Entrepreneurial Ecosystem Development: Theory and Practice

Seminar Stellenbosch University
December 1, 2022

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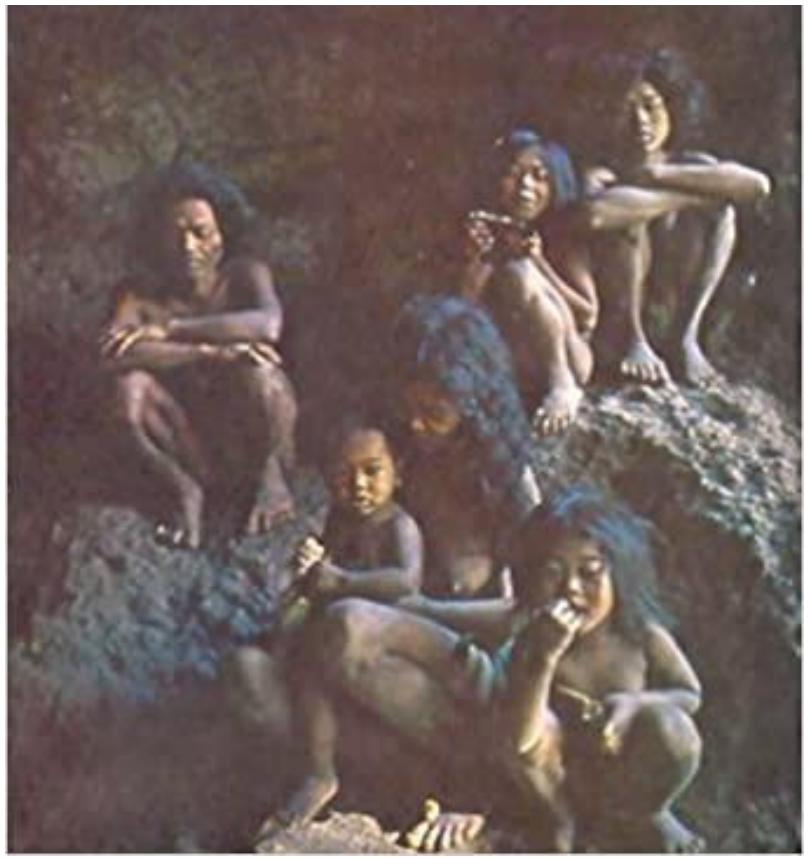


BREWDOG

airbnb

GUILD

adyen

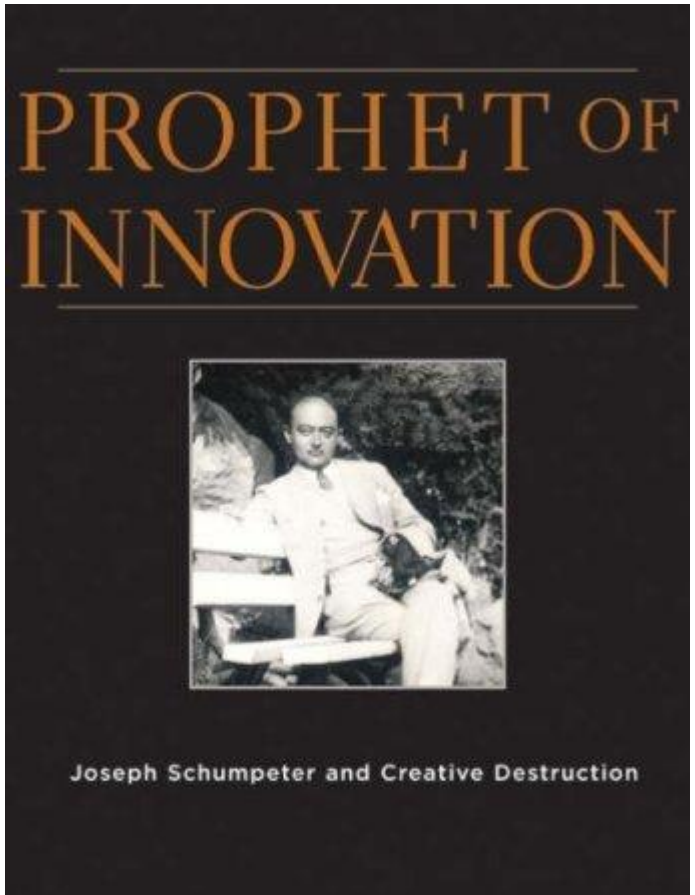
BREWDOG

GUILD

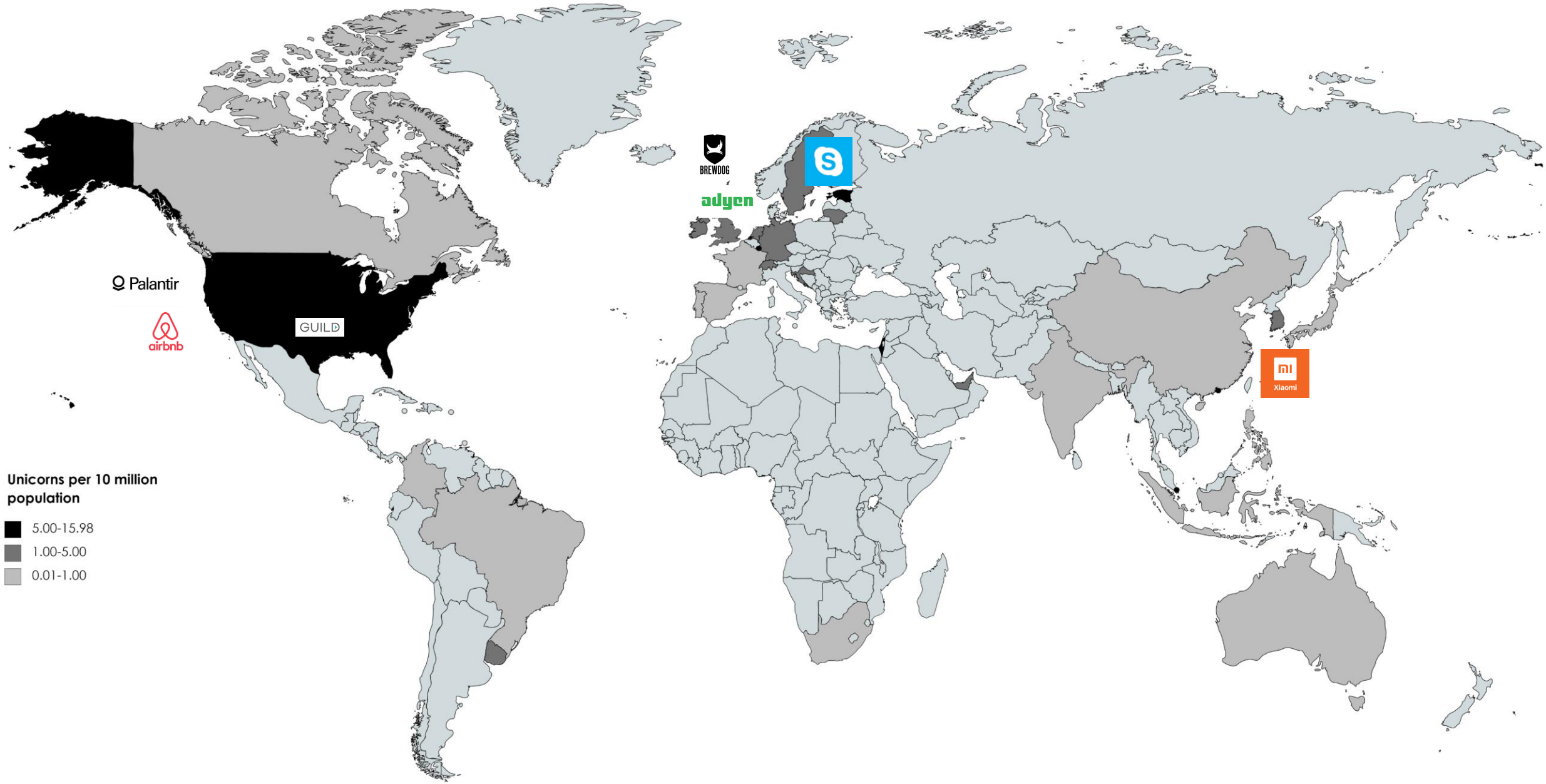
adyen

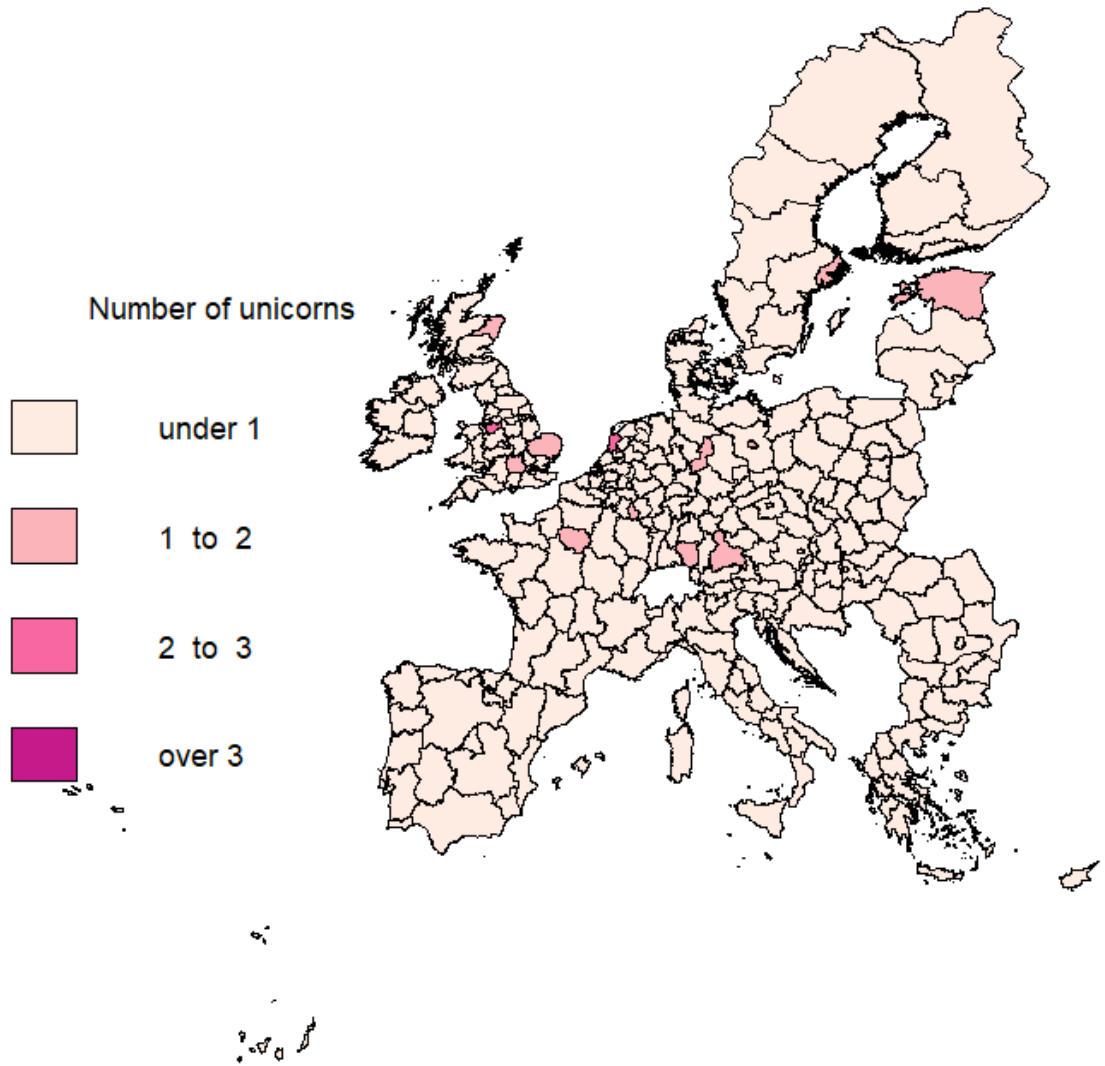
Palantir

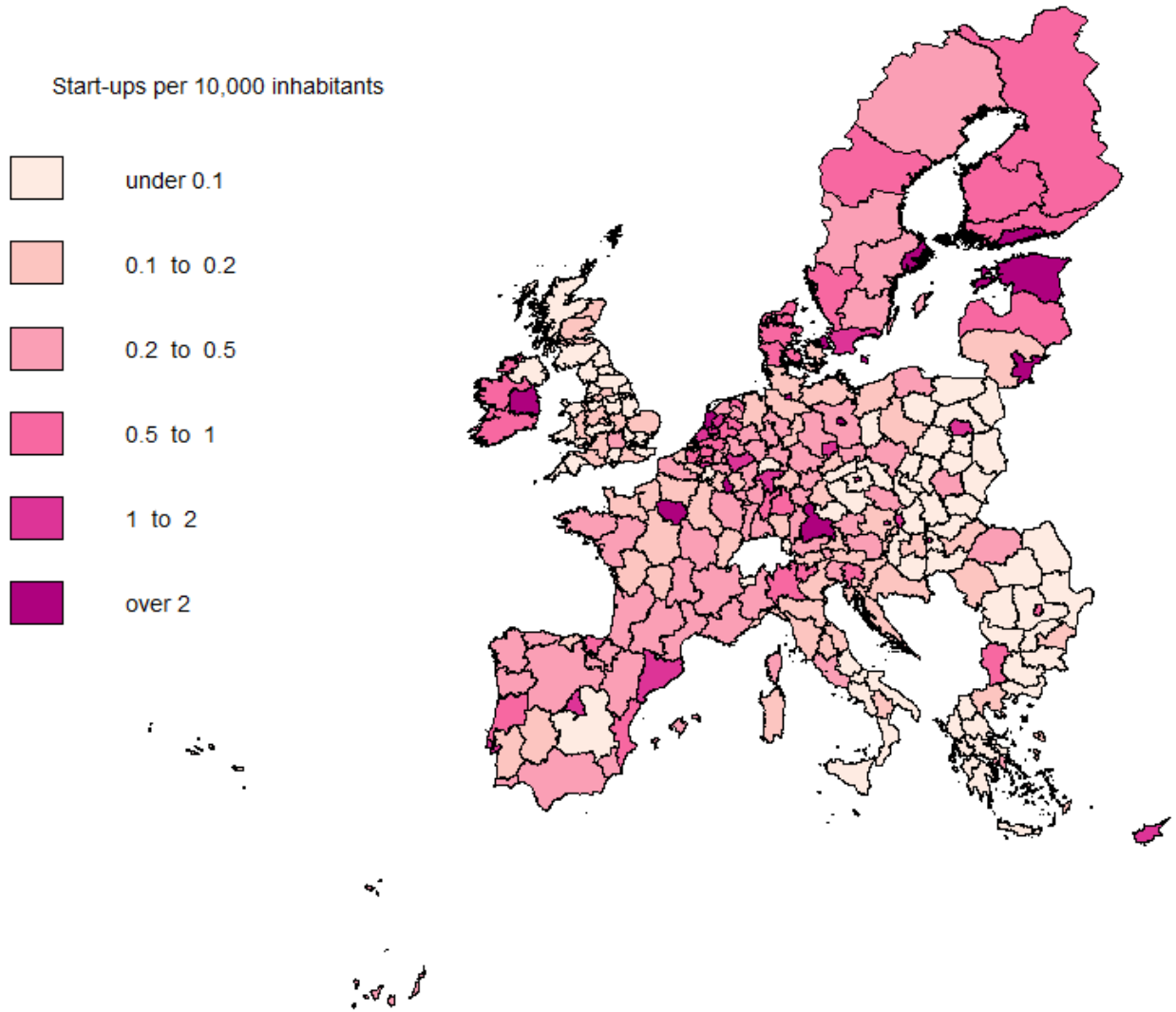
airbnb



Xiaomi

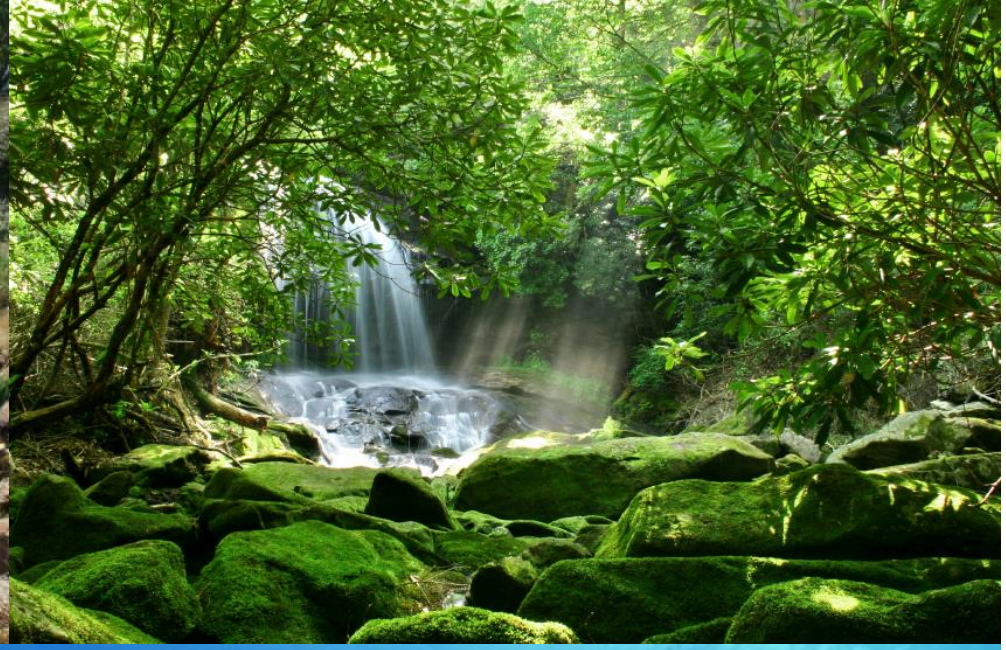

Palantir
airbnb
GUILD
BREWDOG
adyen
Xiaomi
Unicorns per 10 million population
5.00-15.98
1.00-5.00
0.01-1.00


Number of unicorns
under 1
1 to 2
2 to 3
over 3

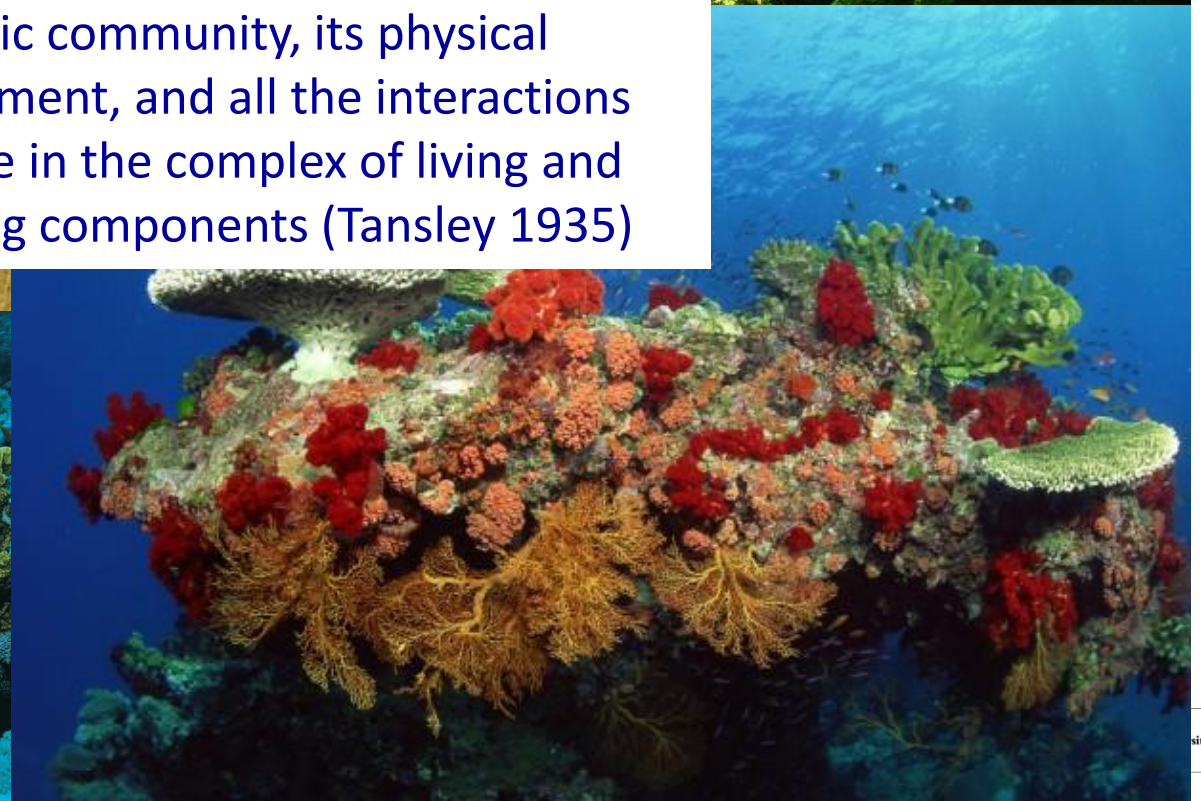

Start-ups per 10,000 inhabitants
under 0.1
0.1 to 0.2
0.2 to 0.5
0.5 to 1
1 to 2
over 2

STARTUP AMSTERDAM

www.startupamsterdam.org



An ecosystem (‘ecological system’) is a biotic community, its physical environment, and all the interactions possible in the complex of living and nonliving components (Tansley 1935)



Entrepreneurial Ecosystem

- a set of **interdependent** actors and factors governed in such a way that they enable **productive entrepreneurship** within a particular territory (Stam 2015; Stam & Spigel 2018)

  - Complex **eco**nomic **system**:
    - **Interdependence**: between elements, between nodes
    - Emergence: **productive entrepreneurship**

Entrepreneurship & Economic Development: *academic evidence base*

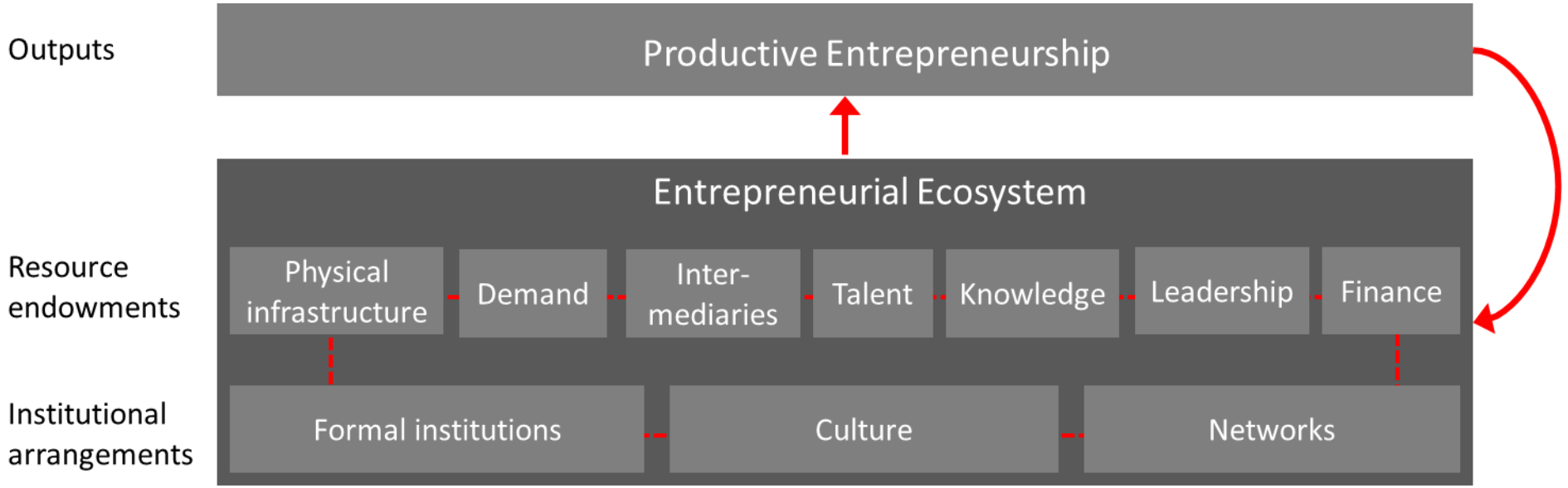
- Talent (Glaeser et al. 2010)
- Knowledge (Acs et al. 2009)
- Capital (Kerr & Nanda 2009)
- Intermediate services (Howells 2006)
- Networks (Stuart & Sorenson 2005)

Fundamental causes of long-term growth:

- Institutions (formal, informal) (Baumol 1990; Acemoglu et al. 2005)
- Physical infrastructure (Audretsch et al. 2015)
- Effective demand (Smith, Keynes)

Entrepreneurial Ecosystem Research Program

- Improve our understanding of **entrepreneurial economies** as **complex systems**
- Entrepreneurial ecosystem model (based on Stam 2015; Stam & Spigel 2018; Stam & Van de Ven 2021):

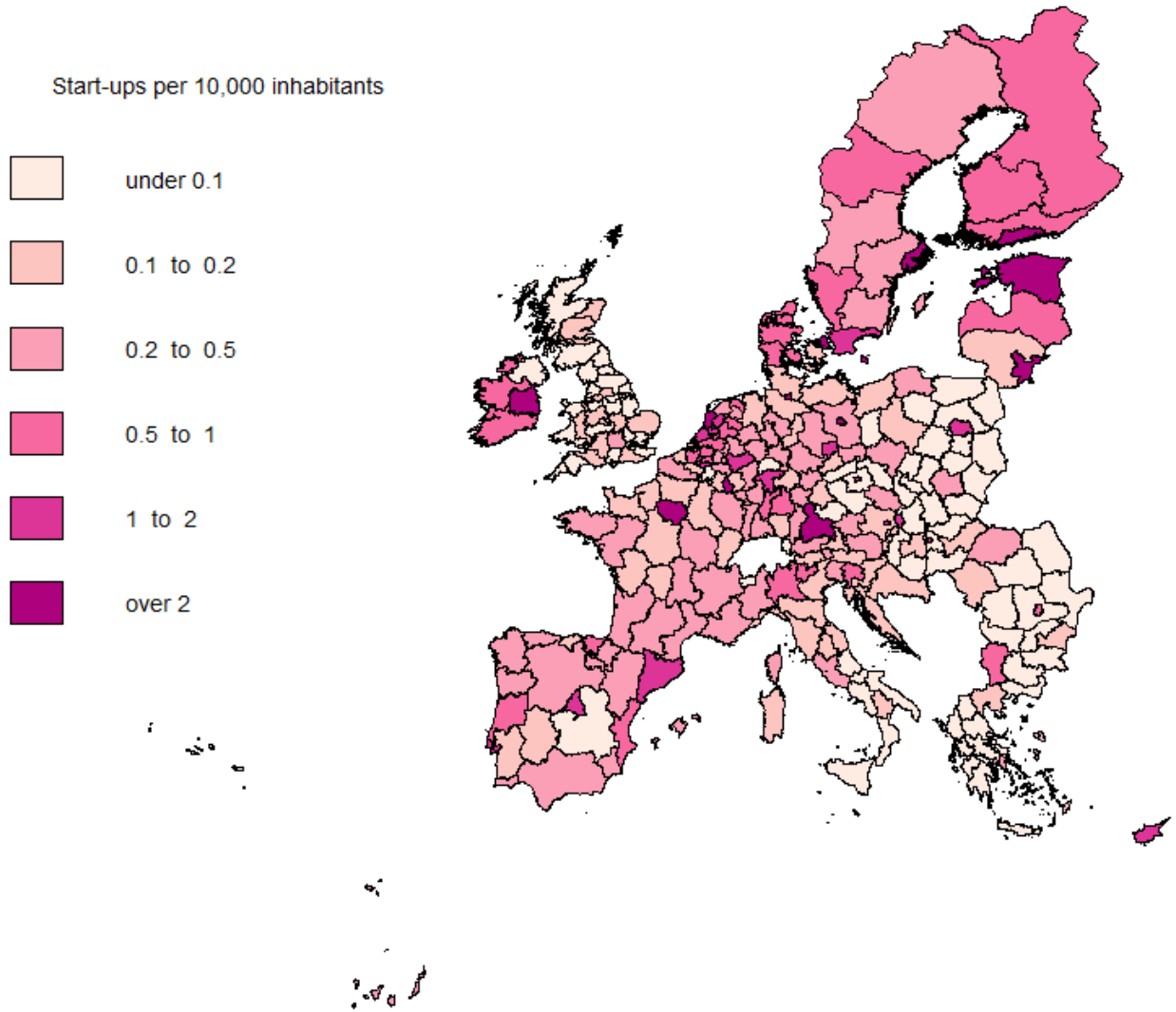


Research questions

1. How can we compose harmonized data sets with which the quality of key **elements** of entrepreneurial economies can be measured?
2. To what extent and how are the elements of entrepreneurial economies **interdependent**?
3. How can we determine the **quality** of entrepreneurial economies?

Research questions

1. How can we compose harmonized data sets with which the quality of key **elements** of entrepreneurial economies can be measured?
   - We develop a universal set of constructs for each element of entrepreneurial economies and compose a harmonized data set to measure these constructs in the context of 274 NUTS 2 regions in the 28 countries of the European Union.
2. To what extent and how are the elements of entrepreneurial economies **interdependent**?
3. How can we determine the **quality** of entrepreneurial economies?


Start-ups per 10,000 inhabitants
under 0.1
0.1 to 0.2
0.2 to 0.5
0.5 to 1
1 to 2
over 2

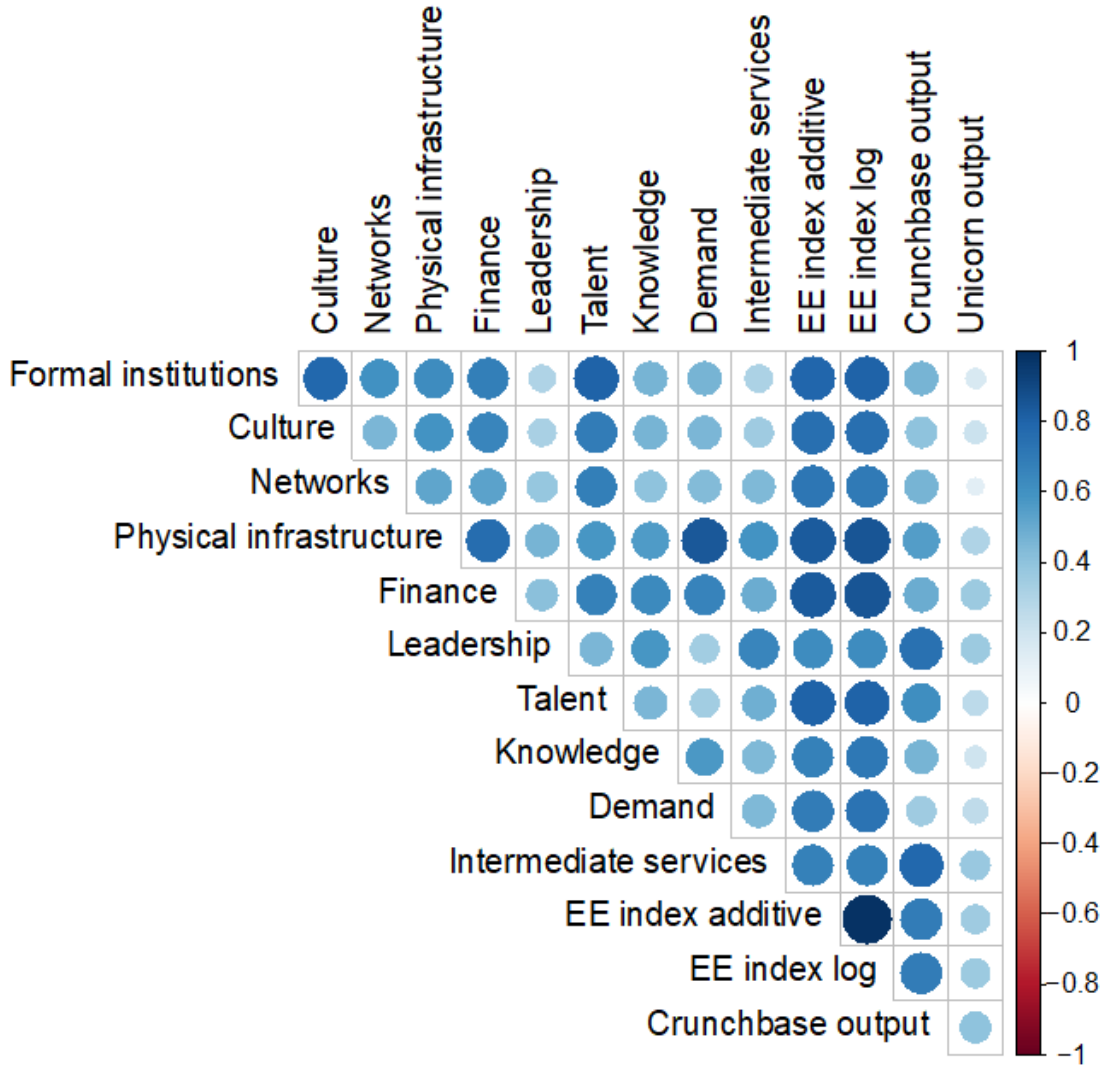
Elements	Description	Empirical indicators	Data source
Formal institutions	The rules of the game in society	Two composite indicators measuring the overall quality of government (consisting of scores for corruption, accountability, and impartiality) and the regulatory framework for entrepreneurship (number of days to start a business, difficulties encountered when starting a business, the barriers to entrepreneurship and the ease of doing business)	Quality of Government Survey and the Regional Ecosystem Scoreboard
Entrepreneurship culture	The degree to which entrepreneurship is valued in a region	A composite measure capturing the regional entrepreneurial culture, consisting of entrepreneurial motivation, cultural and social norms, importance to be innovative and trust in others	Regional Ecosystem Scoreboard
Networks	The connectedness of businesses for new value creation	Percentage of SMEs that engage in innovative collaborations as a percentage of all SMEs in the business population	Regional Innovation Scoreboard
Physical Infrastructure	Transportation infrastructure and digital infrastructure	Four components in which the transportation infrastructure is measured as the accessibility by road, accessibility by railway and number of passenger flights and digital infrastructure is measured by the percentage of households with access to internet	Regional Competitiveness Index
Finance	The availability of venture capital and bank loans to firms	Two components: availability of venture capital, availability of bank loans for capital investments	Regional Ecosystem Scoreboard
Leadership	The presence of actors taking a leadership role in the ecosystem	The number of coordinators on H2020 innovation projects per 1000 inhabitants	CORDIS (Community Research and Development Information Service)
Talent	The prevalence of individuals with high levels of human capital, both in terms of formal education and skills	Eight components: tertiary education, vocational training, lifelong learning, innovative skills training, entrepreneurship education, technical skills, creative skills, e-skills	Regional Ecosystem Scoreboard
New Knowledge	Investments in new knowledge	Intramural R&D expenditure as percentage of Gross Regional Product	Eurostat
Demand	Potential market demand	Three components: disposable income per capita, potential market size expressed in GRP, potential market size in population. All relative to EU average.	Regional Competitiveness Index
Intermediate services	The supply and accessibility of intermediate business services	Two components: the percentage of employment in knowledge-intensive market services and the percentage of incubators/accelerators per 1000 inhabitants	Eurostat and Crunchbase
Output	Entrepreneurial output	The number of Crunchbase firms founded in the past 5 year per 1000 inhabitants	Crunchbase
	Unicorn output	The absolute number of unicorns in the region	CB Insights

Research questions

1. How can we compose harmonized data sets with which the quality of key **elements** of entrepreneurial economies can be measured?
2. To what extent and how are the elements of entrepreneurial economies **interdependent**?
   - Can entrepreneurial economies be seen as complex systems, with strong interdependencies between the elements? Interdependence is a key aspect of complex systems, we show with multiple statistical methods to what extent and how the elements of entrepreneurial economies are interdependent.
3. How can we determine the **quality** of entrepreneurial economies?

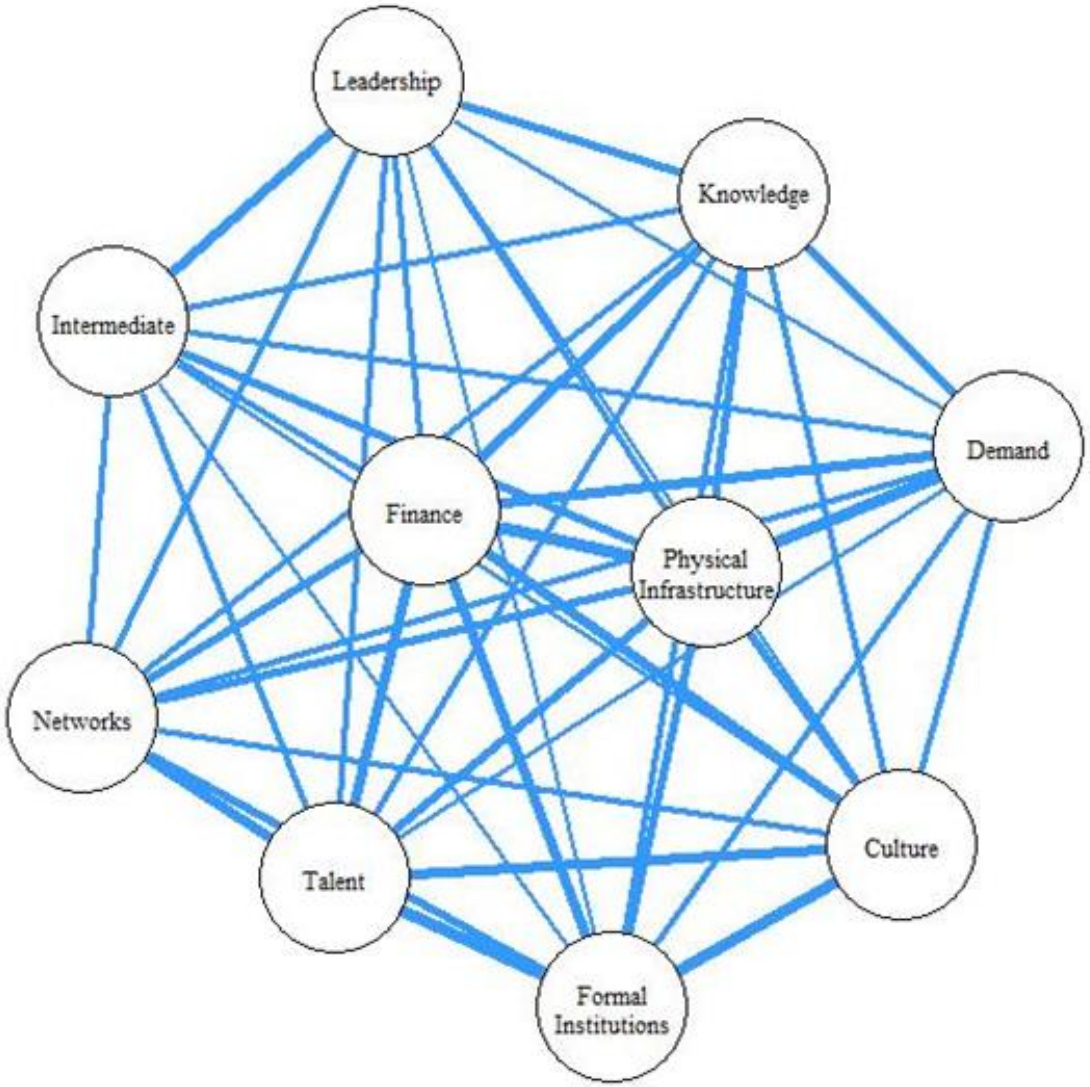
Correlation matrix

correlation coefficient is indicated by colour and the significance level by size, only correlations that are significant at 5% level are shown

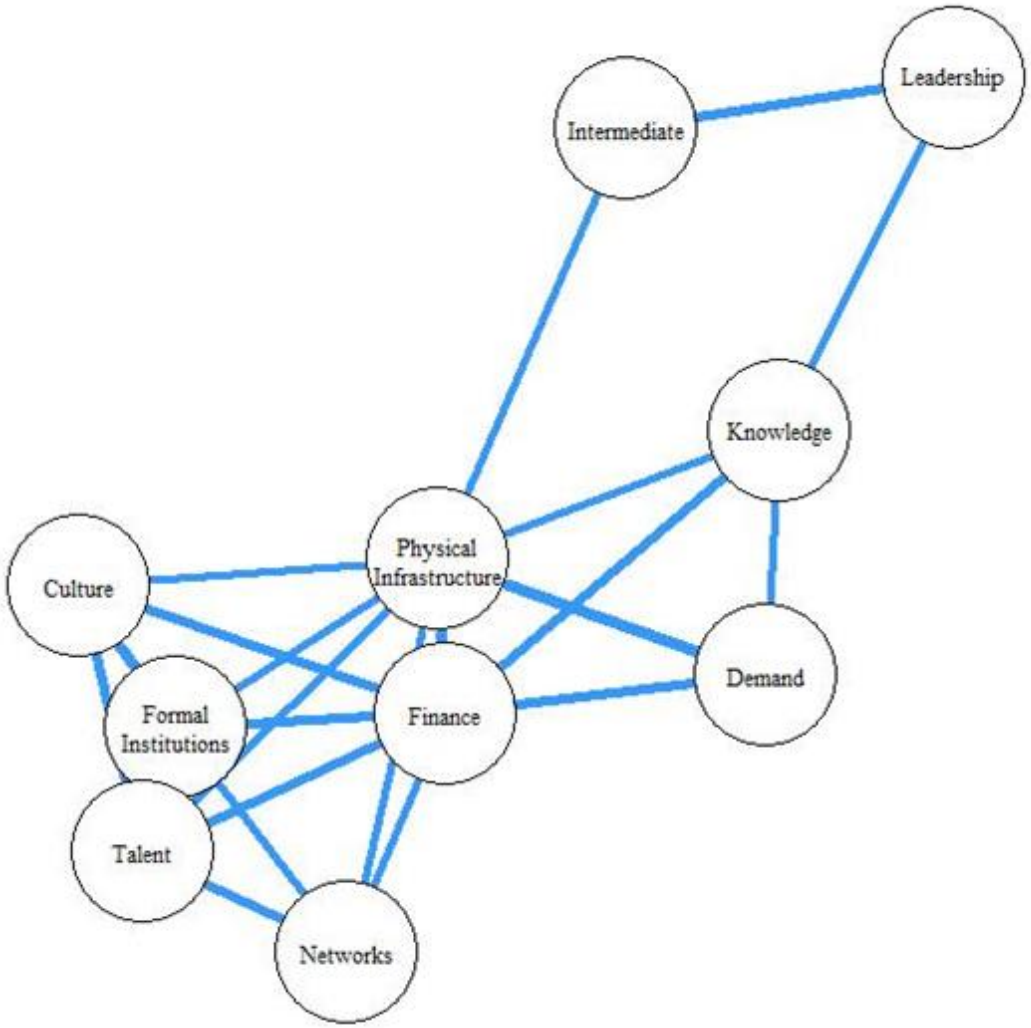


Interdependence web

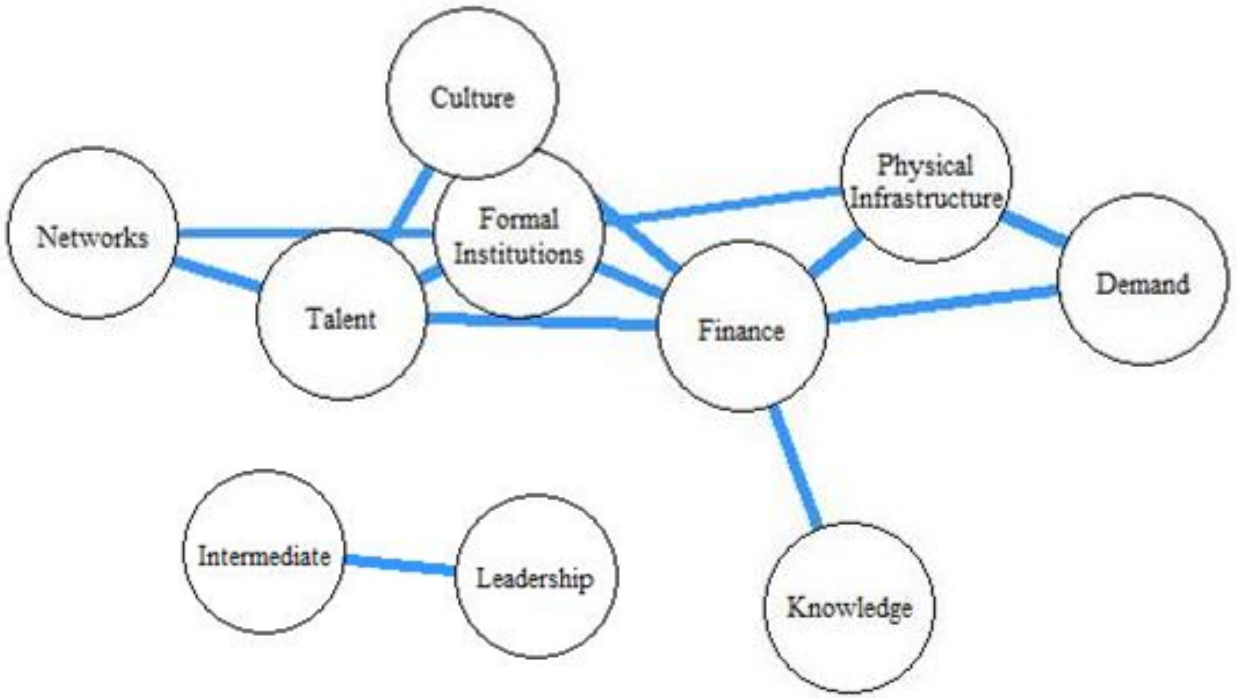
(edge weight indicates correlation strength)



Interdependence web >0.5



Interdependence web >0.6



Research questions

1. How can we compose harmonized data sets with which the quality of key **elements** of entrepreneurial economies can be measured?
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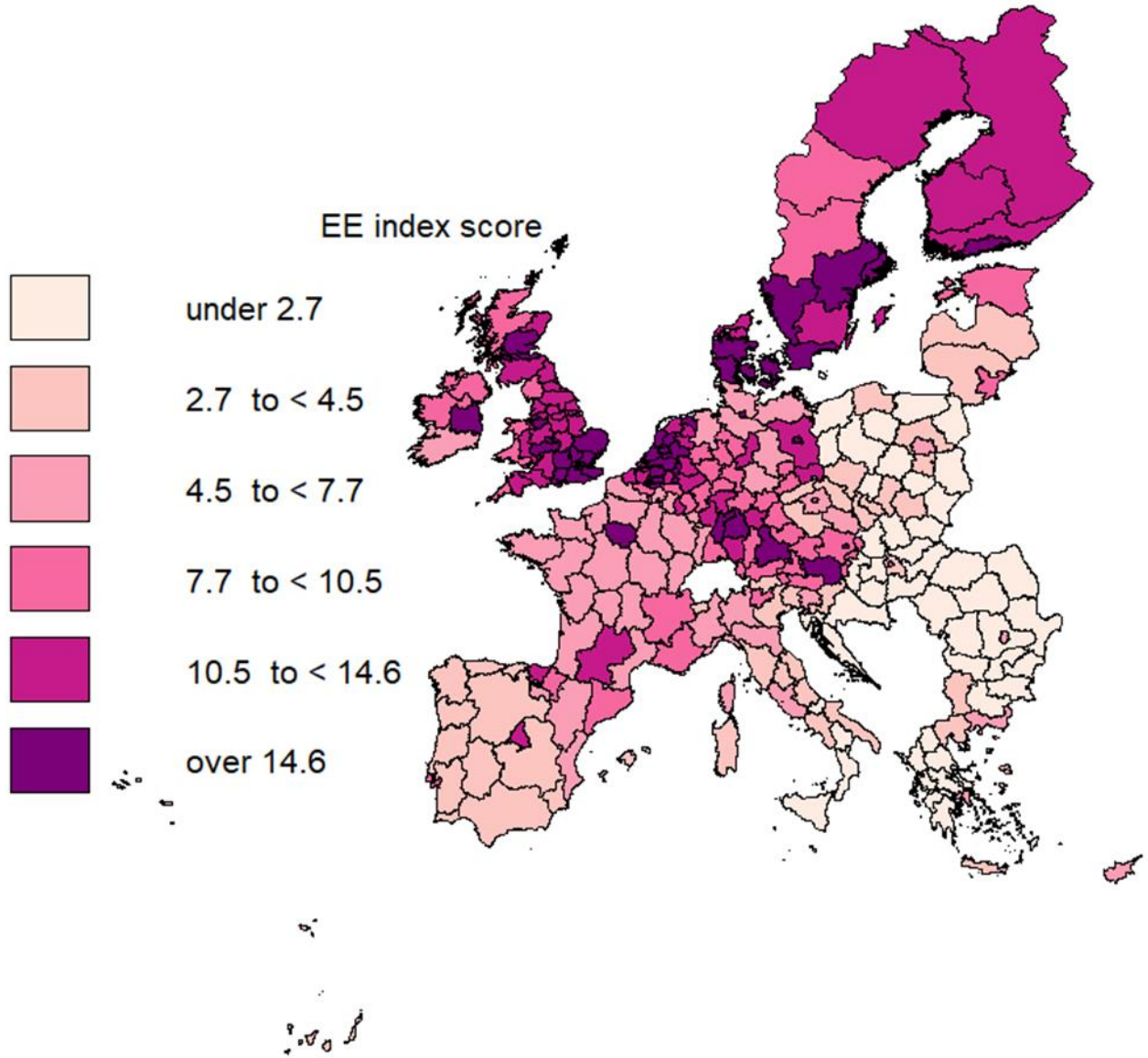
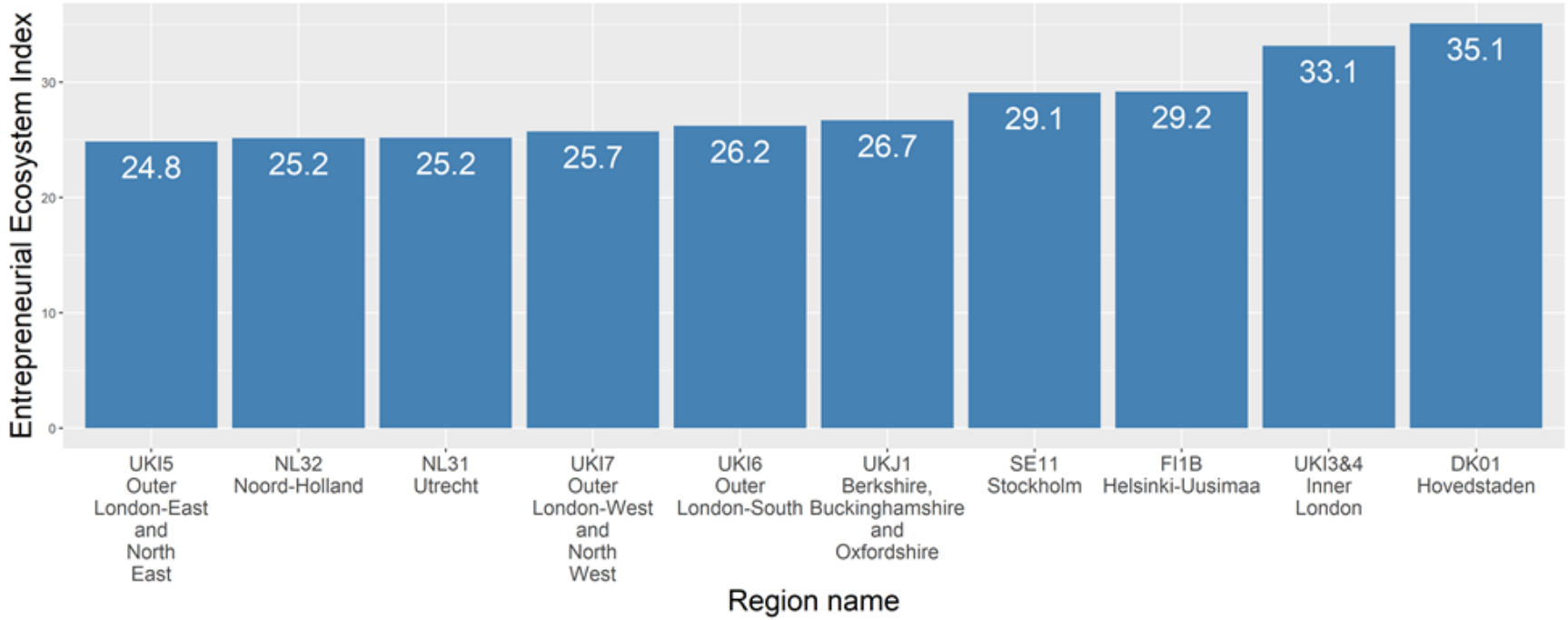
3. How can we determine the **quality** of entrepreneurial economies?
   - Compose an entrepreneurial ecosystem **index** and analyse its relation to **entrepreneurial outputs**, an indicator of the **emergent property** of the entrepreneurial economy as a complex system.

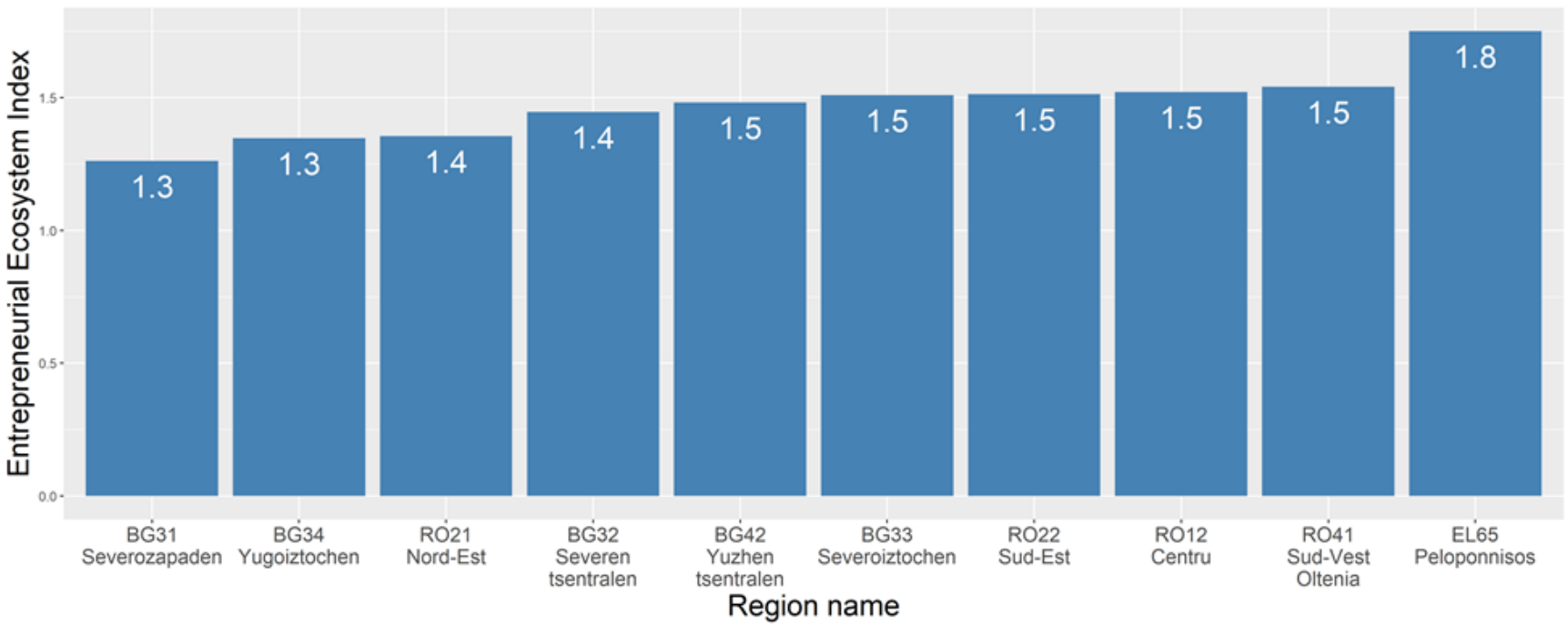
Measuring Entrepreneurial Ecosystem Quality

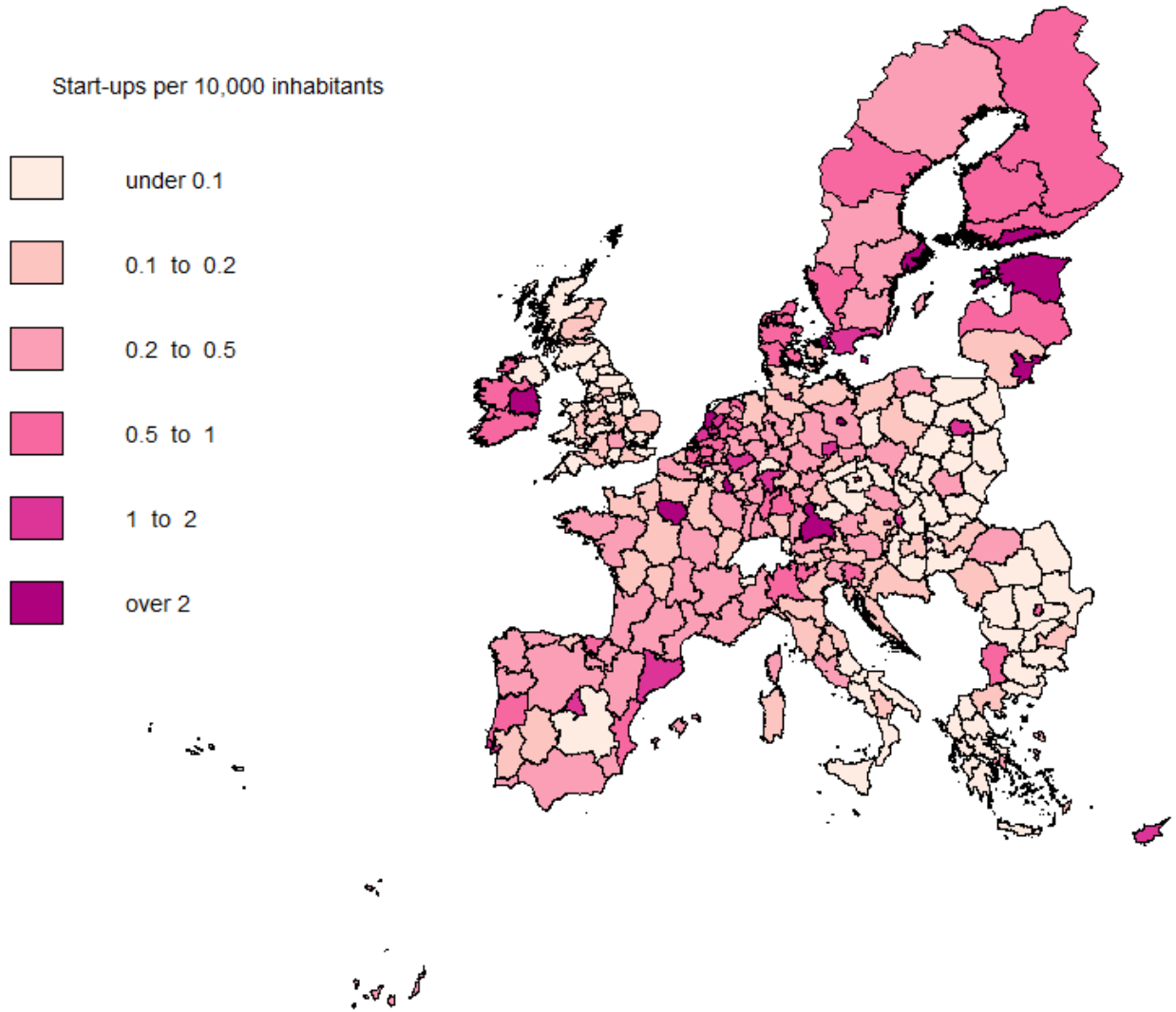
Create an index in:

- an additive way (E1 + E2 +…E10).
- a multiplicative way (E1*E2*…E10).
- Logarithm of the multiplicative way (log(E1*E2*…E10))


EE index score
under 2.7
2.7 to < 4.5
4.5 to < 7.7
7.7 to < 10.5
10.5 to < 14.6
over 14.6


Entrepreneurial Ecosystem Index
0
10
20
30
24.8
25.2
25.2
25.7
26.2
26.7
29.1
29.2
33.1
35.1
UKI5 Outer London-East and North East
NL32 Noord-Holland
NL31 Utrecht
UKI7 Outer London-West and North West
UKI6 Outer London-South
UKJ1 Berkshire, Buckinghamshire and Oxfordshire
SE11 Stockholm
FI1B Helsinki-Uusimaa
UKI3&4 Inner London
DK01 Hovedstaden
Region name


Entrepreneurial Ecosystem Index
0.0
0.5
1.0
1.5
1.3
1.3
1.4
1.4
1.5
1.5
1.5
1.5
1.5
1.8
BG31 Severozapaden
BG34 Yugoiztochen
RO21 Nord-Est
BG32 Severen tsentralen
BG42 Yuzhen tsentralen
BG33 Severoiztochen
RO22 Sud-Est
RO12 Centru
RO41 Sud-Vest Oltenia
EL65 Peloponnisos
Region name


Start-ups per 10,000 inhabitants
under 0.1
0.1 to 0.2
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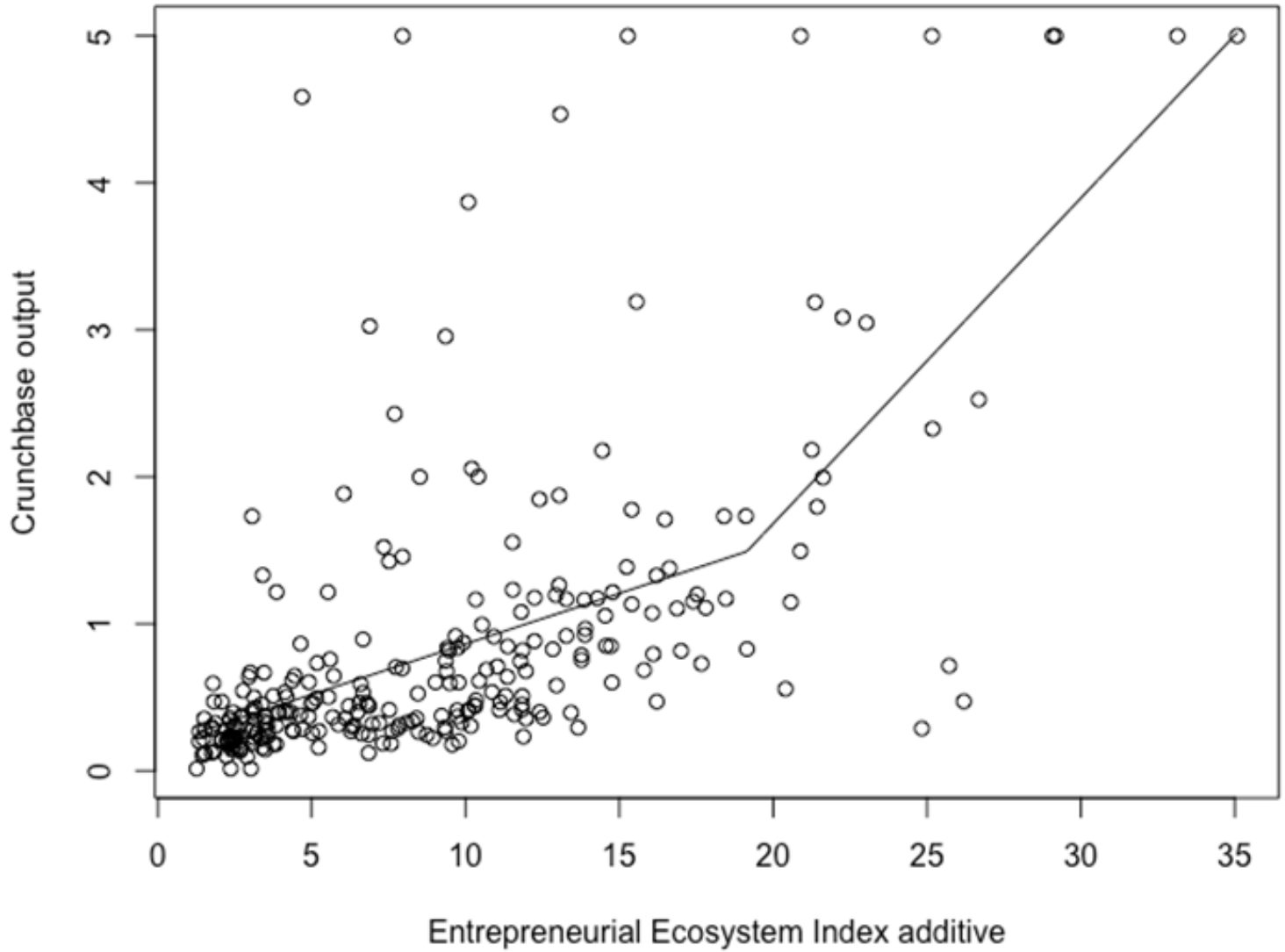

Crunchbase output
0
1
2
3
4
5
0
5
10
15
20
25
30
35
Entrepreneurial Ecosystem Index additive

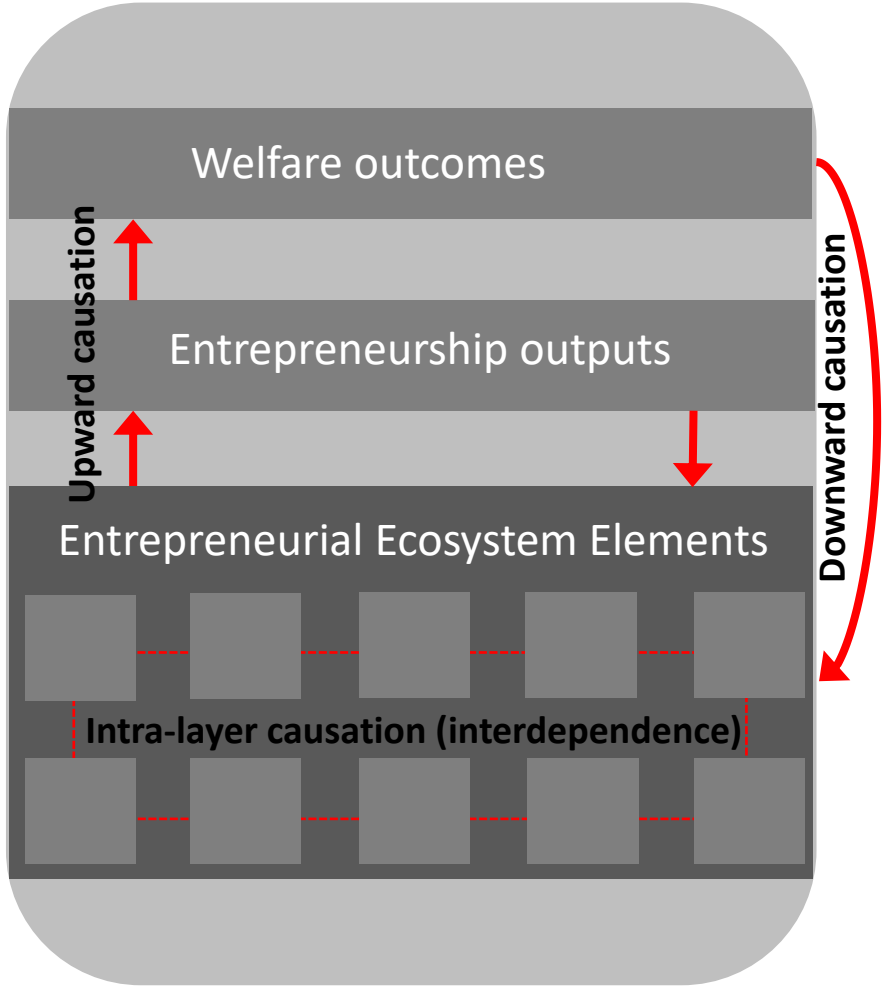
Why not regional competitiveness, regional innovation systems, ….?

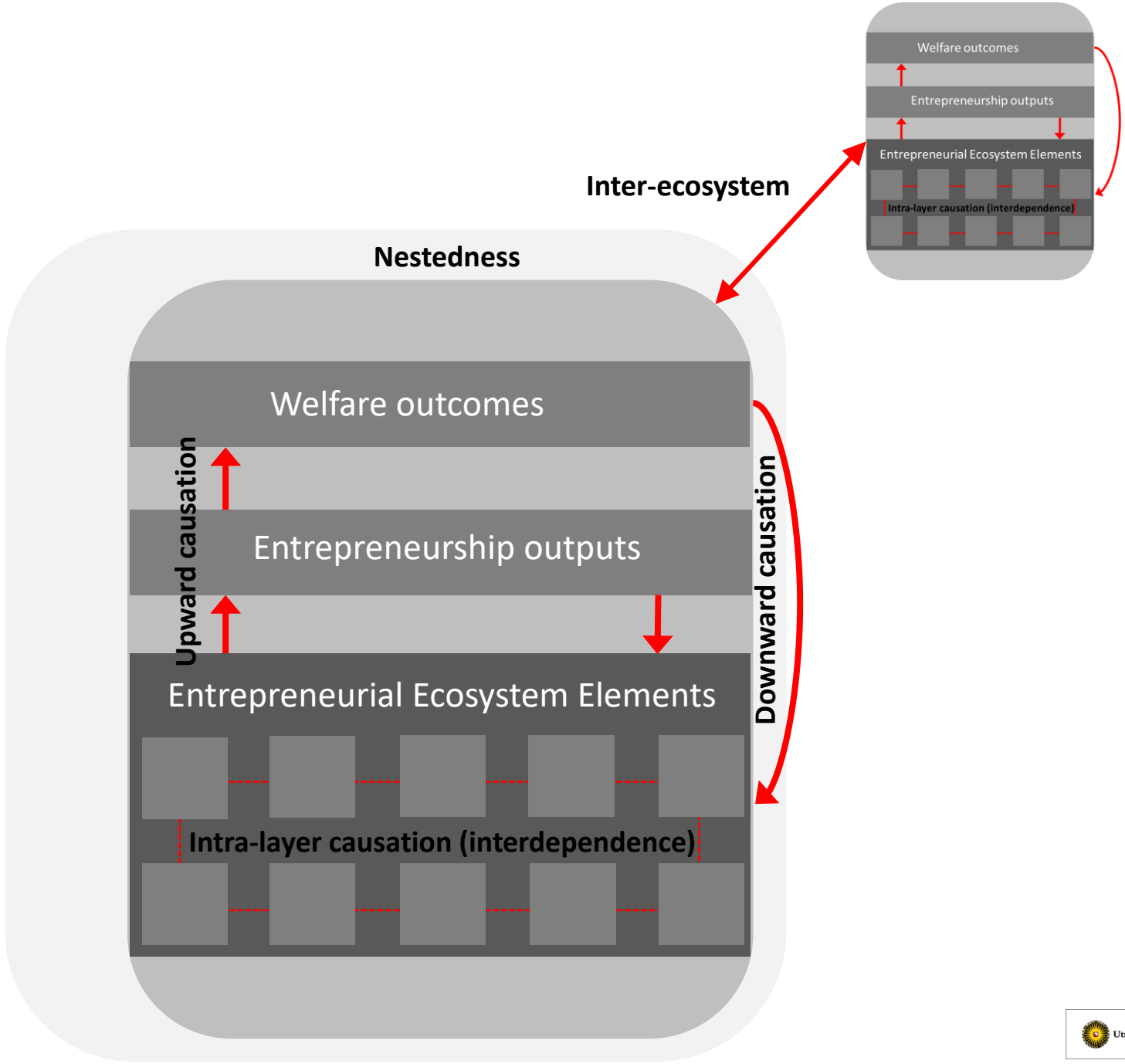
	EE index add	EE index log	RCI 2019	RIS 2019	GRP per capita	Crunchbase output
EE index log	0.985****					
RCI 2019	0.920****	0.941****				
RIS 2019	0.900****	0.902****	0.885****			
GRP per capita	0.773****	0.782****	0.820****	0.724****		
Crunchbase output	0.696****	0.695****	0.573****	0.588****	0.585****	
Unicorn output	0.351****	0.362****	0.300****	0.286****	0.281****	0.400****

Conclusions

- Quantify and qualify regional economies with an Entrepreneurial Ecosystem approach
- Developed a universal set of constructs for each EE element and constructed a harmonized dataset
- Strong interdependence between EE elements: complex system
- Qualify entrepreneurial economies with an EE index
- EE index -> entrepreneurship outputs: emergence

Entrepreneurial Ecosystem Research Program - I




Welfare outcomes
Entrepreneurship outputs
Entrepreneurial Ecosystem Elements
Intra-layer causation (interdependence)
Inter-ecosystem
Nestedness
Welfare outcomes
Upward causation
Entrepreneurship outputs
Entrepreneurial Ecosystem Elements
Downward causation
Intra-layer causation (interdependence)

Entrepreneurial Ecosystem Research Program - II

- Improve our understanding of **entrepreneurial economies** as **complex systems**
  - Learn more from complexity studies
- Quantify and qualify regional economies with an entrepreneurial ecosystem approach: entrepreneurial economies as complex systems
- New data sources:
  - Surveys: Global Entrepreneurship Monitor Entrepreneurial Ecosystem Quality Composite Index (ESI)
  - Social media: Twitter, LinkedIn
  - …
- More fine-grained analyses: Nuts 2 -> Nuts 3 (city regions)
- Multiple context (beyond Europe and US): Latin America, **Africa**, Middle East, South-East Asia, Canada, Australia, ….
- Next step: longitudinal analysis
- Multiple methods: time series analysis, Qualitative Comparative Analysis [Schrijvers, Stam, Bosma 2021], penalty-for-bottleneck method, social network analysis, agent-based modelling [Wurth et al. 2021], historical case studies, narrative analysis….

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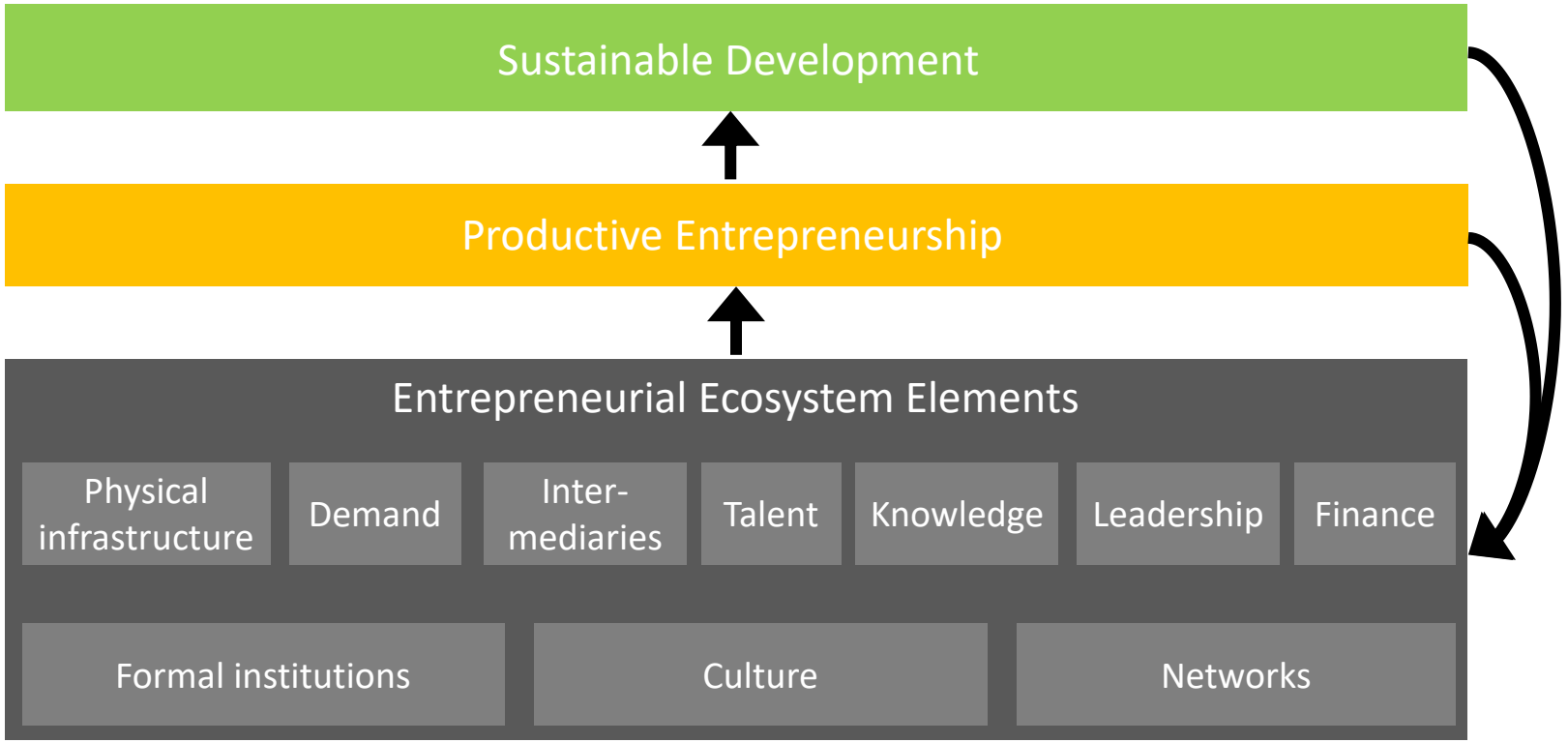
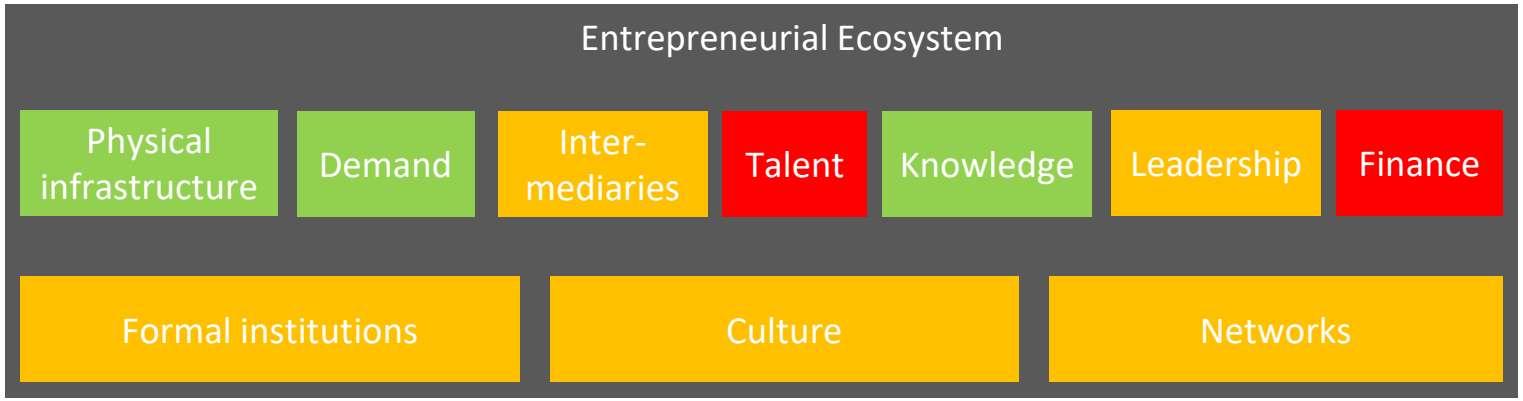
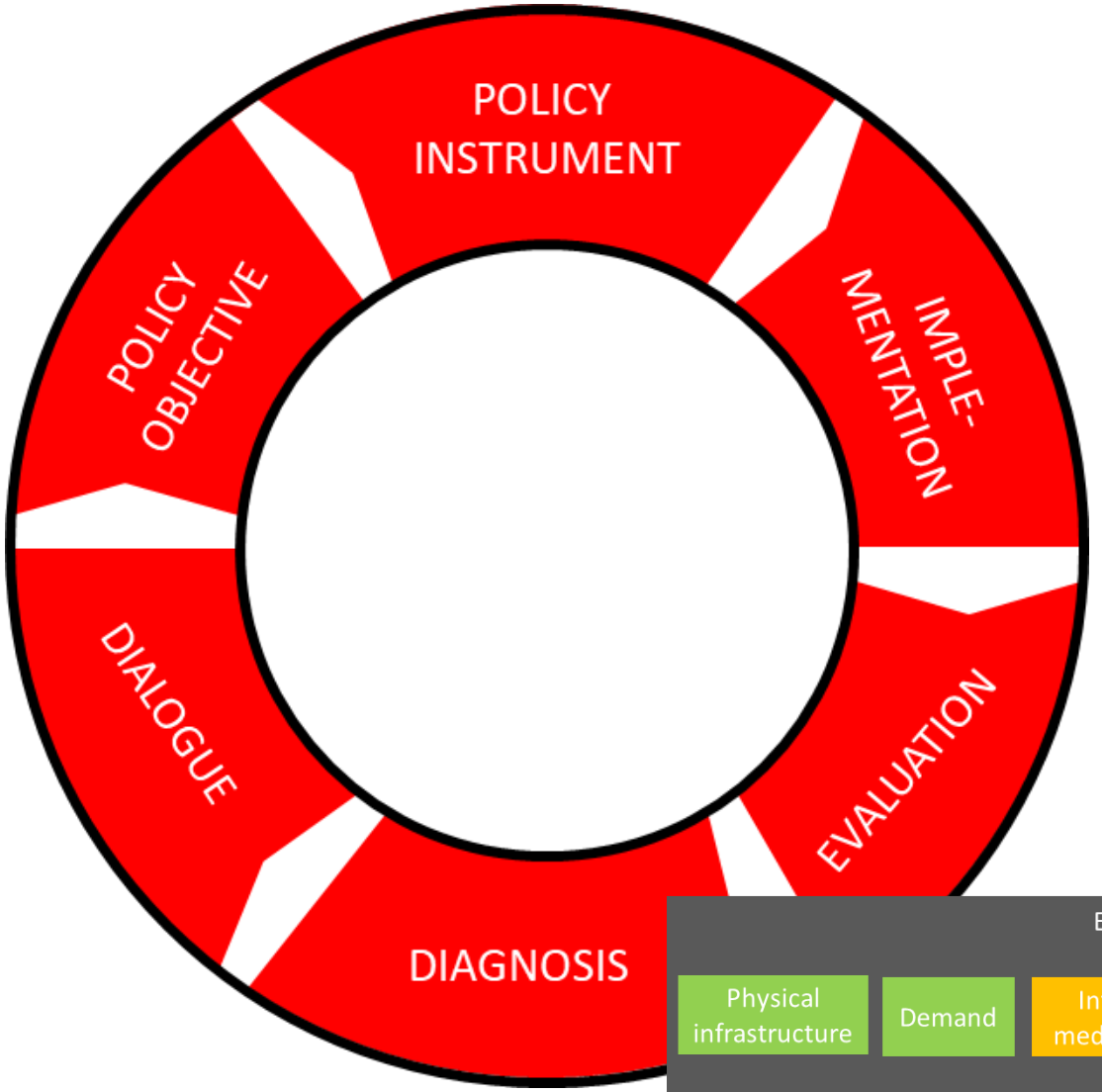
Entrepreneurial Ecosystem **Development**



Diagnostics



Collective Learning Process to Improve your Economy

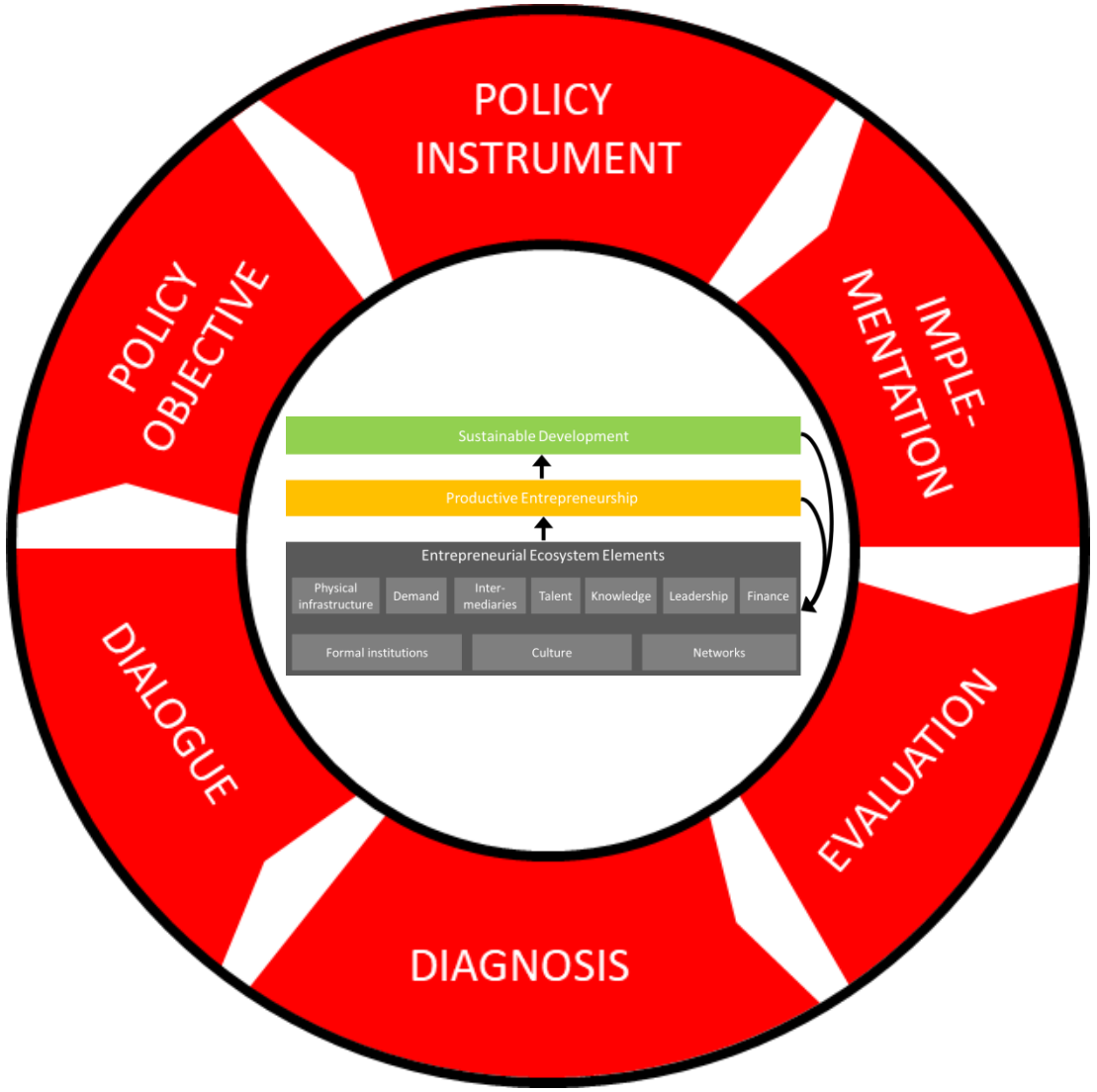


Entrepreneurial Ecosystem

Physical infrastructure	Demand	Inter-mediaries	Talent	Knowledge	Leadership	Finance

Formal institutions	Culture	Networks

Ecosystem Strategy



Enable entrepreneurship-led development in Africa with a data-and-dialogue driven entrepreneurial ecosystem approach

Stellenbosch University
Allan Gray Centre for Africa Entrepreneurship:
Enable entrepreneurship-led development in Africa with a data-and-dialogue driven entrepreneurial ecosystem approach

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