of entrepreneurial ecosystems for this level.

D1. Policies

The existence of trustworthy institutions and a reliable governance system is fundamental to foster a healthy business environment where entrepreneurship is supported by regulations that are designed to combat corruption, ease business processes and increase partnerships.

Klapper et al. (2011) describe how policymakers can foster entrepreneurship with policies or programs aimed

ENVIRONMENT



SOCIAL CAPITAL

- Network Density
- Innovation Culture



GOVERNANCE

- Policies
- International Connectivity

at modifying regulations, such as easing constraints on the business environment, expanding access to credit, or promoting value chain integration. Specifically, governments have become increasingly interested in fostering a positive climate for entrepreneurship through favorable tax rates and incentives and by eliminating bureaucratic processes – such as those associated with permit and license applications – that can otherwise hamper the establishment of businesses (Porter 1998).

The suitability of local policies can be measured using different proxies, ranging from ratings for the ease of doing business to the willingness of entrepreneurs to

set up their headquarters in their home country. In fact, it is a commonly observed behavior that entrepreneurs locate their legal headquarters in a different country to their actual operations due to concerns about the robustness of local legal frameworks. Depending on the local situation, different proxies may be most effective in capturing the quality of the policies.

Structure	Dimension	Metric	Proxy	
			HGE	IEE
ENVIRONMENT	Governance	Policies	1. Ratings for ease of doing business 2. Share of start-ups with no international headquarters	1. Ratings for ease of doing business 2. Number of pro-business initiatives

Table 7: Possible proxies for measuring Policies

D2. International Connectivity

International Connectivity is a function of governance, as described above. The ability to connect internationally has traditionally been limited by regulations and international treaties, as well as by infrastructure. However, a newer approach determining international connectivity is the brand of a nation or region, as this is the basis on which external stakeholders decide whether or not to collaborate with an ecosystem.

International connectivity is therefore a fundamental metric for assessing the effectiveness of governance

arrangements in the creation of a visible and valuable ecosystem, forming the perception among external players of the actual and potential value of the entrepreneurial ecosystem.

The scale of international connectivity of an entrepreneurial ecosystem can be measured by proxies such as the brand perception of a start-up hub. Alternatively, one could look at the number of international tech conference participants or second offices of top international start-ups as a function of the connectivity of a location.

Structure	Dimension	Metric	Proxy	
			HGE	IEE
ENVIRONMENT	Governance	International Connectivity	1. Number of international top start-ups with offices in the city 2. Number of international conference participants in the city 3. Ecosystem brand and visibility	1. Share of young companies with sales in foreign markets Share of start-ups that moved to the ecosystem from another country

Table 8: Possible proxies for measuring International Connectivity

4. CONCLUSIONS

The framework that has been developed makes it possible to apply a pragmatic approach when measuring the health of an ecosystem and determining whether the ecosystem is improving over time and is on a sustainable development path.

The data-driven method we have proposed applies a multilevel approach to investigate the health of this complex unit of analysis. By breaking down the ecosystem's components, we have been able to define a set of metrics that track entrepreneurial ecosystem conditions and are central to the development of coherent interventions for improving overall ecosystem health. By introducing standardized criteria to measure and diagnose ecosystems, it is possible to create a strong theoretical basis that reduces the uncertainty facing ecosystem builders and increases the impact of their actions and resources, as well as the relevance of their work.

In our framework, as shown in Figure 2, we identify:

- Two structures that define the functioning of an ecosystem (i.e. the Community of Entrepreneurs and the Environment in which these individuals interact);
- Four dimensions mapping out the different components of the two structures (i.e. the Pool of Entrepreneurs, Entrepreneurship Support Network, Social Capital, and Governance);
- Eight metrics allowing for the definition of measures for each dimension (i.e. Diversity & Inclusivity, Knowledge & Talent, Start-up Support, Specialization & Diversification, Network Density, Innovation Culture, Policies, and International Connectivity).

Finally, we decided to provide an overview of the possible proxies that can be used to estimate the eight metrics (see Table 9). In addition, a guide is available to support the practical implementation of the framework.

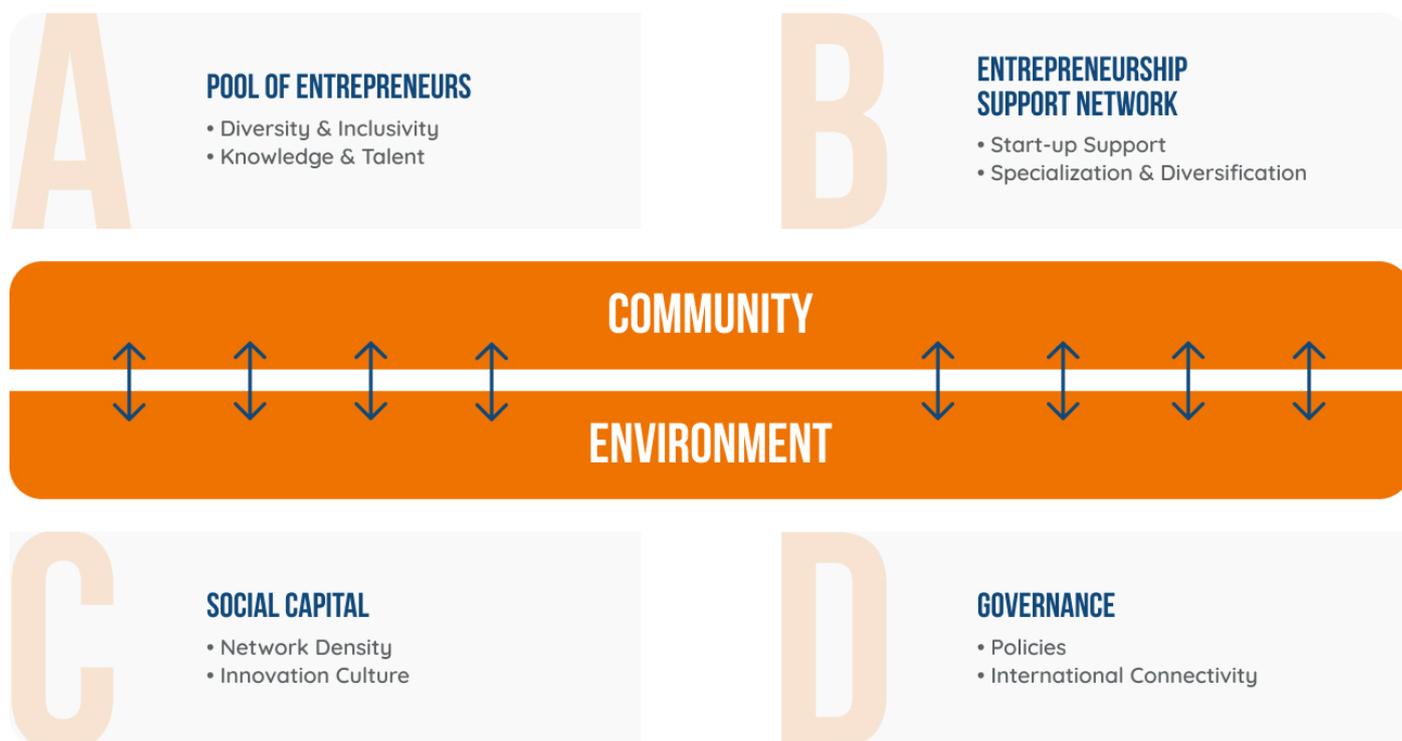


Figure 2: Ecosystem Health Check framework

ANNEX

Structure	Dimension	Metric	Proxy		
			HGE	IEE	
COMMUNITY	Entrepreneurial Landscape	Diversity & Inclusivity	<ol style="list-style-type: none"> 1. Share of female founders 2. Share of foreign-born founders 	<ol style="list-style-type: none"> 1. Share of female founders 2. Share of founders from minorities/marginalized communities 3. Share of female PhD graduates 	
		Knowledge & Talent	<ol style="list-style-type: none"> 1. Number of developers per capita 2. Share of engineers among founders 3. Number of tech start-ups per capita 	<ol style="list-style-type: none"> 1. Share of startups with tech product 2. Start-up skills 3. Share of ambitious entrepreneurs 	
	Entrepreneurship Support Network	Start-up Support	<ol style="list-style-type: none"> 1. Number of start-ups per capita 2. Share of accelerated start-ups receiving follow-on funding 3. Share of companies with exits from total companies receiving investments 4. Share of mentors with start-up experience 	<ol style="list-style-type: none"> 1. Share of mentors with start-up experience 2. Number of profitable social enterprises 3. Share of people with an entrepreneurial attitude 	
			Specialization & Diversification	<ol style="list-style-type: none"> 1. Investments based on stages 2. Investments based on sectors 3. Diversity of firms based on sectors 	<ol style="list-style-type: none"> 1. Share of programs focusing on specialized verticals (sector, technology, interest) 2. Diversity of projects based on business models (for-profit and high-growth vs. NGO and non-profit) and revenue stages

Table 9: List of Proxies - Part 1

Structure	Dimension	Metric	Proxy	
			HGE	IEE
ENVIRONMENT	Social Capital	Network Density	1. Participants in tech meetups per capita 2. Number of tech meetups per capita	1. Participants in tech meetups per capita 2. Number of start-up communities /entrepreneur communities
		Innovation Culture	1. Total of foreign investments per capita 2. Total VC investments per capita 3. Number of deals EUR > 1 million per capita	1. Share of research expenditure on business enterprise 2. Innovation global ranking 3. Foreign direct investment
	Governance	Policies	1. Ratings for ease of doing business 2. Share of startups with no international headquarters	1. Rankings for ease of doing business 2. Number of pro-business initiatives
		International Connectivity	1. Number of international top startups with offices in the city 2. Number of international conference participants in the city 3. Ecosystem brand and visibility	1. Share of young companies with sales in foreign markets 2. Share of start-ups that moved to the ecosystem from another country

Table 9: List of Proxies - Part 2

REFERENCES

- Asheim, B. T., Smith, H. L., & Oughton, C. (2011). Regional innovation systems: theory, empirics and policy. *Regional studies*, 45(7), 875-891.
- Bellandi, M., De Propriis, L., & Santini, E. (2019). An evolutionary analysis of industrial districts: the changing multiplicity of production know-how nuclei. *Cambridge Journal of Economics*, 43(1), 187-204.
- Evenhuis, E. (2017). Institutional change in cities and regions: a path dependency approach. *Cambridge Journal of Regions, Economy and Society*, 10(3), 509-526.
- Feld, B. (2020). *Startup communities: building an entrepreneurial ecosystem in your city*. John Wiley & Sons.
- Fischer, M.M., (2001). Innovation, knowledge creation and systems of innovation. *The annals of regional science*, 35(2), pp.199-216.
- Hwang, V. W., & Horowitz, G. (2012). *The rainforest: The secret to building the next Silicon Valley*, Regenwald, California, U.S.A.
- Hornberger, K., & Chau, V. (2018), *The missing middles. Segmenting Enterprises to Better Understand Their Financial Needs*, Dalberg.
- Jansiti, M., & Levien, R. (2004). *The keystone advantage: what the new dynamics of business ecosystems mean for strategy, innovation, and sustainability*. Harvard Business Press.
- Isaksen, A. (2016). Cluster emergence: combining pre-existing conditions and triggering factors. *Entrepreneurship & Regional Development*, 28(9-10), 704-723.
- Isaksen, A., & Trippl, M. (2016). Path Development in Different Regional Innovation Systems: A Conceptual Analysis. In Parrilli, M. D., Fitjar, R. D., & Rodríguez-Pose, A. (Eds.), *Innovation drivers and regional innovation strategies*. Routledge (pp. 82-100). Routledge.
- Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, 39(8), 2255-2276.
- Klapper, L., Lewin, A., & Delgado, J. M. Q. (2011). The impact of the business environment on the business creation process. In *Entrepreneurship and Economic Development* (pp. 108-123). Palgrave Macmillan, London.
- Martin, R. (2010). Roepke lecture in economic geography—rethinking regional path dependence: beyond lock-in to evolution. *Economic geography*, 86(1), 1-27.
- Menzel, M. P., & Fornahl, D. (2010). Cluster life cycles—dimensions and rationales of cluster evolution. *Industrial and corporate change*, 19(1), 205-238.
- North, D. C. (1990). A transaction cost theory of politics. *Journal of theoretical politics*, 2(4), 355-367.
- Peters, B. G., & Pierre, J. (Eds.). (2006). *Handbook of public policy*. Sage.
- Porter, M. E. (1998). Clusters and the new economics of competition (Vol. 76, No. 6, pp. 77-90). Boston: Harvard Business Review.
- Scott, W. R. (2008). *Institutions and organizations: Ideas and interests* (3rd ed.). Thousand Oaks, CA: SAGE Publications.