Designing a National Entrepreneurial Ecosystem Benchmarking Tool – Expert Workshop

13 December 2023

Hybrid workshop organised by the OECD Centre for Entrepreneurship, SMEs, Regions and Cities

What's the issue?

Start-ups drive economic growth by bringing innovative new products, services and processes to the market and stimulating competition across the economy. There is wide variation between countries in the numbers of new businesses being created and, crucially, the degree to which these start-ups go on to deliver wider benefits for the economy. A country's success in creating start-ups and growing them into scale-ups is shaped by the quality of its entrepreneurial ecosystem.

How supportive is the regulatory framework for a young business? Is finance available? Is there a strong supply of talent in the labour market or investments in knowledge by universities and corporations? Does society celebrate successful entrepreneurs and encourage risk-taking? The answers to these questions will provide insights into the conditions for entrepreneurship, and ultimately the way in which prosperity is achieved in countries.

The OECD is developing a national entrepreneurial ecosystem benchmarking tool to measure the strengths and weaknesses of entrepreneurial ecosystems in order to support policy makers in diagnosing important areas for national policy action, and to monitor the evolution of the ecosystem and evaluate policy interventions. The tool will be made up of a series of internationally-comparable indicators of entrepreneurial ecosystem elements and its entrepreneurship outputs, working with experts at Utrecht University.

This technical workshop gathered policy officials and experts in the field of entrepreneurial ecosystems to discuss the proposed structure, elements and indicators of the tool and how the tool can be used in future policy development.

The rationale for a National Entrepreneurial Ecosystems Benchmarking Tool

Dr. Jonathan Potter, Head of the Entrepreneurship Policy and Analysis Unit, OECD explained the demand that exists from governments for a tool that diagnoses strengths, weaknesses and bottlenecks in their national entrepreneurial ecosystems. **Professor Erik Stam, Utrecht University & Stellenbosch University** then set out in further detail the rationale for developing a new set of indicators on the performance and characteristics of entrepreneurial ecosystems at the national level, examining strengths, weaknesses and gaps of existing approaches to benchmarking entrepreneurial ecosystems.

There is substantial academic evidence that national conditions (i.e. the set of actors and factors that enable entrepreneurship) are important in explaining national levels of entrepreneurship (Levie & Autio 2008; Sternberg 2009; Bosma and Schutjens 2011). These conditions affect entrepreneurship directly by design (for example in the case of entrepreneurship support and education) and indirectly (for example through the effects of labour market regulations and physical infrastructure) (Stam 2015; Spigel 2007;

Stam & Spigel 2018; Wurth et al. 2023). These actors and factors do not act upon entrepreneurship in isolation, but are often interdependent (Stam & Van de Ven 2021; Leendertse et al. 2022). This gives rise to the concept of entrepreneurial ecosystems, which refer to the inter-related set of actors and factors that together shape entrepreneurship outcomes in a given context.

Entrepreneurship is here defined in the widest sense as comprising the actions by individuals to start and grow a business (which can be independent, or part of an existing organization: intrapreneurship) (Shane & Venkatamaran 2000; Reynolds et al. 2005; Stam et al. 2012). It is important to note that particular types of entrepreneurship are more productive for the wider economy than other types of entrepreneurship (Baumol 1990; Minniti et al. 2024). Particular phases need to be gone through to achieve productive entrepreneurship at a large scale (market leadership): ideation, Minimum Viable Product (MVP), seed, early growth, growth (Garnsey et al. 2006; Shepherd & Gruber 2021). Different measures of entrepreneurship can be positively related (innovative startups and scale-ups: Leendertse et al. 2022) and negatively related (self-employment and multiperson firms: Audretsch et al. 2022; independent entrepreneurship and intrapreneurship: Stam 2013).

Entrepreneurial ecosystem theory (see Figure 1) explains and predicts:

1. Interdependence between entrepreneurial ecosystem elements.

2. A positive effect of entrepreneurial ecosystem quality on the prevalence of productive entrepreneurship.

3. Positive feedback effects of productive entrepreneurship on the quality of the entrepreneurial ecosystem (see Stam & Van de Ven 2021), for example through "entrepreneurial recycling" (Mason & Harrison 2006).

Figure 1. Entrepreneurial ecosystem model
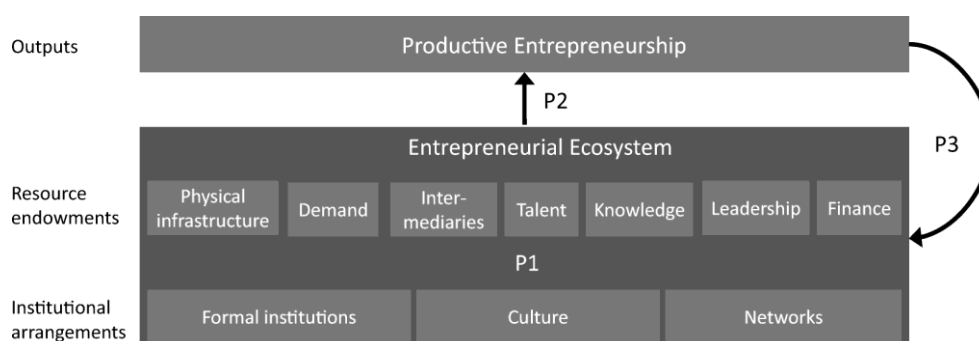
Source: Stam & Van de Ven 2021

Governments see it as their task to improve well-being (economic development and growth, prosperity), and entrepreneurship is an important mechanism to achieve this.

Supporting entrepreneurship is an important mechanism through which governments can improve well-being, economic development and prosperity. There are substantial market, system and transformation failures, which limit the prevalence of entrepreneurship, and ultimately well-being:

1. Market failures such as asymmetric information result in an undersupply of knowledge, talent and capital for productive entrepreneurship (Nooteboom & Stam 2008).

2. System failures, such as a lack of support organisations, limited co-ordination between organisations, and the presence of institutions the constrain productive entrepreneurship are another bottleneck (Nooteboom & Stam 2008; Stam 2015).

3. Transformation failures include hindrances to transformative change, resulting in too low a speed of transition (Weber & Rohracher 2012). Examples are demand articulation failure (i.e. deficits in anticipating and learning about user needs), policy co-ordination failure (i.e. lack of co-ordination and coherence between supra-national, national and regional policies, between sectoral policies, and between technological policies) and reflexivity failure (i.e. insufficient monitoring of activities and progress towards change). Transformation failures constrain the ability of entrepreneurship to contribute to solutions to societal challenges.

The recognition of the positive role of entrepreneurship in economies and societies and the recognition of these market, system and transformation failures means that there is a strong demand from policy makers for reliable data and intelligence to inform the design and implementation of actions for improving entrepreneurial ecosystems. Given the uncertainty involved in these actions and the systemic nature of conditions for entrepreneurship (entrepreneurial ecosystems), there is a need for ex-ante diagnostics and ex-durante monitoring of entrepreneurial ecosystems (and their entrepreneurial outputs), and ex-post evaluation of actions to improve entrepreneurial ecosystems.

Entrepreneurial ecosystem benchmarking tools provide the means to compare entrepreneurial ecosystems over space (benchmarking with other relevant nations, regions, cities), and over time.

Methodology for developing a National Entrepreneurial Ecosystem Benchmarking Tool

Pablo Shah, Policy Analyst at the OECD's Centre for Entrepreneurship, SMEs Regions and Cities presented the National Entrepreneurial Ecosystem Benchmarking Tool being developed by the OECD and Utrecht University. The Tool is designed to solve the problem of limited information for policy interventions and stimulate collective learning within entrepreneurial ecosystems. It is based on explanatory science and needs to be useful for both policy officials and other ecosystem actors and stakeholders.

An entrepreneurial ecosystem benchmarking tool needs to include data on the relevant conditions for productive entrepreneurship, as well as measures of productive entrepreneurship outputs. There, an ideal database for measuring entrepreneurial ecosystems contains:

1. Measures of formal institutions that enable or constrain productive entrepreneurship: including rule of law, corruption, institutions that channel knowledge, capital and labour towards productive entrepreneurship (Elert et al. 2019), and regulations for business registration (Djankov et al. 2002)

2. Measures of informal institutions that enable or constrain productive entrepreneurship: including the degree to which independent entrepreneurship (self-employment) and successful entrepreneurship are valued in society, the degree to which fear of failure prevents people from setting up a business, the degree to which people think others are to be trusted.

3. Measures of networks / connectivity that enable or constrain productive entrepreneurship: including the degree to which people and organizations can find each other and collaborate for improving (the conditions for) entrepreneurship (Fernandes & Ferreira 2022).

4. Measures of physical infrastructure: how easy it is in a particular place to interact with other people and organizations via transportation (road, railway, air) and digital infrastructure (digital connectivity).

5. Measures of demand, including the access to people and organizations with the willingness and ability to buy the products of the business. This can be within and outside the country (region, city) of origin. Supranational free trade zones (European Union, US-Mexico-Canada Agreement, ASEAN Free Trade Area).

6. Measures of the availability of (access to) talent, including all people with the knowledge and skills relevant for founding and working for the business (this might entail both generic reading and math skills, and very specific entrepreneurial skills).

7. Measures of the availability of (access to) capital, including all types of capital that provides the means of investment for the different phases of the entrepreneurial venture (ranging from bank credit, to investments by business angels, venture capitalists). Also includes the capital gained by selling a prior business, and reinvesting this in a subsequent (own or other) business (in the previous case this will not show up in business angel data).

8. Measures of the production of new knowledge, as a source of entrepreneurial opportunities, including (public and private) investments in Research and Development

9. Measure of intermediary services, including entrepreneurial support organizations (e.g. incubators, accelerators) and business services more broadly.

10. Measures of entrepreneurial ecosystem leadership (or orchestration: Porras-Paez & Schmutzler 2019; Santos et al. 2023), including the prevalence of (public-private) partnerships and collective action organizations to stimulate entrepreneurial ecosystem development.

11. Data on productive entrepreneurship i.e. entrepreneurial activity that delivers wider economic and social benefits.

Whether the relationship with these measures (variables) and productive entrepreneurship is linear or non-linear is an empirical question (see Van Dijk et al. 2024). For example, an increase in entrepreneurial support organisations might not lead to an increase in productive entrepreneurship, because these organizations do not provide the support needed, are not of sufficient quality, or are over-providing particular services (see Hruskova et al. 2022). Also, in line with the systemic nature of entrepreneurial ecosystems, the elements might only be effective in combination with the (sufficient) presence of other elements. There may be multiple configurations leading to a similar prevalence of productive entrepreneurship (Cherubini Alves et al. 2021; Schrijvers et al. 2024).

For selecting appropriate data to measure entrepreneurial ecosystem (elements), five selection criteria can be used: relevance, reliability, coverage, availability, timeliness. These criteria have been applied to identify a shortlist of indicators and data sources to measure different elements and outputs of national entrepreneurial ecosystems. The shortlisted indicators and data sources are described in Table 1 below.

Table 1. Indicators for National Entrepreneurial Ecosystems Benchmarking Tool

Element	Indicator	Description	Source	Included in composite indicators for the element
Formal Institutions	Corruption (1)	Extent to which government officials in the executive branch, judicial branch, police and military, and legislative branch use public office for private gain.	World Justice Project (General Population Poll and Local Expert Survey)	✓
	Civil justice	Extent to which the civil justice system is accessible, free		✕

		from discrimination, corruption and improper government influence, timely, and effectively enforced.		
	Regulatory effectiveness	Extent to which government regulations are effectively enforced and applied without unreasonable delay or improper influence and with respect for due process in administrative proceedings.		✓
	Corruption (2)	Level of agreement with the statement: "Corruption in my area is used to get access to special unfair privileges and wealth".	European Commission Quality of Government Survey	✗
	Administrative burden on start-ups	Administrative requirements for starting a business and obtaining licenses and permits.	Start-ups subset of the OECD Product Market Regulation Indicators	✓
Culture	Fear of failure	Percentage who agree that they see good opportunities but would not start a business for fear it might fail.	Global Entrepreneurship Monitor Adult Population Survey	✓
	Status of entrepreneurs	Percentage who agree that in their country, successful entrepreneurs receive high status.		✓
	Entrepreneurship as a good career choice	Percentage who agree that most people consider starting a business as a desirable career choice.		✓
	Trust in others (1)	Public perceptions on whether most people can be trusted	European Social Survey	✓
	Creativity and new ideas	Share of people that associate with those who think up new ideas and place an importance on being creative		✓
	Trust in others (2)	Public perceptions on whether most people can be trusted.	World Values Survey	✓
	Openness to technology	Public perceptions on whether science and technology makes the world better off		✓
	Imagination	Public perceptions on importance of encouraging children to be imaginative		✓
Infrastructure	Mobile broadband penetration	Number of DSL, cable and fibre broadband subscriptions with download speeds exceeding 256kbits/second per 100 people.	OECD Going Digital Toolkit	✓
	Fixed broadband penetration	Number of "data only" and "data and voice" mobile subscriptions with download speeds exceeding 256kbits/second per 100 people.		✓
	Mobile broadband penetration	Number of DSL, cable and fibre broadband subscriptions with download speeds exceeding 256kbits/second per 100 people.		✓
	Air connectivity	Number of airline passenger journeys, per capita	World Bank Transport Indicators	✓
	Density of road network	Length of roads (km) per 100 000 square km of land area.	OECD Transport Performance Indicators	✓
	Density of rail network	Length of railways (km) per 100 000 square km of land area.		✓
Networks	SME collaboration	Share of innovative SMEs collaborating with others	European Innovation Scoreboard	✓
	Start-up networking	Average number of events attended per start-up	Crunchbase	✗
	Public-private innovation partnerships	Share of patent applications with business and public sector co-applicants	World Intellectual Property Organization	✓
	International software collaboration	Number of international GitHub collaborative projects per capita	GitHub Innovation Graph	✗
	Research collaboration	University-industry collaboration in R&D	World Economic Forum Executive Opinion Survey	✗
Finance	Venture capital funding	Value of seed, start-up, early-stage and growth capital received by young companies (aged 5-years or less), as a share of GDP.	OECD SME Finance Scoreboard and Crunchbase	✓
	Bank financing	Value of outstanding stock of bank and financial institution loans to SMEs, as a share of GDP.	OECD SME Finance Scoreboard	✓

	Cost of bank financing	Difference between average annual rates for SME loans and large company loans.		✓
Leadership	Serial entrepreneurs, mentors and coaches	Number of individuals describing themselves as serial entrepreneurs, mentors or coaches.	Crunchbase	✓
Talent	Reading ability	Average score in overall reading for 15 year olds in the Programme for International Student Assessment (PISA).	OECD PISA statistics	✓
	Mathematics ability	Average score in overall mathematics for 15 year olds in the Programme for International Student Assessment (PISA).	OECD PISA statistics	✓
	Tertiary education	Share of population with a level of educational attainment of International Standard Classification of Education (ISCED) code 5 or above i.e. Bachelor's, Master's or Doctoral level.	OECD Education at a Glance Statistics.	✓
	Skills for business creation	Percentage of 18-64 population who believe they have the required skills and knowledge to start a business.	Global Entrepreneurship Monitor Adult Population Survey	✓
	Software skills	Number of GitHub developers per capita	GitHub Innovation Graph	✓
Knowledge	Research citations	Number of research citations per working age adult.	Scimago Journal Rank	✓
	Patents	Number of triadic patent families (sets of patents filed at the EPO, JPO and USPTO) per working age adult.	OECD Patents Database.	✓
	Software development	Number of GitHub pushes per capita.	GitHub Innovation Graph	✓
	R&D expenditures	Total expenditure on R&D carried out by all resident companies, research institutes, universities and government laboratories in a country, as a percentage of GDP.	OECD Main Science and Technology Indicators	✓
	Researchers	Number of researchers per thousand people employed.	OECD Main Science and Technology Indicators	✕
Markets	Domestic purchasing power	Disposable household income per capita (PPP adjusted)	OECD National Accounts Statistics.	✓
	Domestic market size	Country population	OECD Labour Force Statistics	✓
	Ease of international trade	Average performance across OECD Trade Facilitation Indicators.	OECD Trade Facilitation Indicators	✓
	Exports	Exports as a share of GDP	OECD	✕
Intermediate services	Knowledge intensive services	Share of employment accounted for by the Professional, scientific and technical activities sector (VM, ISIC rev4)	OECD Labour Force Statistics	✓
	Incubators and accelerators	Number of business incubators, accelerators and other start-up support programmes per capita.	Crunchbase	✓
Productive entrepreneurship outputs	Early-stage entrepreneurship	Percentage of 18-64 population who are either a nascent entrepreneur or an owner-manager of a new business that has paid wages for 3-42 months.	Global Entrepreneurship Monitor Adult Population Survey	✓
	Growth expectations	Percentage of early-stage entrepreneurs expecting to employ more than 5 people within five years.		✓
	Self-employment rate	Share of self-employed people in the labour force (with employees and without employees)	OECD Labour Force Statistics	✕
	Business birth rate	Number of employer enterprise births in the reference period divided by the number of employer enterprises active in reference period (or by size of workforce).	OECD Structural Demographic Business Statistics	✓
	Surviving start-up rate	Number of employer births surviving after 3 years of start-up divided by the number of employer births.		✓
	Start-up employment	Share of enterprise employment in businesses aged 3 years old.		✓
	High growth firms	Share of enterprises with at least 10 employees in period t that experienced at least 10% annualised employment growth at period t+3.		✓
	Enterprise churn rate	Sum of employer birth rate and death rate in the reference period.		✓

	Innovative start-ups	Number of new firms registered in Crunchbase in the last five years per capita.	Crunchbase	✓
	Unicorns	Number of private companies aged less than 10 years old with a valuation in excess of USD 1 billion per capita.	CB Insights	✓
Productive entrepreneurship balance	Regional balance	Value of the Herfindahl Hirschman Index for the geographical distribution of start-ups within a country.	Crunchbase	✓
	Social balance	Share of founders and senior employees that are women within new firms registered in Crunchbase in the last five years.	Crunchbase	✓
		Size of estimated "missing entrepreneurs" group divided by the population all early-stage entrepreneurs (missing entrepreneurs calculated as the additional number of entrepreneurs there would be if women, youth, seniors and immigrants created businesses at the same rate as males 30-49 years old).	OECD Missing Entrepreneurs publication series	✓

To enable the construction of composite indicators for entrepreneurial ecosystem elements, the data for each indicator are harmonised. For each indicator, each country's score is normalised such that a score of 0 is assigned to countries whose indicator score is at least 2 standard deviations below the OECD-average and a score of 100 is assigned to countries whose indicator score is at least 2 standard deviations above the OECD-average. After raw indicator values are converted into normalised scores between 0 and 100, indicators can be combined into one composite element value.

The value of each indicator (sub-element) and element in a composite index can be weighted in different ways:

- In an agnostic way, where each (sub-)element receives the same weighting.

- In a calibrated way, where the relative importance of each (sub-)element is determined by calibrating the relation between that (sub-)element to entrepreneurship outputs.

- In a subjective manner, where weightings are determined based on expert judgement.

- A method that is more tailored toward measuring complex systems is the penalty of bottleneck method, in which case-specific weak elements have stronger (negative) effects on the overall index value.

In addition, element scores can be combined into one composite entrepreneurial ecosystem index score. The overall entrepreneurial ecosystem index can be used as an indicator of the overall quality of entrepreneurial ecosystems (see Stam & Van de Ven 2021; Leendertse et al. 2022), and in combination with entrepreneurship output measures it can be used to compute the "efficiency" with which entrepreneurial ecosystems "produce" entrepreneurship. The composite entrepreneurial ecosystem index has more analytical than diagnostic value (see Leendertse & Stam 2023). For diagnostics it is better to use the values of the indicators, or composite indices for the elements.

Feedback was provided by workshop participants on the methodology, indicators and data sources, including gaps, potential additions and approaches to weighting the indicators. It was also noted that due consideration should be given to how to correctly interpret the indicator values. Discussants highlighted the difficulties associated with understanding and measuring entrepreneurial ecosystems due to their complexity, noting that there is more still to learn about the underlying drivers of entrepreneurship, with implications for how entrepreneurial ecosystems should be measured and at what level.

Policy applications

The workshop participants exchanged on the potential policy applications of the National Entrepreneurial Benchmaking Tool. It was highlighted that the tool must be useful for diagnostics by enabling comparisons with entrepreneurial ecosystems in other countries. The diagnostics also need to provide useful and relevant inputs into stakeholder dialogues.

It is also important that the data are up to date in order to facilitate monitoring and evaluation. Furthermore, the data should enable collective learning in the entrepreneurial ecosystem, in order to answer questions such as:

- What areas should be prioritised and what are the leverage points in the system?

- What kind of interventions can best tackle the identified system weaknesses?

- Do the interventions effectively and efficiently improve the entrepreneurial ecosystem, and does this lead to increases in entrepreneurship outputs?

This type of collective learning will primarily come from analysis of the individual indicators and composite indicators the entrepreneurial ecosystem level. The overall entrepreneurial ecosystem rankings may be useful for publicity and competition between countries but are less insightful in terms of providing diagnostic insights to inform future policy design and implementation (Leendertse & Stam 2023).

Other relevant considerations regarding the policy applications of the National Entrepreneurial Ecosystems Benchmarking Tool are:

1. Does the tool speak to the relevant audience (public and private sector actors; at national, regional, and local levels)?

2. Do the users have enough "patience" to wait for the (often long-term) results of ecosystem interventions?

3. Can intermediate measures (milestones) of intervention success be traced?

4. Which ecosystems should different countries benchmark themselves against?

Next steps

There was broad support for the development of the National Entrepreneurial Ecosystems Benchmarking Tool among workshop participants, with participants agreeing that it can be a useful as a diagnostics tool for policy makers to identify areas for policy action and/or further examination.

After gathering feedback on potential indicators, data sources and methodology from experts and policy makers, the OECD will assemble data from the dispersed datasets in order to construct a database containing the final set of indicators. It will also develop composite index scores by element and the overall entrepreneurial ecosystem score for each country.

The results of the National Entrepreneurial Ecosystems Benchmarking Tool will be presented in an OECD publication in 2024. The OECD will also work with policy makers and academics on an ongoing basis to apply the Tool in order to support future policy making (diagnostics, monitoring, and evaluation) and research. This will include undertaking in-depth studies with interested governments in order to assess and develop policy action plans for their national entrepreneurial ecosystems.

Read More

Further information on the themes discussed at the workshop:

- [OECD International Compendium of Entrepreneurship Policies](#)
- [OECD SME and Entrepreneurship Outlook 2023](#)
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