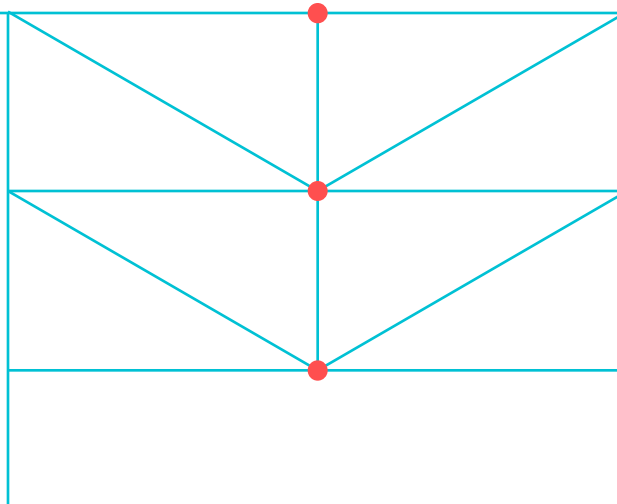


From innovation to mission-oriented ecosystems: Strengthening the capabilities of the innovation ecosystems for circular economy

AI-InnoScEnCE Webinar

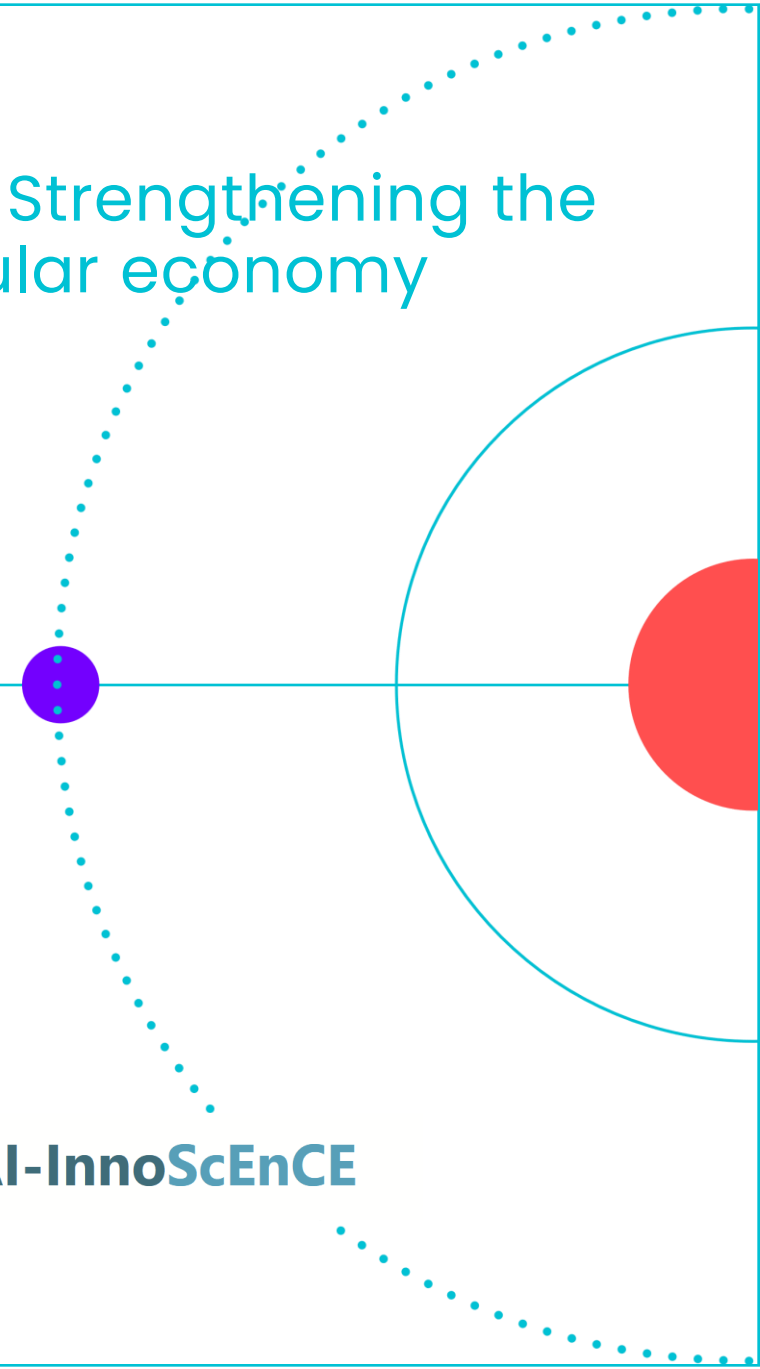
TUHH
Hamburg
University of
Technology



Olena Soltmann, Dipl.-Phys.
08-09 December 2025



AI-InnoScEnCE



TUHH Institute of Business Logistics and General management

TUHH



Prof. Dr. Thorsten Blecker

Full professor, Dean of TUHH's School of Management Sciences and Technology



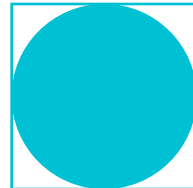
Mohamed Osman, M.Sc.

Research associate at the Institute of Business Logistics and General Management



Olena Soltmann, Dipl.-Phys.

Research associate at the Institute of Business Logistics and General Management



Chema Abdennadher, M.Sc.

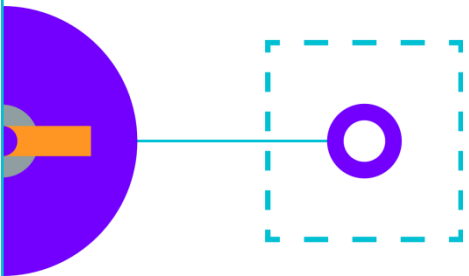
Research associate at the Institute of Business Logistics and General Management

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Agenda:

1. Key insights into innovation ecosystems
2. Ecosystem stakeholder model
3. Ecosystem mapping
4. Project approach for a circular economy innovation ecosystem



Ecosystem definition

An ecosystem is defined as *“a system or group of interconnected elements formed by the interaction of a community of organisms with their environment”* [GIZ, 2018].

The ecosystem concept: The ecosystem as a concept has its origins in the science of ecology, and it conceptualizes the flow of material and energy [Granstrand 2020].

An innovation ecosystem is considered as evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors” [Granstrand 2020]

Ecosystem typology

NOVEMBER 2021

Strengthening Innovation Ecosystems

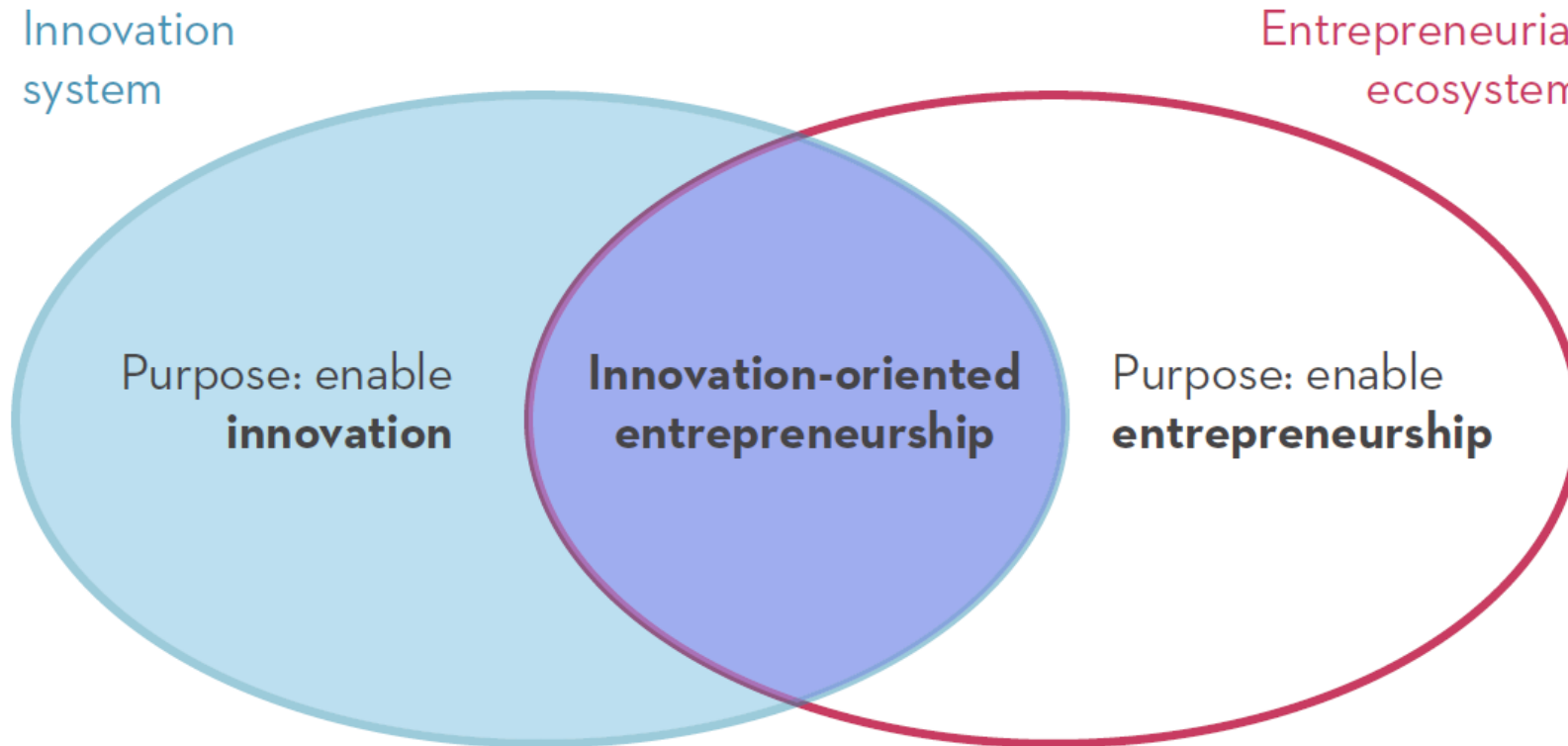


Prepared By IDIA and the Ecosystem Strengthening Working Group

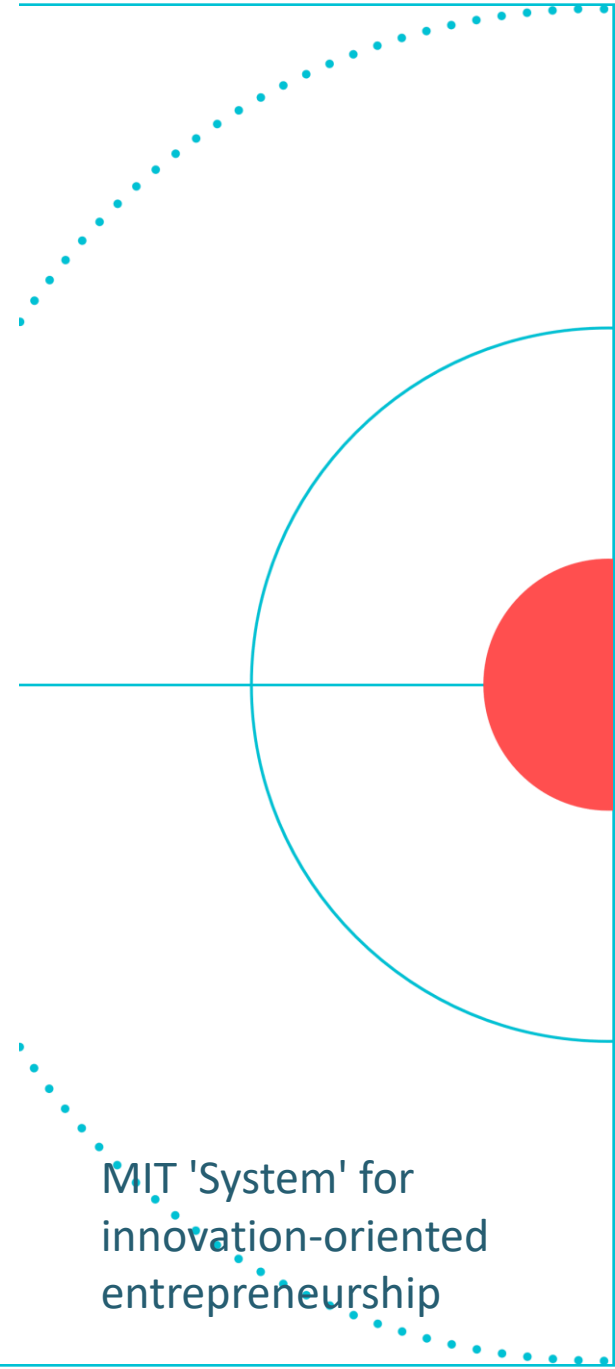
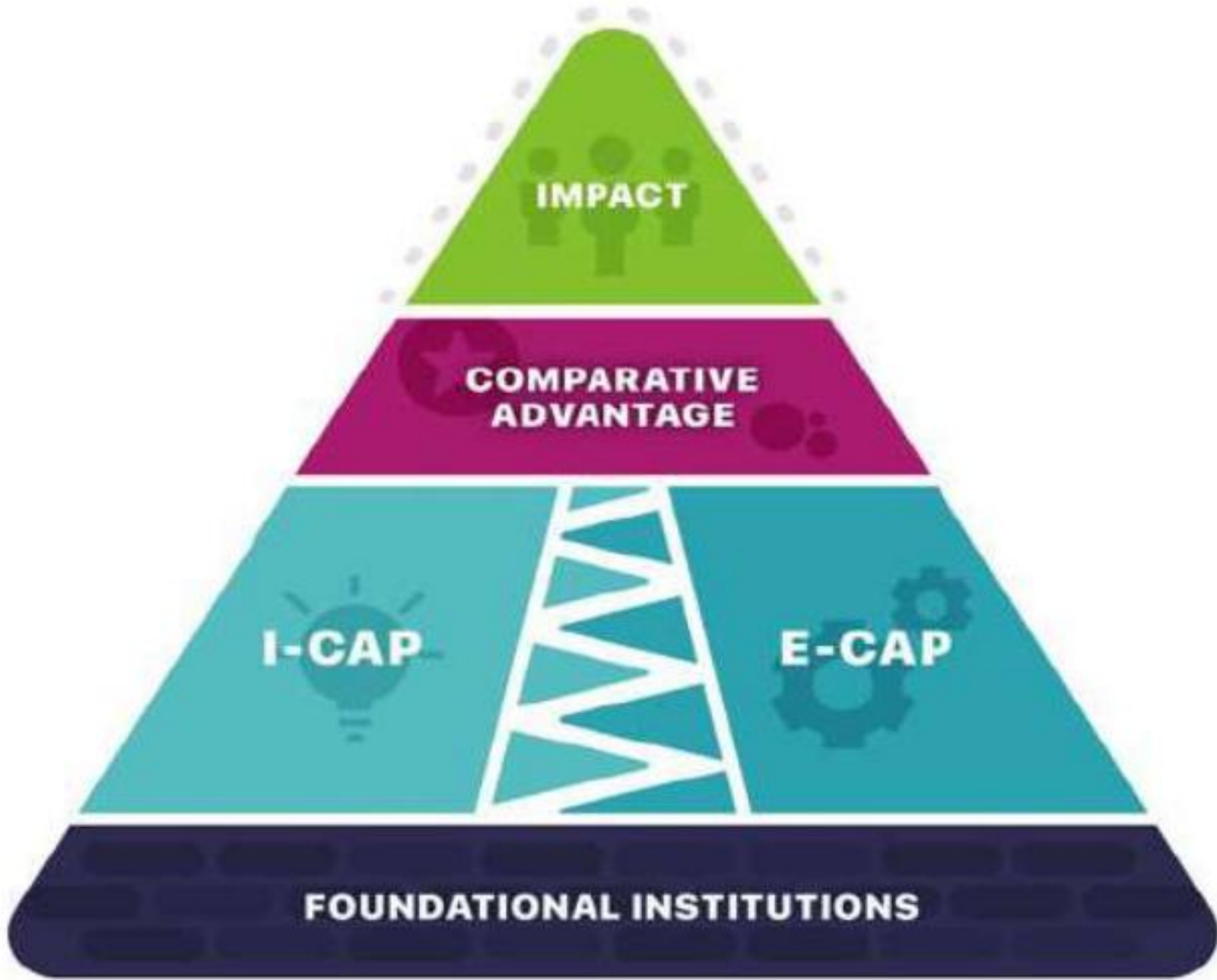
- 1. Entrepreneurial ecosystems** — where the focus is on the innovator and the ecosystem performance is measured in terms of how well it meets their needs.
- 2. Innovation-oriented ecosystems** — where the focus is on the innovation process, and the ecosystem performance is measured in terms of how well different actors work together in supporting the production of great ideas and to create the enabling environment for innovations to reach scale — be it through public or private-sector pathways or through partnerships.
- 3. Mission-driven ecosystems** — where the focus is on a particular development challenge (sectoral in nature), and the ecosystem performance is measured in terms of how well relevant actors work together to address that challenge, often within a specific timeframe or geographic location.

Source: IDIA 2021

Innovation-oriented entrepreneurship

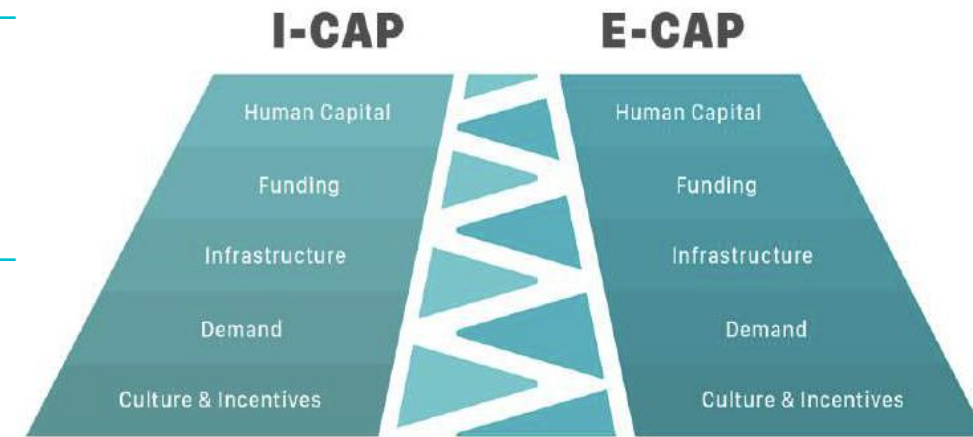


Source: MIT D-Lab



MIT 'System' for innovation-oriented entrepreneurship

Innovation-oriented entrepreneurial ecosystem domains



Human Capital (people) – the appropriate human talent (within a region, or attracted into a region) with relevant education, training and experience for either innovation or entrepreneurship (or both).

Funding – a variety of types of capital (public and private sectors) that support innovation and entrepreneurship from idea to impact, or start-up to scale-up.

Infrastructure – the physical infrastructure that is necessary to support innovation and entrepreneurship at their different stages (including space and equipment required for discovery, production, supply chains, etc).

Demand – the level and nature of specialized demand for the outputs of innovation and entrepreneurial capacities supplied by different organizations in the system.

Culture & incentives – the nature of role models and individuals; the social norms ('culture') that shape acceptable career choice; individual and team behaviors.

Source: MIT model design: Innovation-driven entrepreneurship

How to measure the capacities of an innovation-oriented entrepreneurial ecosystem

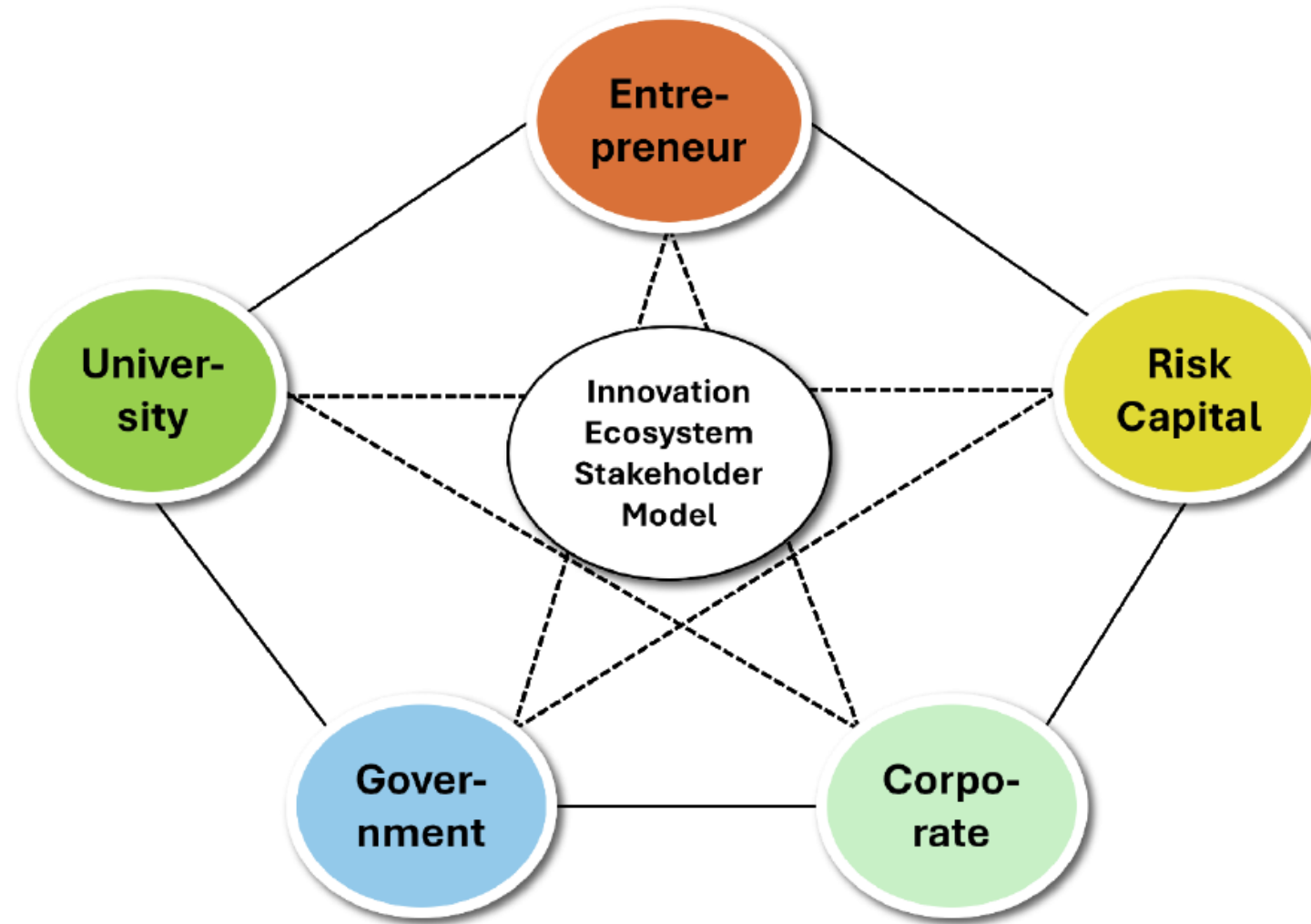
Using simple metrics such as:

I-Cap outputs: Number of scientific publications per country; number of patents registered and/or granted per year.

E-cap Outputs: Number of start-ups launched each year, number of corporate growths (scale-ups)

Source: MIT model design:
Innovation-driven entrepreneurship

Figure 4. Innovation Ecosystem Stakeholder Model (adapted from Budden & Murray, 2019, MIT Innovation Initiative)



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Source: MIT model of innovation ecosystem

Innovation ecosystem stakeholder model: Explanation of model domains TUHH

University: Crucial role in ecosystem acceleration by providing novel scientific insights, technical and academic training, entrepreneurial education, and a regional economic mission embedded in the university's activities. Important supplier of talented and well-connected workforce with innovative spirit as a key presence in the region.

Entrepreneur: Represent (informally) the perspectives of a wider entrepreneurial community and is critical for the ecosystem building. Without this, ecosystem-building efforts may simply provide what other stakeholders imagine that an innovation-oriented entrepreneur needs.

Risk capital: plays a crucial role in providing insights into the factors that can constrain venture capital resources. They offer an efficient, geographically localised context for identifying new ideas and supporting risk capital.

Corporate: Large companies increasingly see themselves as 'global' or 'multinational' and less associated with specific regions and local innovation ecosystems. The emergence of the innovation ecosystem has not necessarily been at the core of their activity but their facilities (e.g R&D spaces, testbeds), talent development and offering of own risk capital.

Government: Government representatives may come from various authorities and areas such as economics, education, finance, trade, etc., but also from 'political' areas (e.g. ministers, members of parliament) or rather 'official' areas (e.g. civil servants).

Other key players: play their own role within the complex ecosystem, which can by nature be involved in the ecosystem's development. These include specialised service providers (accelerators, sandboxes, co-working spaces), consultants, but also NGOs and companies such as banks and financial institutions, which play a dual role as large corporations and venture capital providers.

Innovation ecosystem stakeholders limitations

Entrepreneurs and Risk Capital as Leaders: Brings both personal attitudes and values as a basis for a vision of the innovation ecosystem, as well as personal financial resources as 'angel' venture capital plus the acquisition of venture capital from other entrepreneurs from their extended social network. However, less success in innovation and innovation-driven entrepreneurship due to personal wealth as the basis for an ecosystem vision. The community of start-up entrepreneurs, in connection with a strong university, has sparked regional change without establishing a strong innovation ecosystem.

University as a leader: The limitations consist of the university's lack of access to venture capital and (sometime) restricted cooperation with the government (at local or national level), which can lead to a deviation from the university's original mission in the region.

Large corporation leadership: can play a role as an ecosystem leader (if the company is established as a regional champion). Support through collaboration with local entrepreneurs, establishment of new technical universities or research centres, provision of venture capital through a corporate venture capital . Limitations: They must satisfy their shareholders; may change their geographical priorities in the long term.

Government leadership: Proactive (sometimes prescriptive) role, which can lead to effective management of the innovation ecosystem. Stability of the region and long-term economic prospects for the region. Government support programmes and R&D funding. In practice, there is sometimes a lack of understanding of the needs of local entrepreneurs, which can lead to the failure of entrepreneurial capacity building in the region.

Nascent ecosystems - In these settings, an innovation ecosystem is just starting to form. Some actors might be present, but others are missing, and key resources and enabling conditions are absent or weak. A desire exists to create a vibrant ecosystem for innovation and entrepreneurship, but this full-fledged ecosystem does not yet exist.

Ecosystem strengthening in these settings involves bringing those who are already innovating together to develop a joint vision of what a vibrant ecosystem might look like; build relationships, shared values and norms; develop the capacity of existing actors and create new actors and resources; and engage in strategic, short-term, joint action to address immediate, shared, system-level blockages and constraints.

Lopsided ecosystems - These ecosystems have more players and components than nascent systems, but are heavy in some areas and weak in others. They may be dominated by just one or two actor types or sectors, or they may be over-reliant on some resources and unable to access others.

Ecosystem strengthening in these settings involves convening the existing actors and stakeholders to assess the strengths and weaknesses of the system, identify missing actors, roles, resources, and conditions and develop joint action plans to strengthen elements of the system that are under-developed.

Established but disconnected ecosystems - These systems are crowded with many actors and initiatives that are not operating synergistically to produce innovation. Instead, there is lack of coordination, insufficient information-sharing, duplication of efforts, low levels of trust, ineffective collaboration between actors and/or weak capacity for effective collective action.

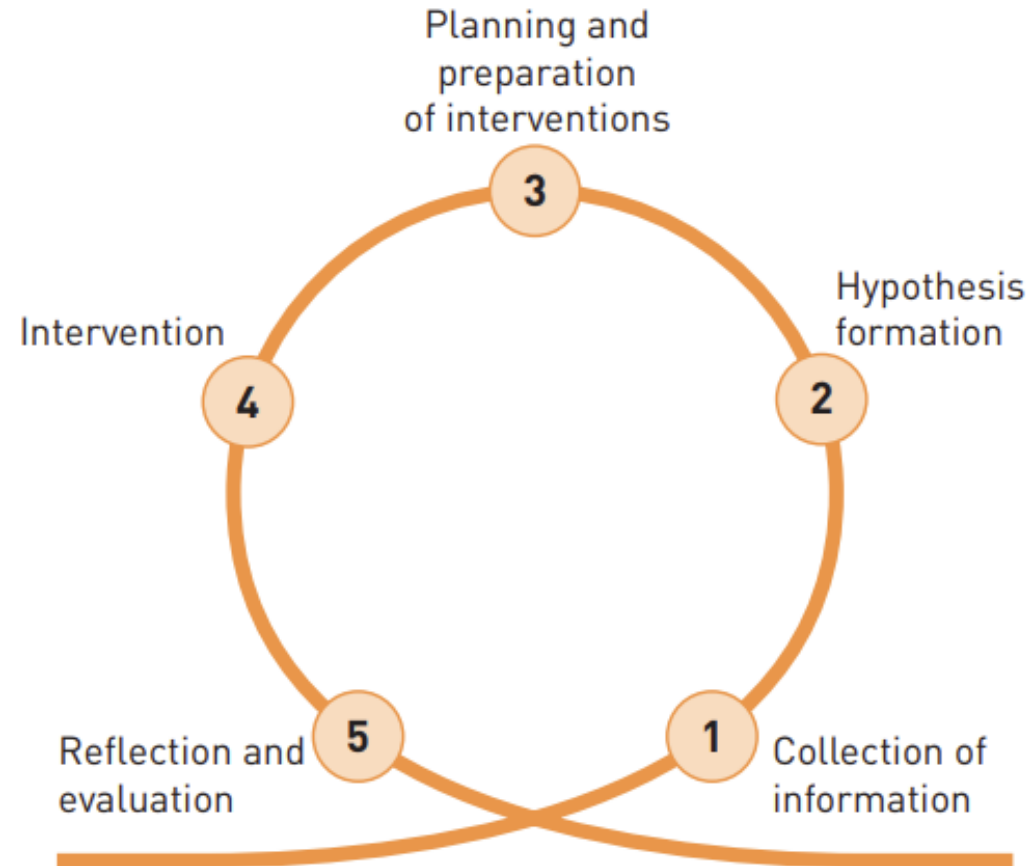
Ecosystem strengthening in these settings involves helping actors in the system to see who is doing what and identifying the strengths of the system through mapping efforts and multi-stakeholder workshops. These efforts may also involve creating new platforms to enhance information sharing and facilitating activities to build trust and collaborative working relationships between members of the system.

Source: MIT D-lab

Strengthening the innovation ecosystem: Ecosystem and stakeholders benefits

- 1) **Shared vision for circular economy:** Shared values on circular economy innovations, shared technology infrastructures and innovation environments such as test beds, access to funds and technologies for local innovators in circular economy domains.
- 2) **Strengthened communication infrastructures;** strengthened networks, relationships, improved collaboration, expanded information flows, optimisation and prevention of redundancies
- 3) **More favorable policy for circular economy innovations:** Regulatory changes, institutional climate and attitudes supportive of innovation and innovation-oriented entrepreneurship; government programs and supporting policies for circular economy innovations.
- 4) **Strengthened capabilities:** Expanding multi-actor innovation chains; multi-stakeholder governance policies to create and support initiatives related to innovation and innovation-driven entrepreneurship.
- 5) **Process enhancement:** New or strengthened governance processes, improved knowledge sharing and mutual learning, enhanced climate-change and social learning, adaptive governance for resilience and ecosystem performance in innovation and innovation-driven entrepreneurship.

Innovation ecosystem mapping methodology



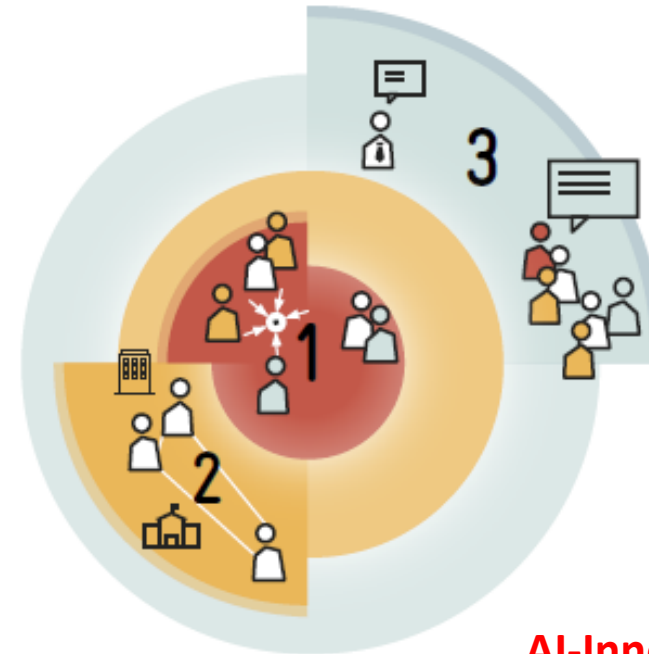
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ENTREPRENEURSHIP DEVELOPMENT

Project Intervention



ECOSYSTEM STRENGTHENING



AI-InnoScEnCE project

Project Intervention

(Source: Authors)

Source: GIZ Guide on strengthening entrepreneurial ecosystems (p. 17)

Methodologies such as a structured guide for mapping and strengthening ecosystems developed by the Deutsche Gesellschaft für Internationale Zusammenarbeit GIZ Guide for Mapping the Entrepreneurial Ecosystem, 2018)

Definition: *Mapping is the process of observing, analysing and visualizing the entrepreneurial ecosystem in a given context is a 'mapping' [GIZ 2018].*

Five steps to ecosystem mapping:

Step 1 Research design (scope of mapping, target group, methods of data collection, expected results)

Step 2 Data collection 1) desk research & secondary data, economic indices, benchmarking reports, 2) deepening through focus groups by stakeholder categories, structured interviews and surveys (using existing instruments such as the ANDE Entrepreneurial Ecosystem Diagnostic Toolkit).

Step 3 Data analysis (including visualization of actor data) to present the findings (such as use of Capacity WORKS visualizations)

Step 4 Data validation (e.g. stakeholders' workshops)

Step 5 Activity (Stakeholder dialogue using a platform for exchange, identifying points for programme interventions, monitoring changes, etc.).

Strengthening the innovation ecosystem: AI-InnoScenCe approach

GIZ (2018) Ecosystem mapping methodology

Phase 1: Circular Economy Ecosystem Mapping

- Stakeholder identification and assessment (role, redundancies) & Stakeholder register
- AI-based ecosystem mapping tool: NLP-based solution for mapping and analysing relationships between ecosystem actors

Phase 2: Ecosystem Capacity Strengthening

- Stakeholder workshops to validate the mapping tool, refine project solutions, and develop region-specific innovation roadmaps.
- Circular Economy Invention Labs (established at partner universities) to enhance research capabilities for a circular economy and support innovation towards marketable solutions
- Community of Best Practice as a collaboration environment and platform to leverage AI for the circular economy



Step 1 Research design

Step 2 Data collection

Step 3 Data analysis

Step 4 Data validation

Step 5 Activity



Hamburg Metropolitan
Region Germany



Autonomous Province
of Vojvodina,
Republic of Serbia

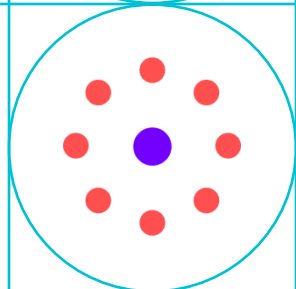
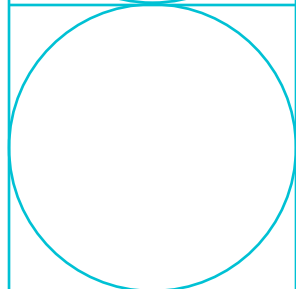
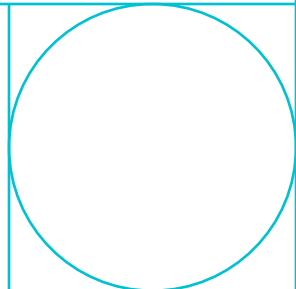


Cahul Subzone,
Republic of Moldova

Thank You very much

Hamburg University of Technology (TUHH)
Olena Soltmann, Dipl.-Phys.
Institute of Business Logistics and General Management
Am Schwarzenberg-Campus 4 (D)
21073 Hamburg
www.tuhh.de

tuhh.de



TUHH
Hamburg
University of
Technology