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Module 3: Subnational Innovation Ecosystems

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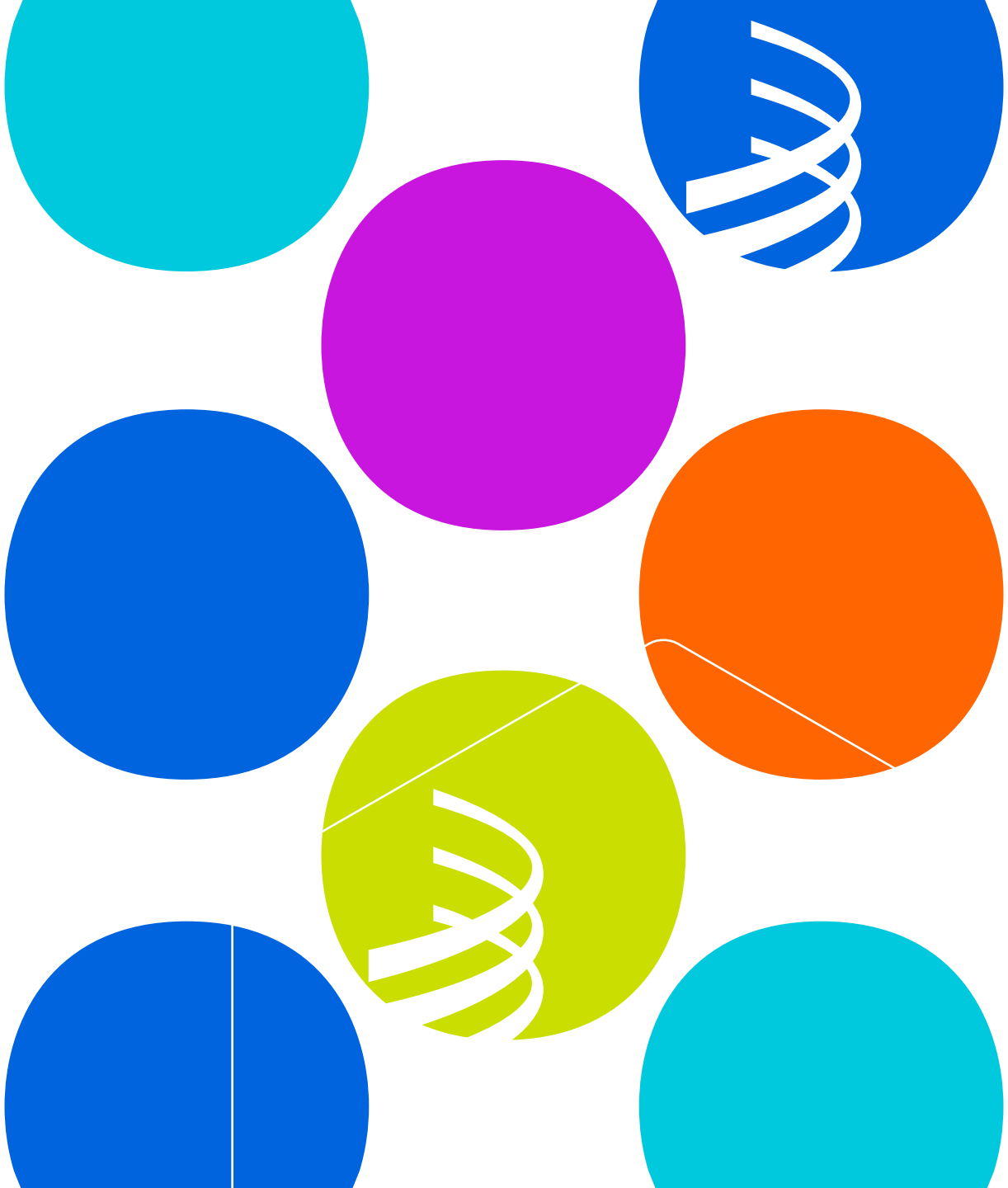


Recapitulating some concepts from the previous module

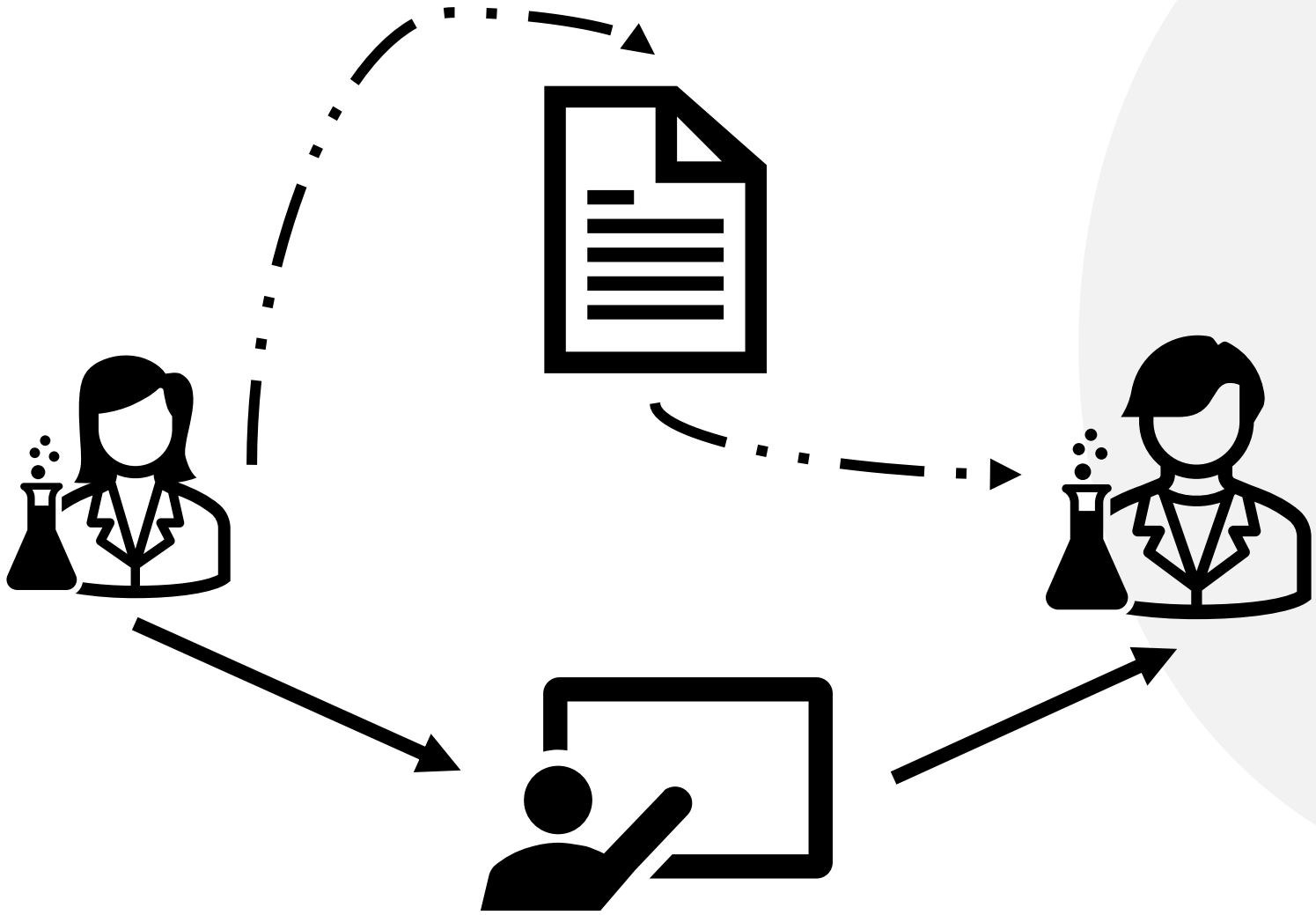
- Technological innovation is the engine that drives economic growth and fosters improved living standards.
- Innovation does not occur in isolation.
- Innovation ecosystems made up of interrelated agents facilitate the generation, acquisition, and dissemination of new knowledge.
- Innovation ecosystems are not easily transplantable or reproducible as they develop in institutional environments and social fabrics with a high degree of territorial specificity

→ focus on the Geography of Innovation.

In this module we will try to answer the following questions:

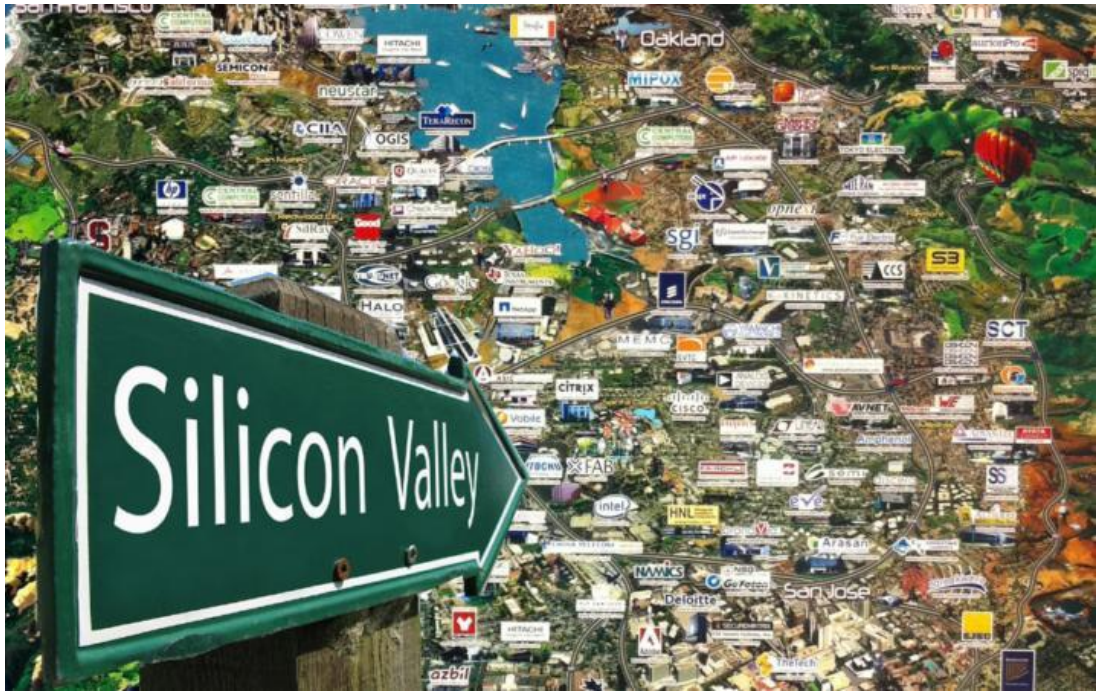
- What forces can explain why innovation has been concentrated in certain geographical areas and has spread only unevenly?
- How exactly is the global geography of innovation changing?
- How do companies organize their innovation activities around the world in today's globalized era?

How do you transfer knowledge?



Bengaluru, India

What forces explain the agglomeration of innovation?



The geographical distribution of innovation determines the economic development trajectory of cities and regions.

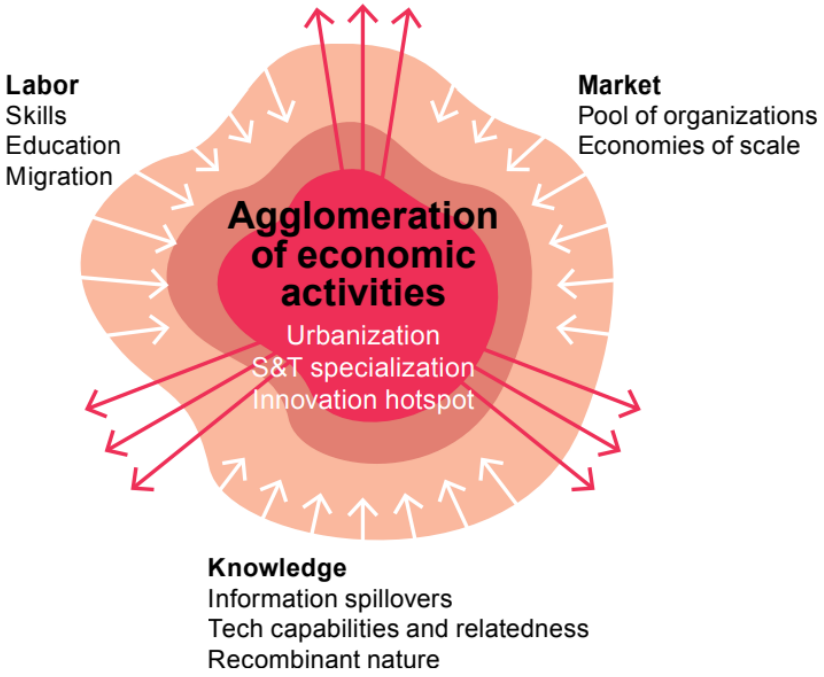
What forces explain the agglomeration of innovation?

Bengaluru, India

The geographical distribution of innovation determines the economic development trajectory of cities and regions.

Main economic forces driving geographic concentration in innovation

Figure 1.1 Main economic forces driving geographical concentration of innovation



Note: S&T = Science and technology.

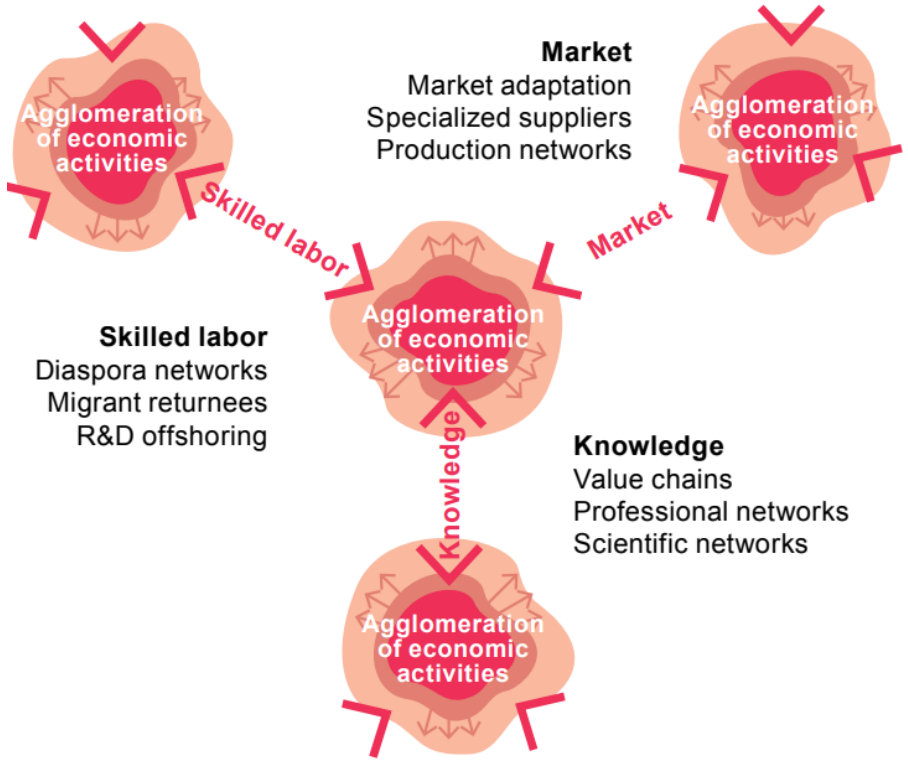
Source: WIPR 2019

Forces of urban agglomeration

- Businesses find skilled workers
- Skilled workers find jobs and value urban services
- Ideas flourish with innovators working in close proximity

Main two-way economic forces that favor the diffusion of innovation

Figure 1.2 Main bidirectional economic forces spreading innovation



Forces of urban agglomeration

Businesses find skilled workers

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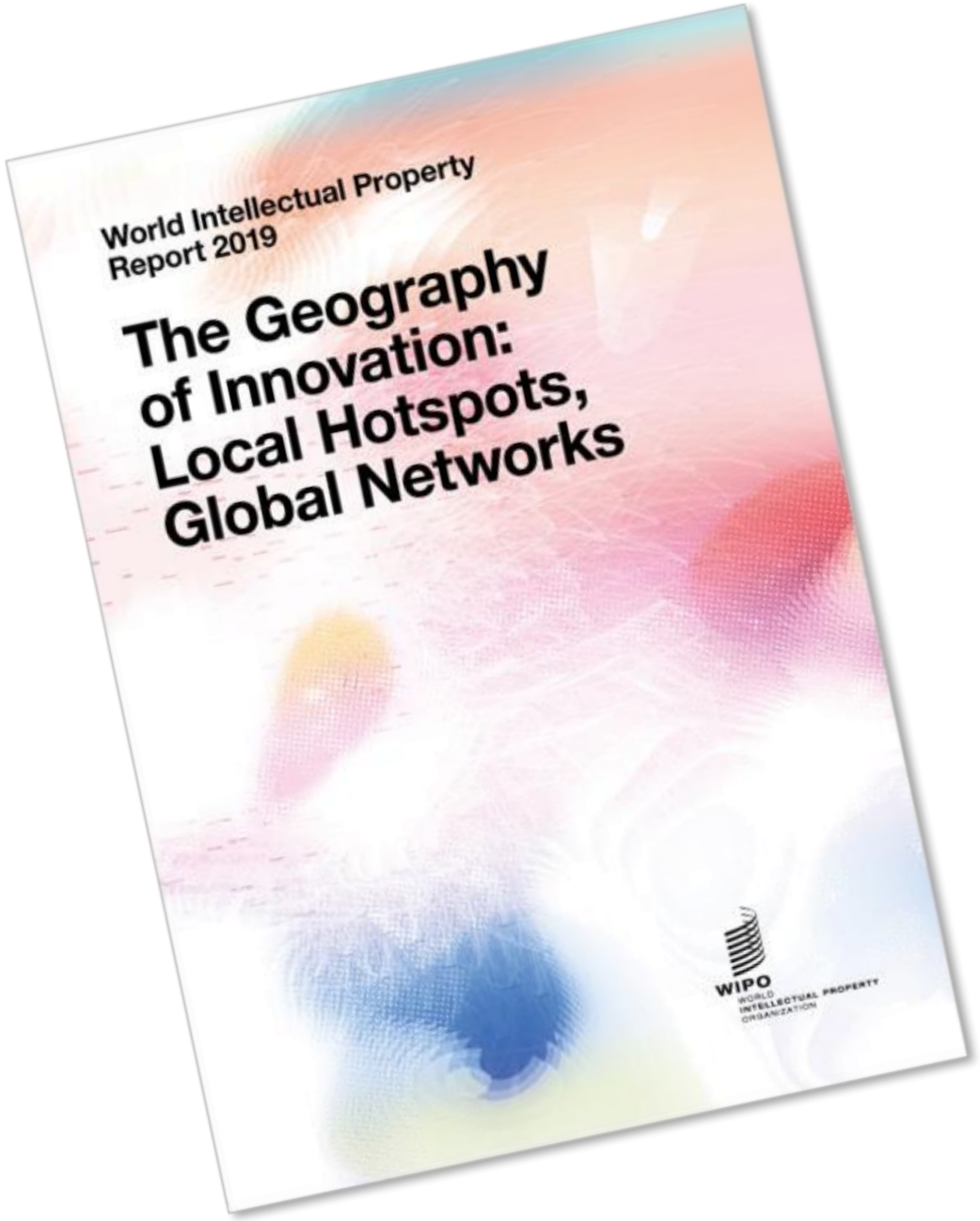
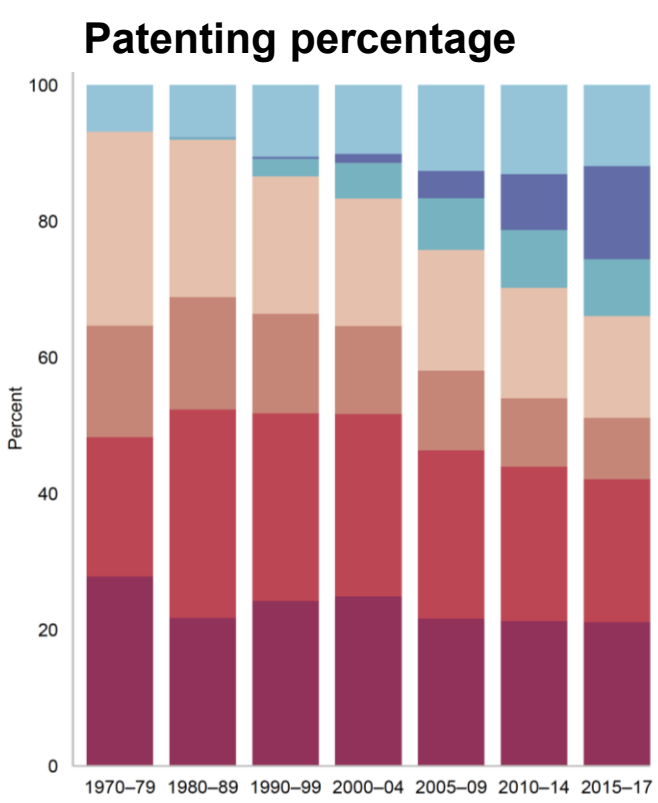
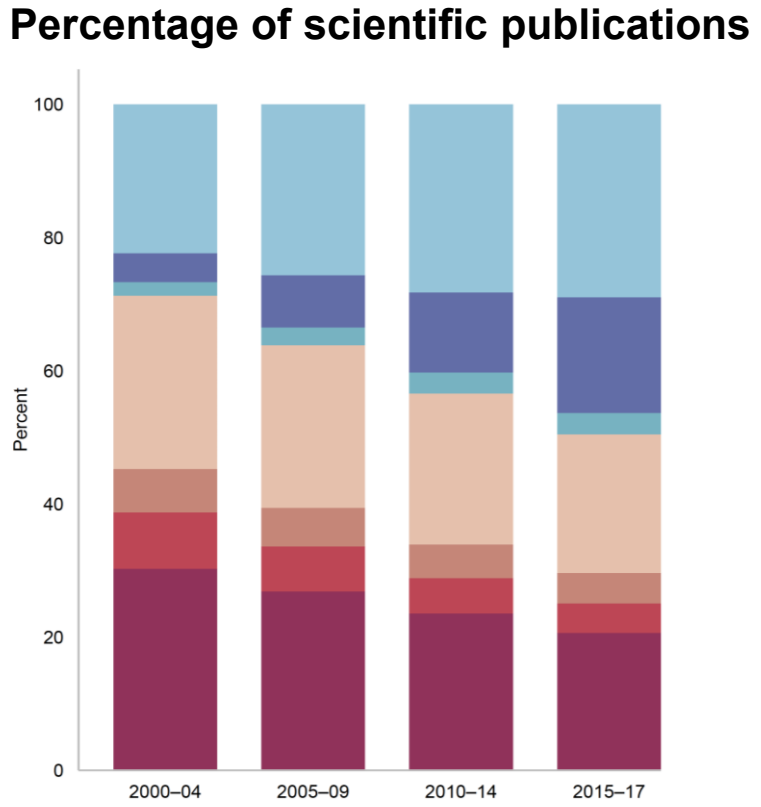


5 Stylized facts about the geography of innovation

#1 More and more countries are participating in global innovation networks.

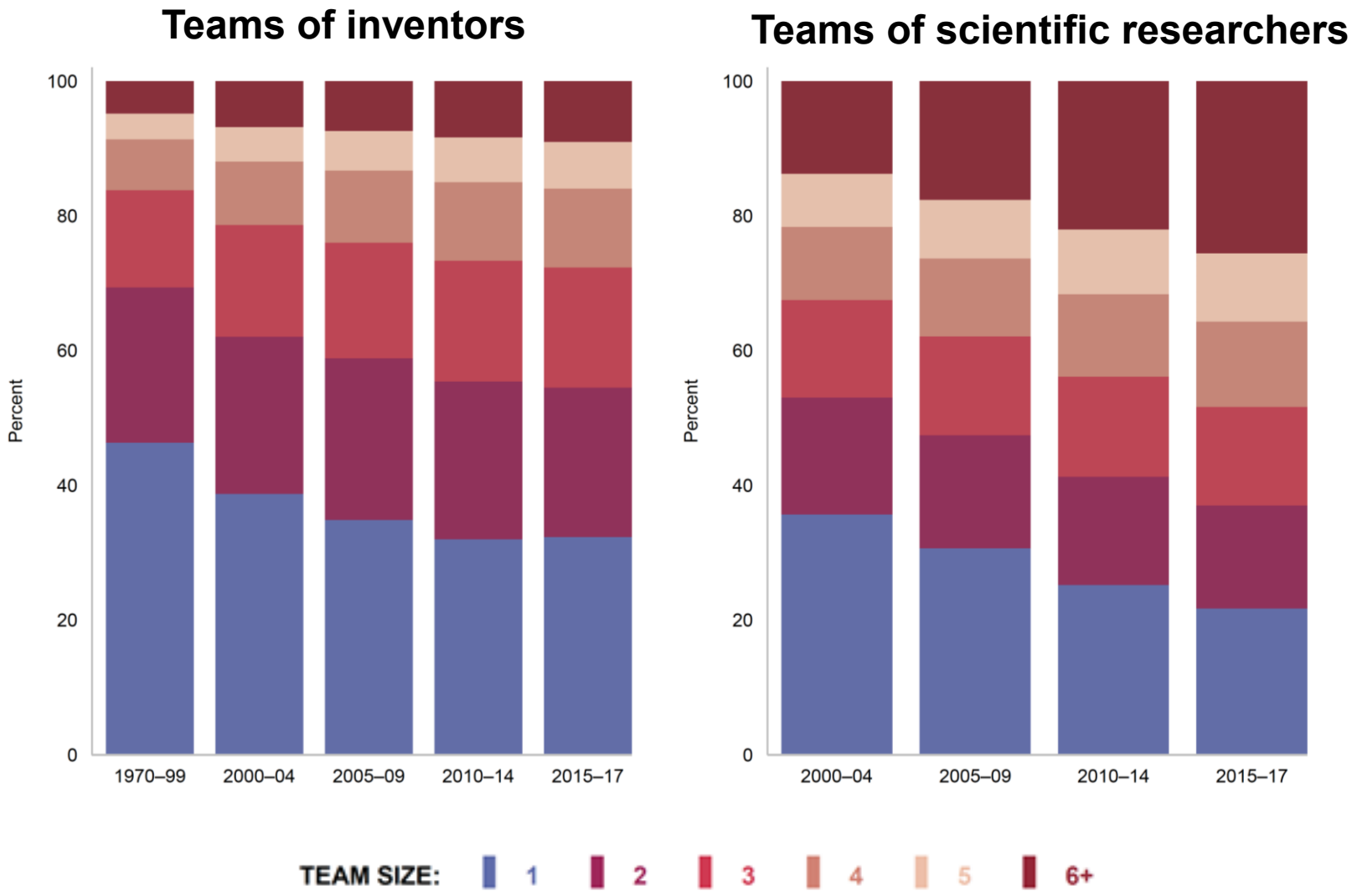
Knowledge production is spreading and shifting eastwards.





U.S. JAPAN GERMANY OTHER WESTERN EUROPE
REP. OF KOREA CHINA REST OF THE WORLD

#2 Collaboration is increasing



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#3 Innovation is increasingly local

Innovation is geographically concentrated in a limited number of areas

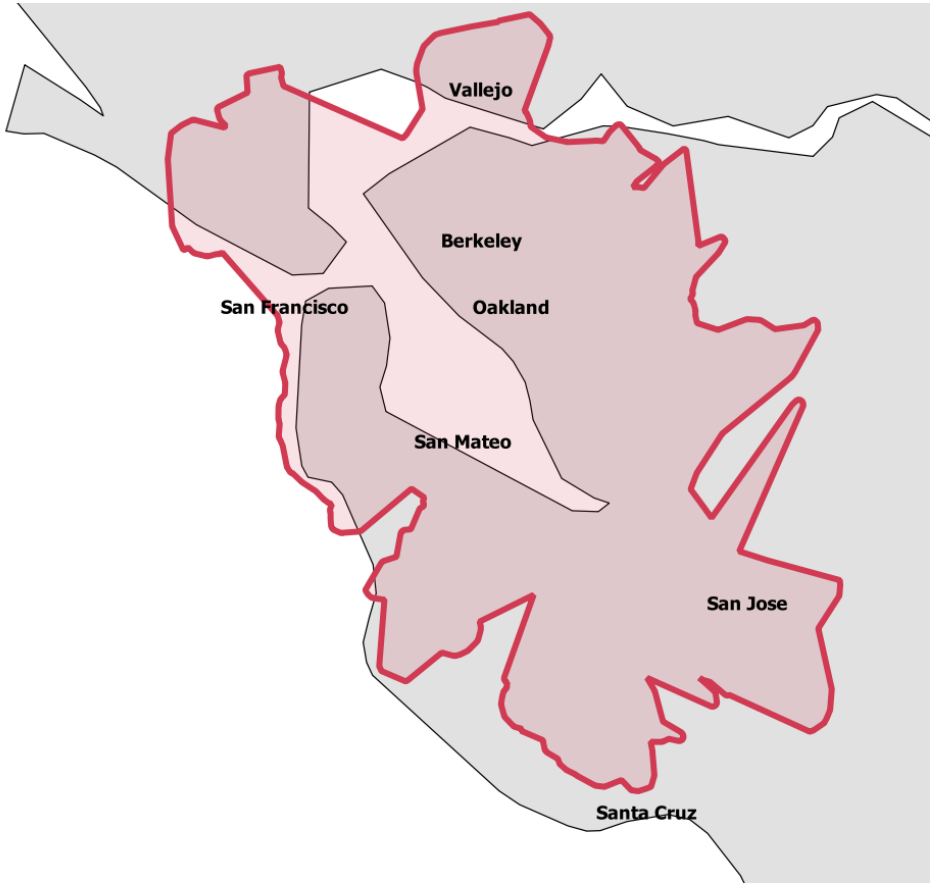
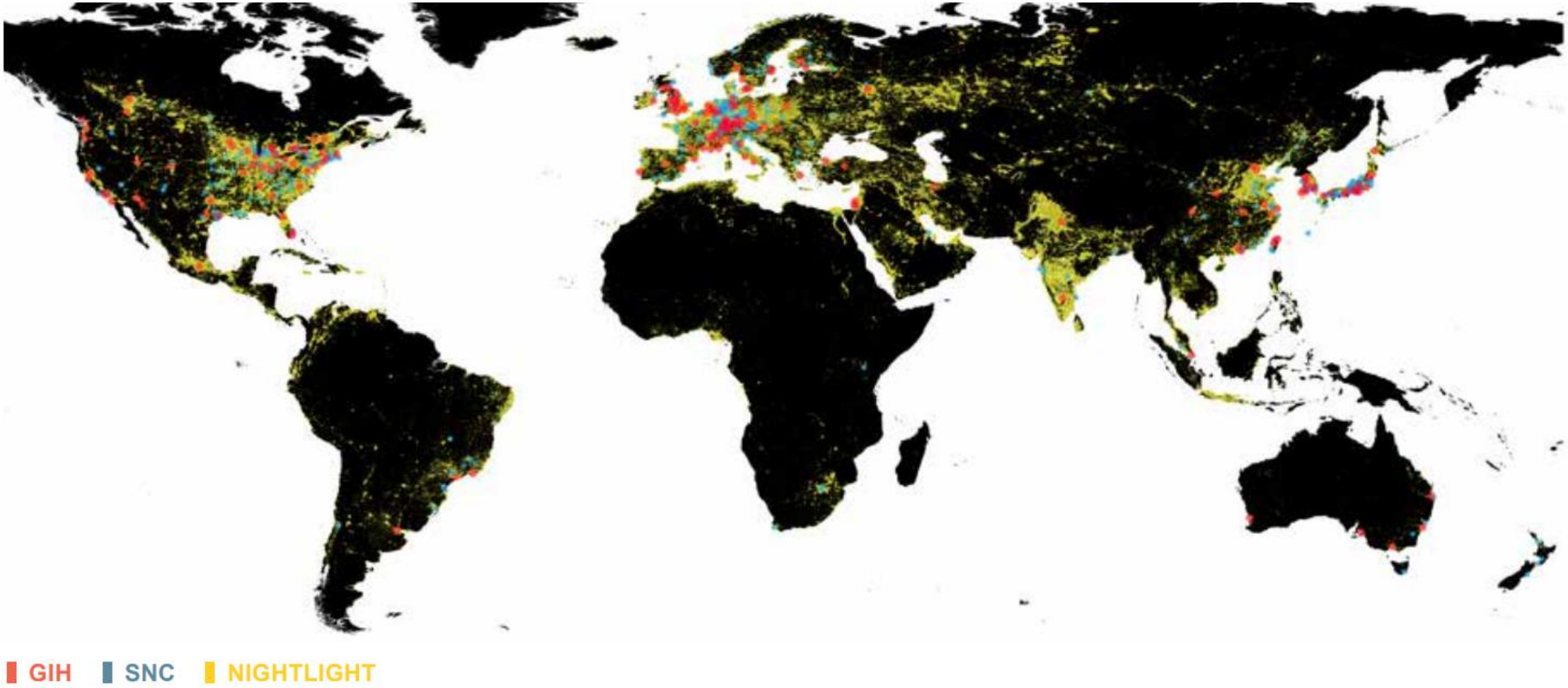


Figure 2.4 Worldwide distribution of innovation (GIHs and SNCs) and DMSP nightlight

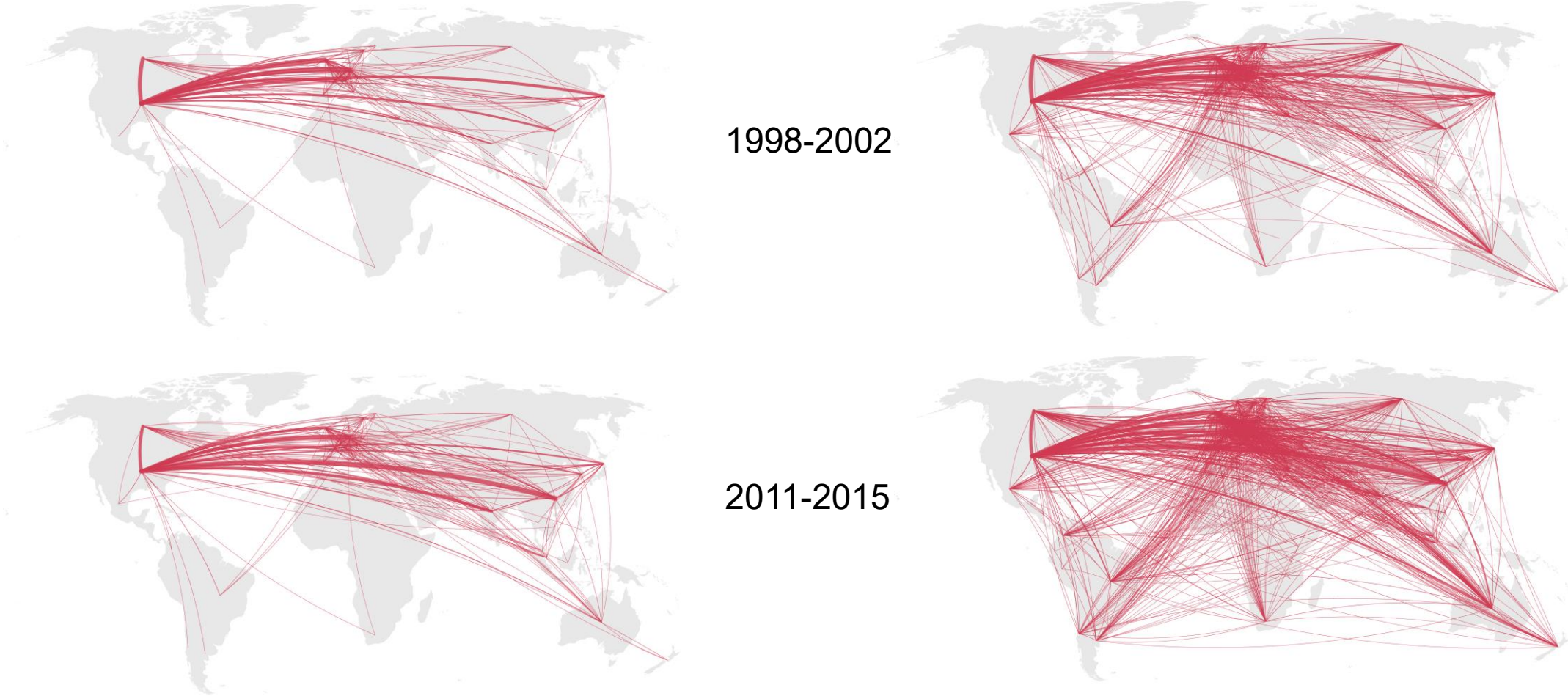


A few places concentrate most of the scientific and inventive activities

#4 More international collaboration between countries

International co-invention

International co-publications



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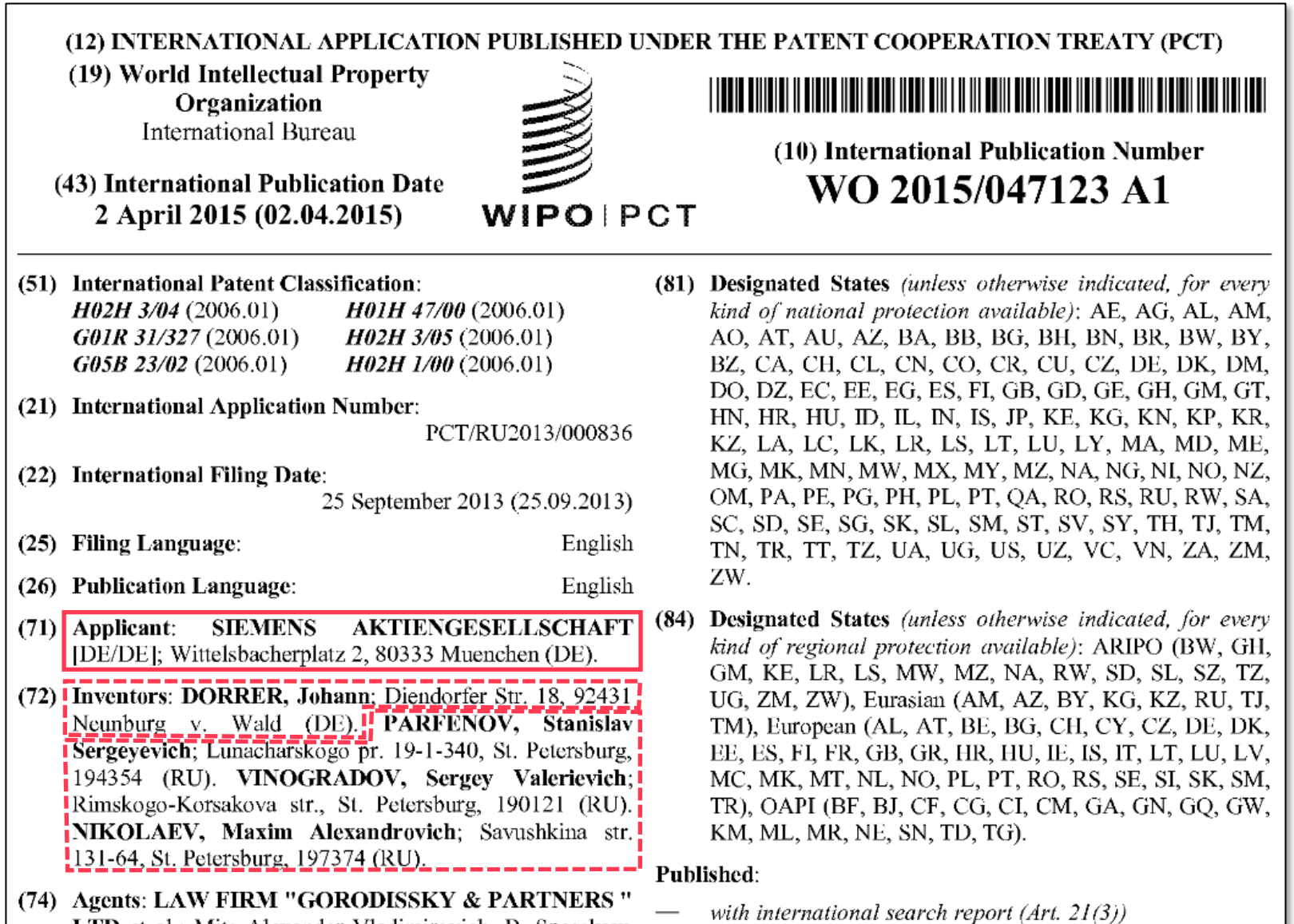
Multinational companies are at the heart of global innovation networks.

International patent sourcing



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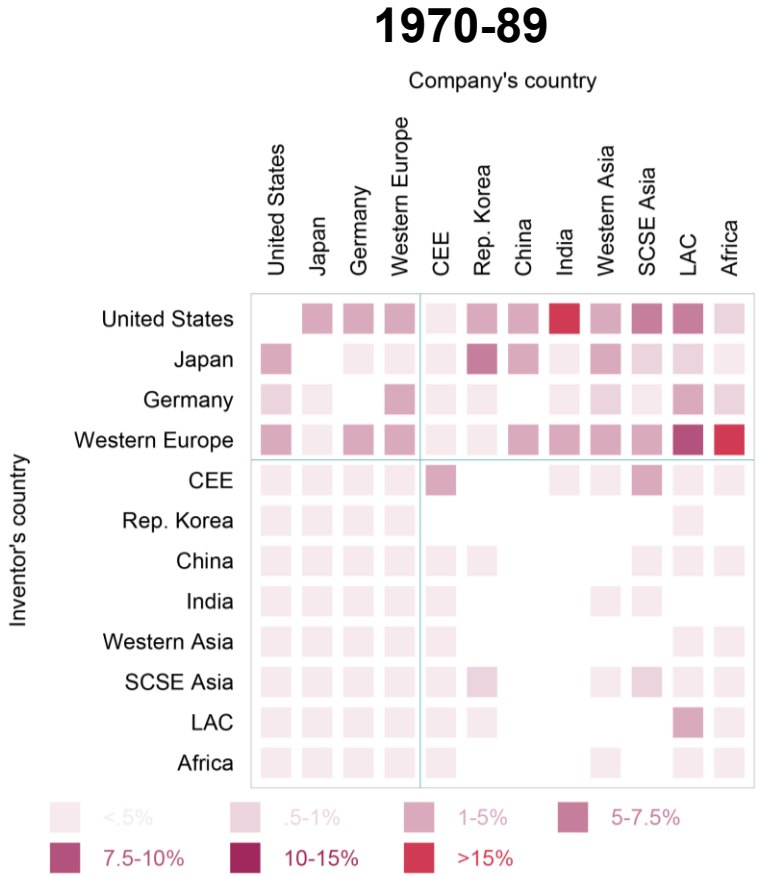
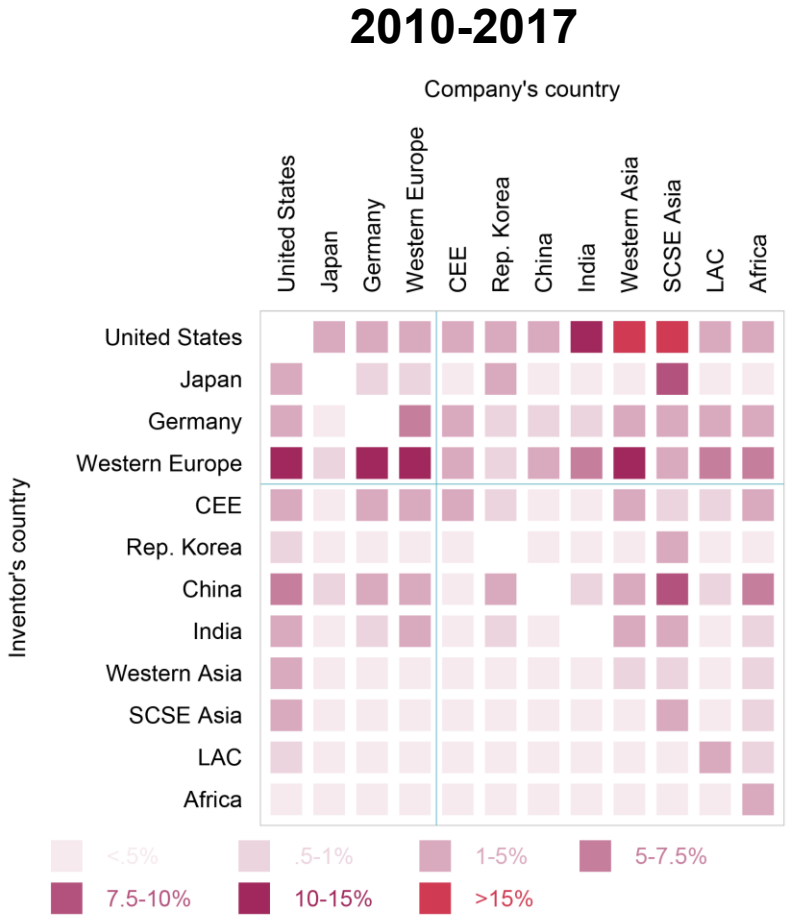
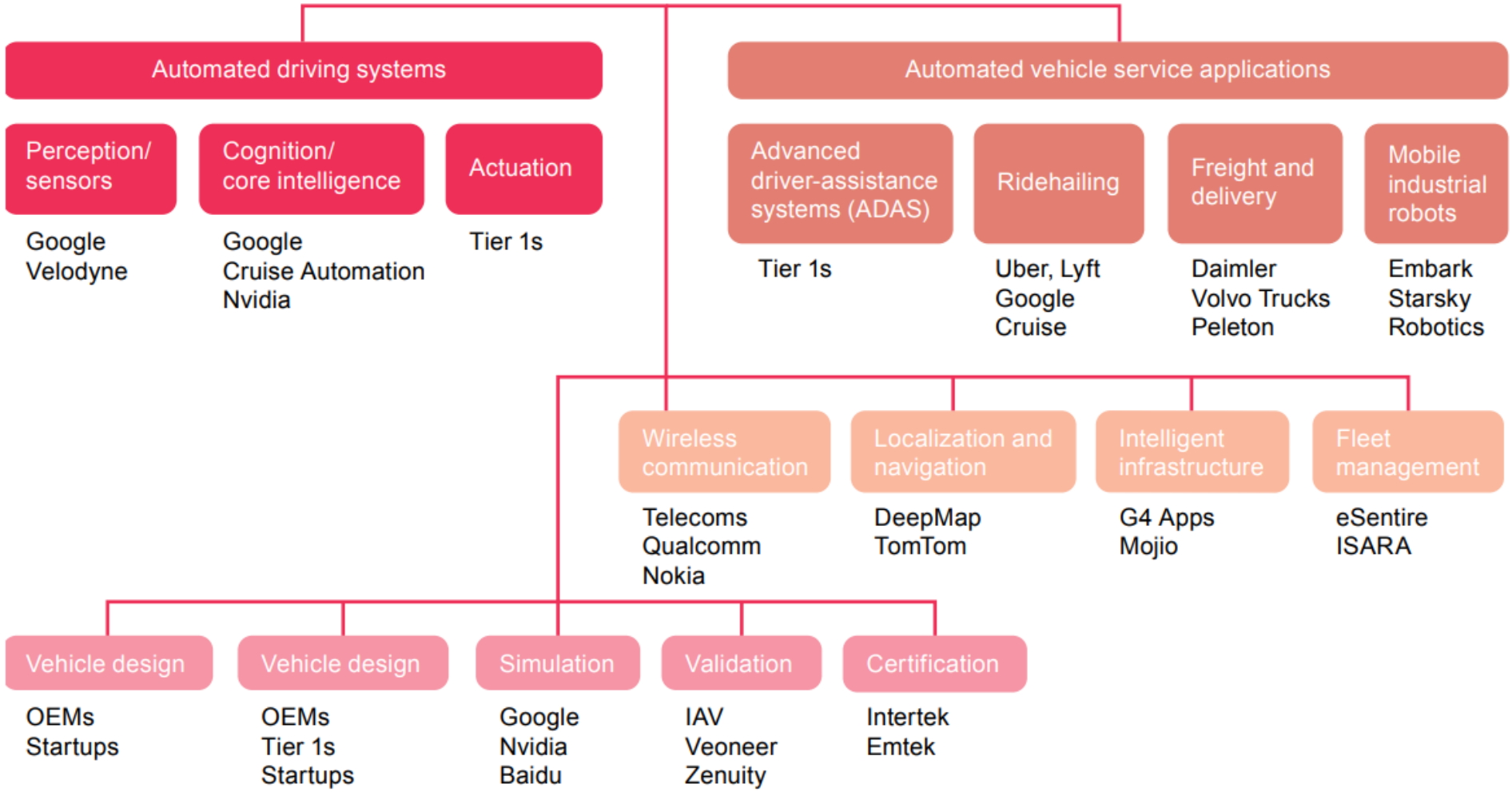
5 More international sources of patents, but concentrated





Mapping the involvement of AV companies

Figure 3.7 Examples of companies working in various AV technologies



Source: Center for Automotive Research (CAR).

Table 3.1 Comparison of the total share of patents with the AV patents of selected automakers in different clusters

Cluster name	Total share (%)	AV share (%)
Audi		
Ingolstadt	60.1	60
Munich	10.7	18.8
Frankfurt	3.9	6.2
San Jose–San Francisco	0.4	6.2
BMW		
Munich	72.5	84.1
Nürnberg	1.3	6.1
Würzburg	0.4	3.7
San Jose–San Francisco	0.4	3.7
Bosch		
Stuttgart	69.1	77.6
Munich	2.6	5.0
San Jose–San Francisco	1.0	4.6
Braunschweig	0.5	4.1

Cluster name	Total share (%)	AV share (%)
GM		
Detroit–Ann Arbor	45.3	54.7
Waterford	5.1	11.3
Los Angeles	4.5	8.5
Frankfurt	16.6	7.5
Honda		
Tokyo	90.8	82.3
Los Angeles	0.2	3.7
Osaka	2.6	2.4
Nagoya	3.1	1.8
Nissan		
Tokyo	97.0	87.7
Osaka	1.5	8.6
San Jose–San Francisco	0.0	3.1
Nagoya	1.2	2.5

Sub National innovation ecosystems

Local Human Capital

Specific Infrastructure

Government

Policy-makers

Local entrepreneurial culture

Specific financing

Researchers

Academia

Companies

Entrepreneurs

Sub-national Innovation Ecosystem Assessment Metrics

- Participation in scientific activities reveals a region's capacity for knowledge generation.
- Technological activities demonstrate a region's potential for transformative innovation.
- Entrepreneurial dynamism and the sophistication of local markets are manifested through business activities, evidenced by trademark registration.
- The development of industrial designs reflects both the creative capacity and the potential for competitive differentiation that distinguishes each region in the global economic context.

Sub-national Innovation Ecosystem Assessment Metrics

- Technological territorial capacity
- *Scientific publications from at least one institution in region x of the country*

Scientific activity

- Territorial Creative Capacity
- *Industrial design applications submitted by at least one applicant from each country and region*

Design activities

- Territorial entrepreneurial capacity
- *Trademark applications filed by an applicant from the country and, by region x*

Enterpreneurial activities

- Territorial innovation capacity
- *Patent applications filed by at least one inventor or applicant from country x and region x, both within and outside the country.*

Technological activities

Geocoding is the Google Maps of innovation.

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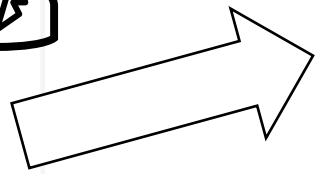

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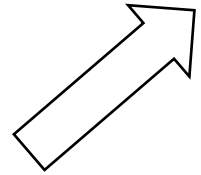

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