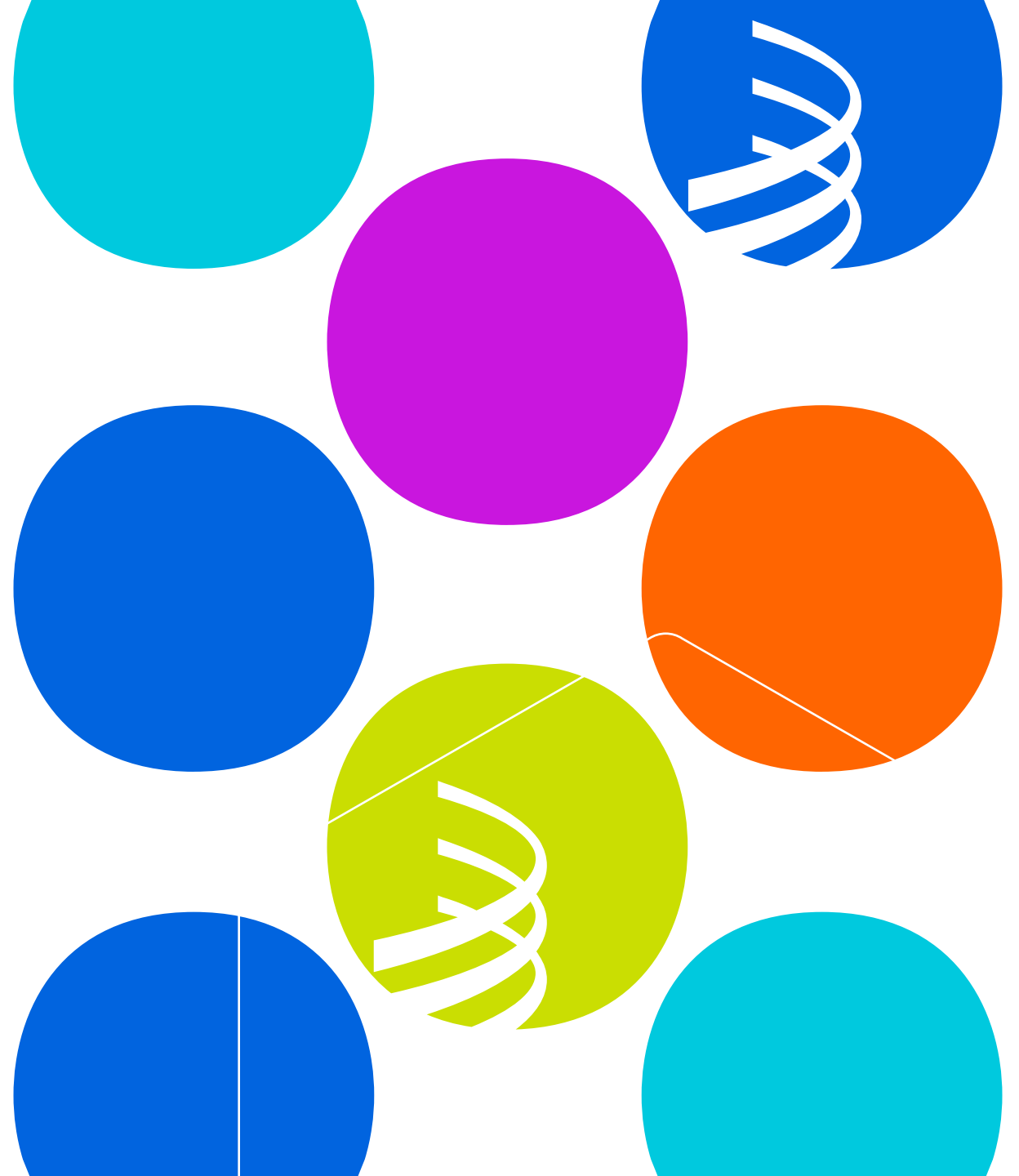


WIPO

Module 3: Subnational Innovation Ecosystems

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Innovation Economy Section - WIPO



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?

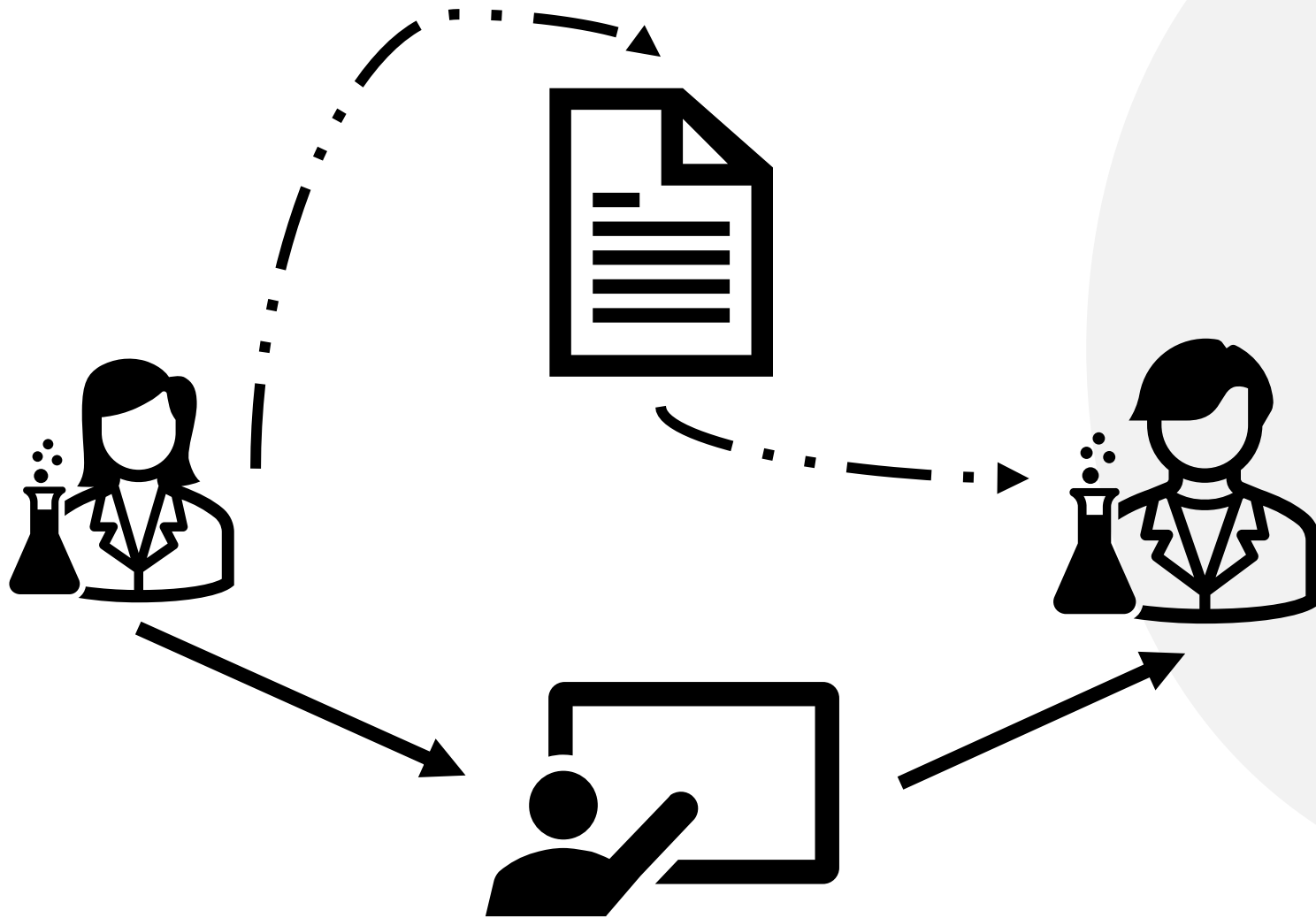


How exactly is the global geography of innovation changing?



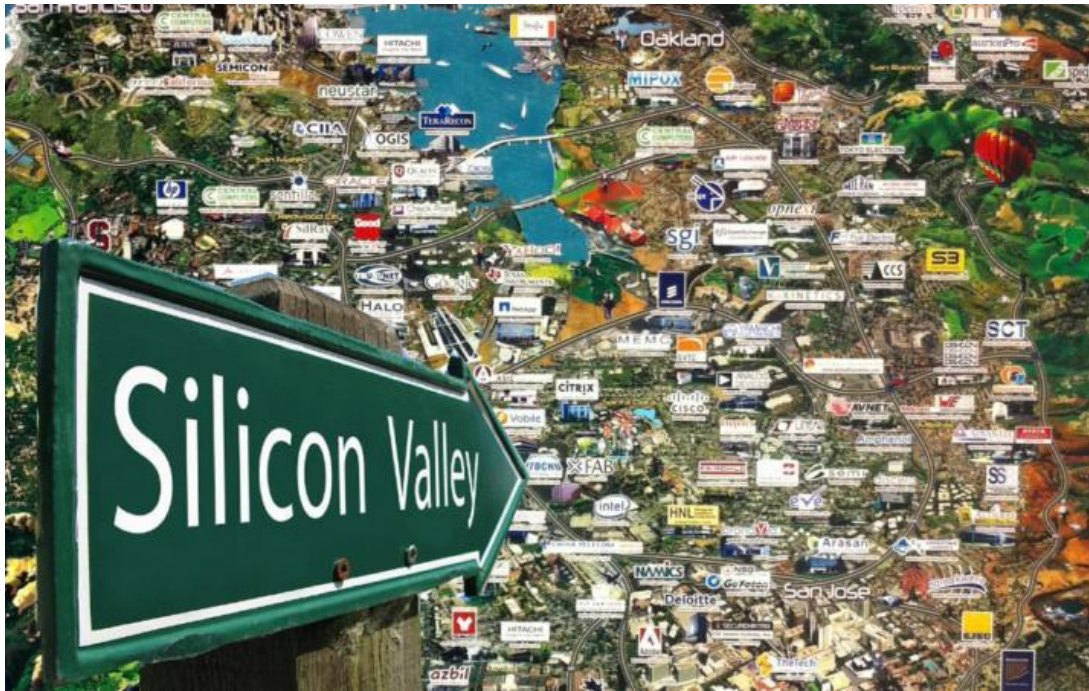
How do companies organize their innovation activities around the world in today's globalized era?

How do you transfer knowledge?



Bengaluru, India

What forces explain the agglomeration of innovation?

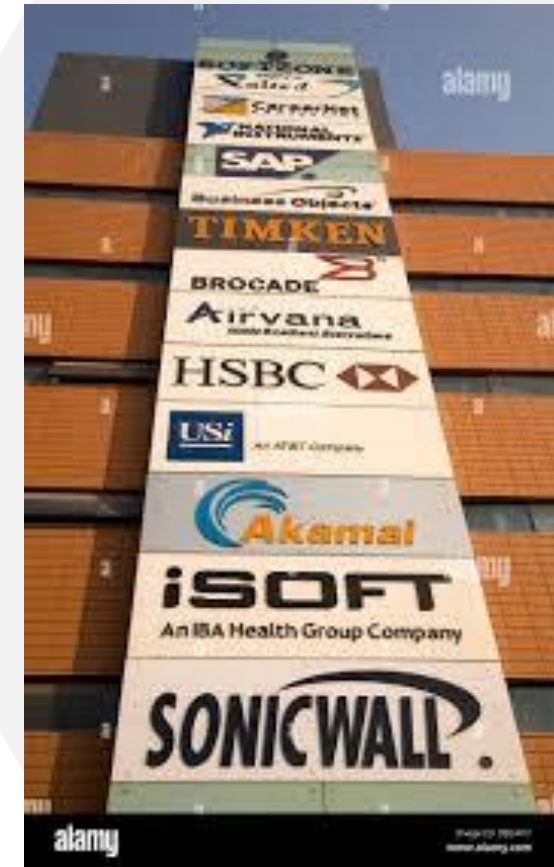


The geographical distribution of innovation determines the economic **development** trajectory of **cities and regions**.

What forces explain the agglomeration of innovation?



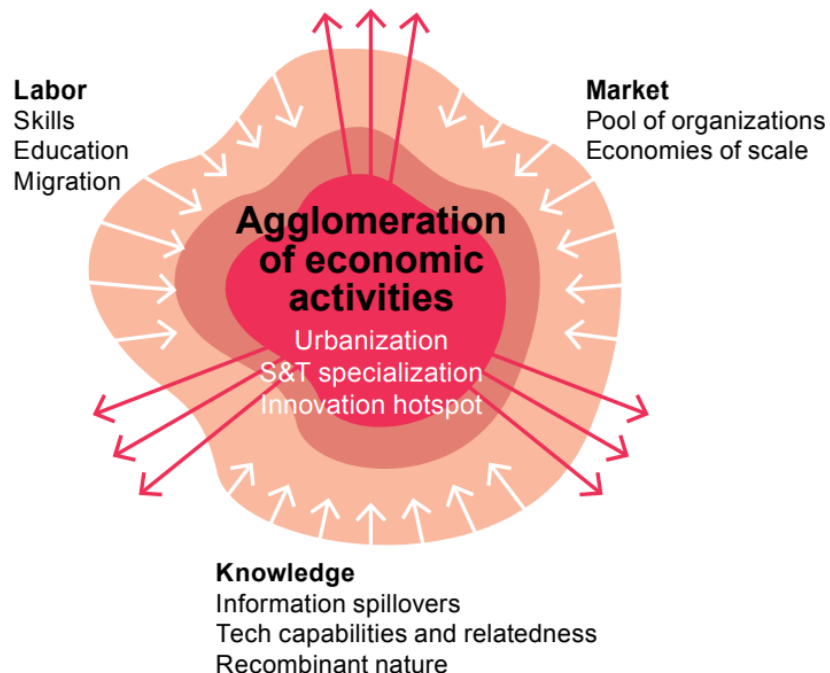
Bengaluru, India



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



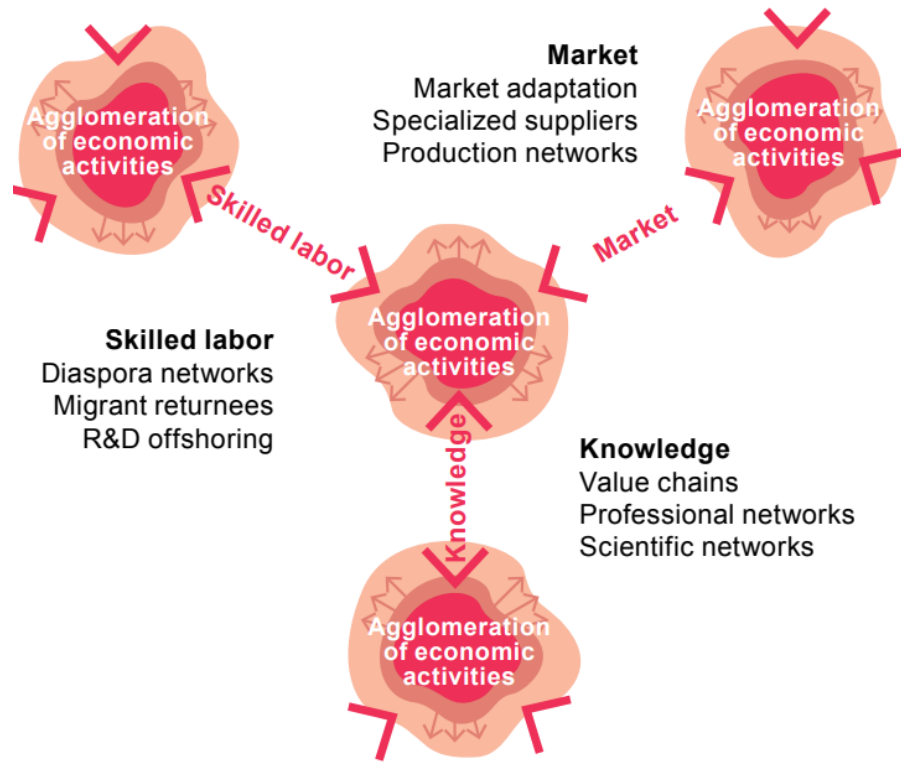
Note: S&T = Science and technology.

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

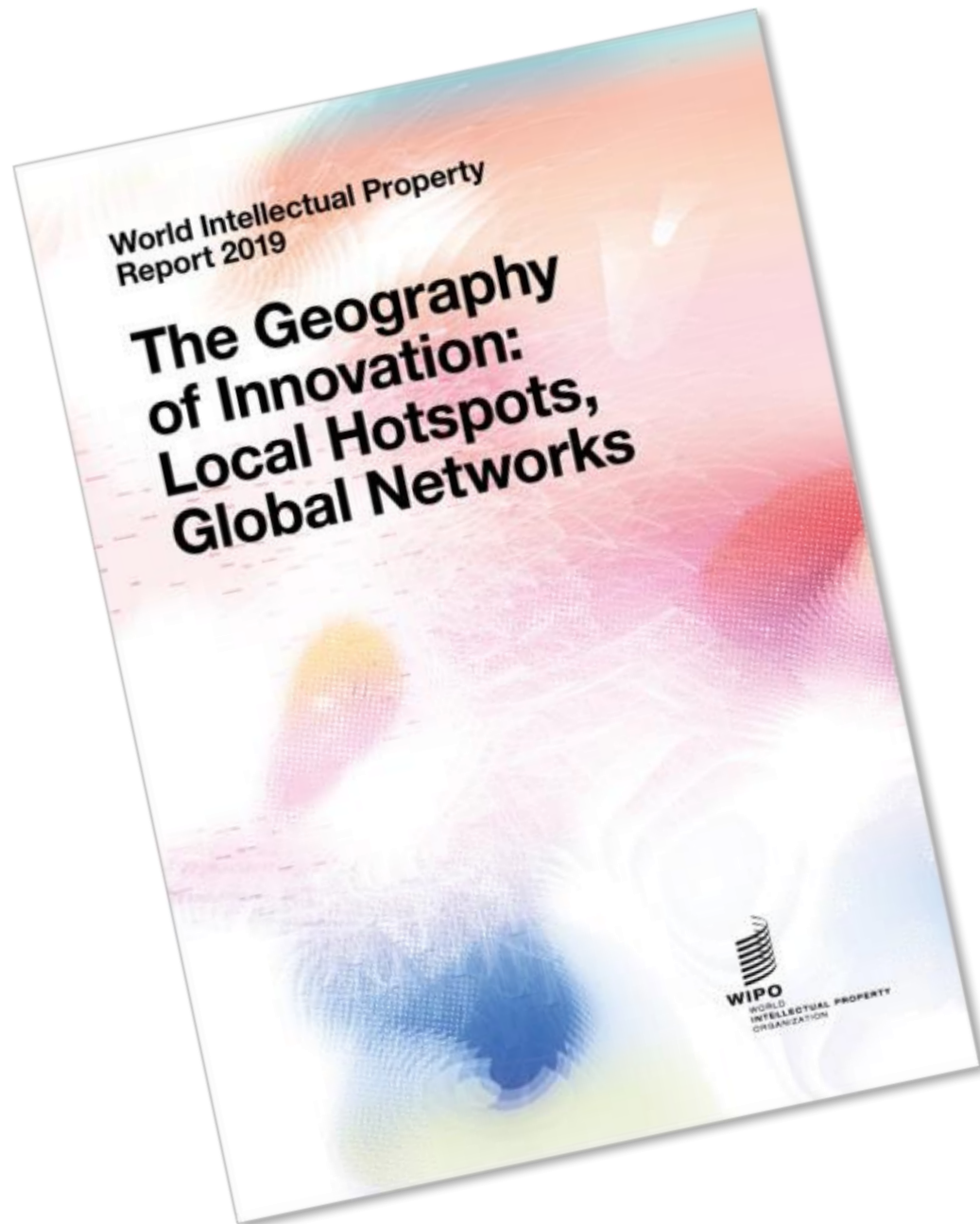


Forces of urban agglomeration

Businesses find skilled workers

Skilled workers find jobs and value urban services

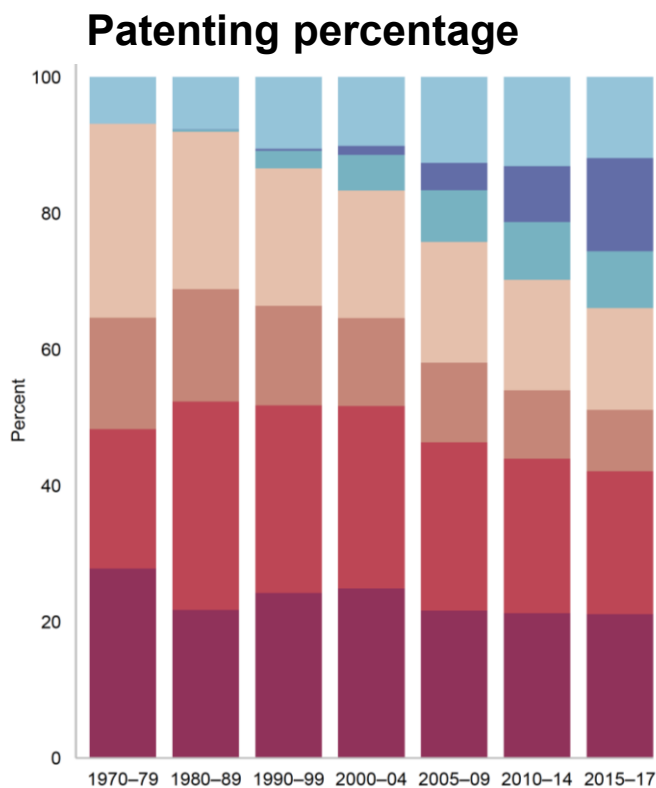
Ideas flourish with innovators working in close proximity



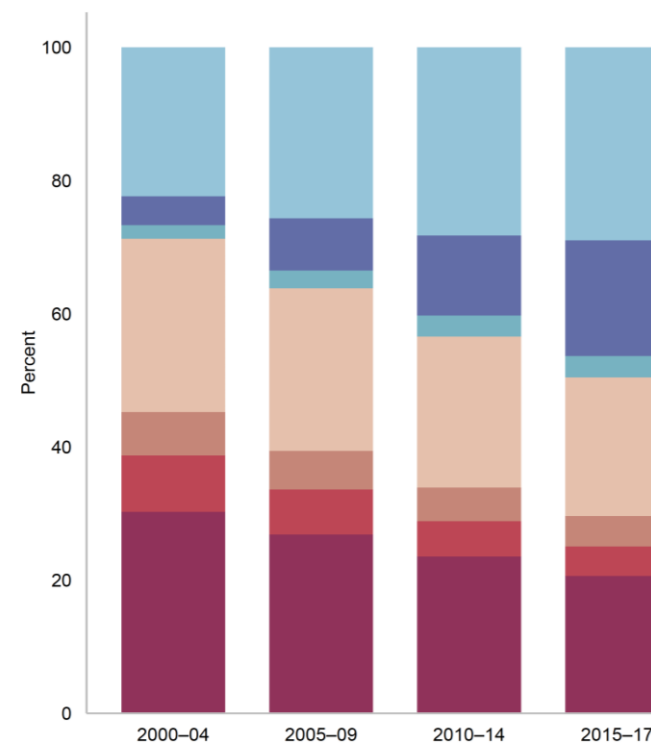
5 Stylized facts about the geography of innovation

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

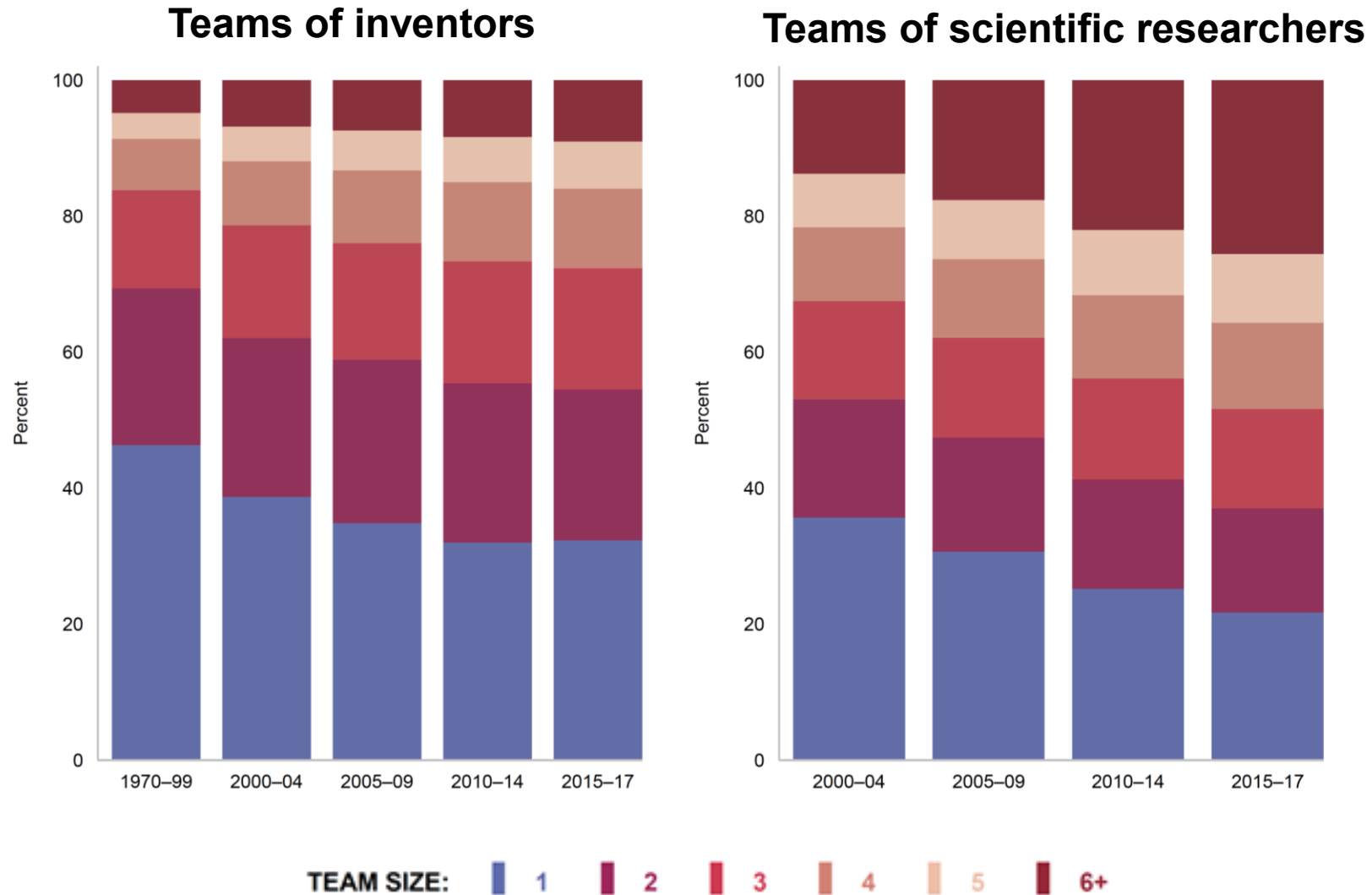
Knowledge production is spreading and shifting eastwards.



Percentage of scientific publications



#2 Collaboration is increasing

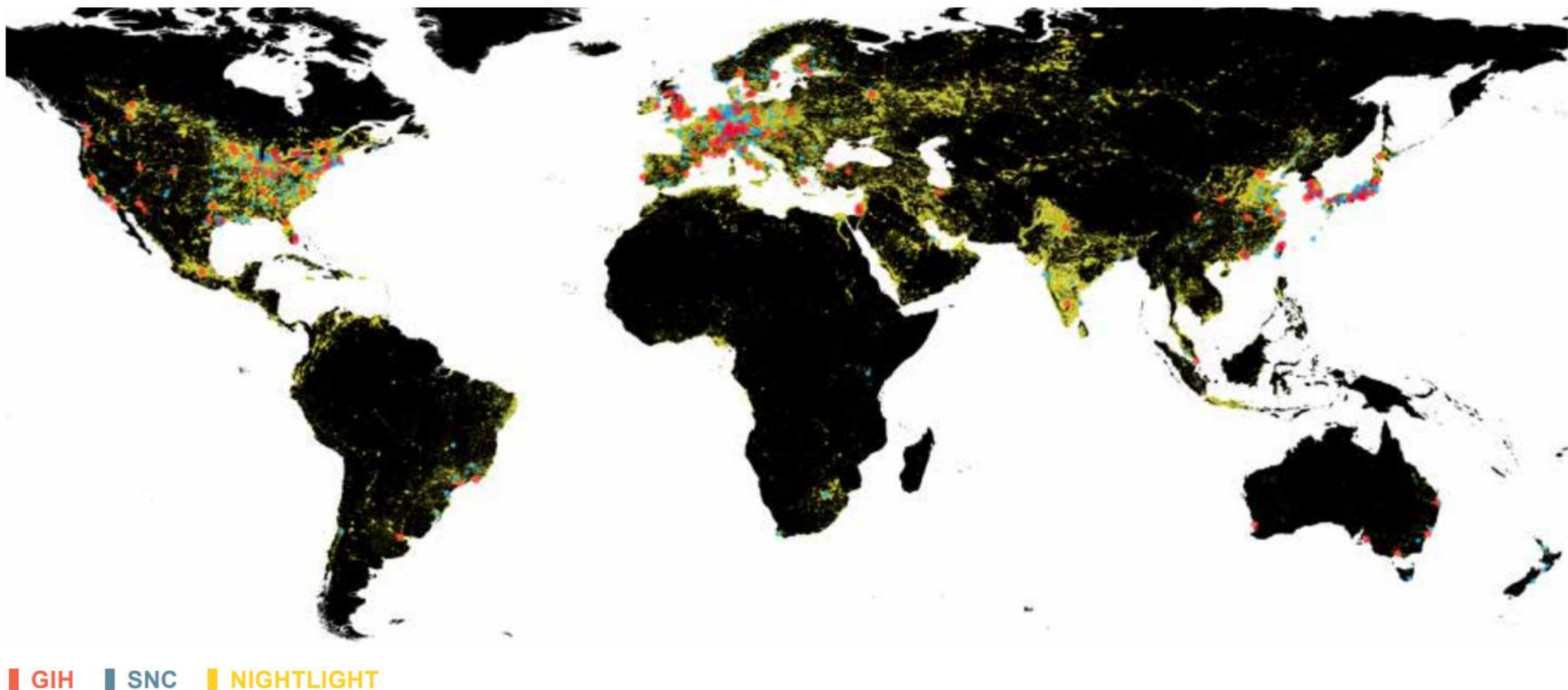


#3 Innovation is increasingly local

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



1998-2002





2011-2015



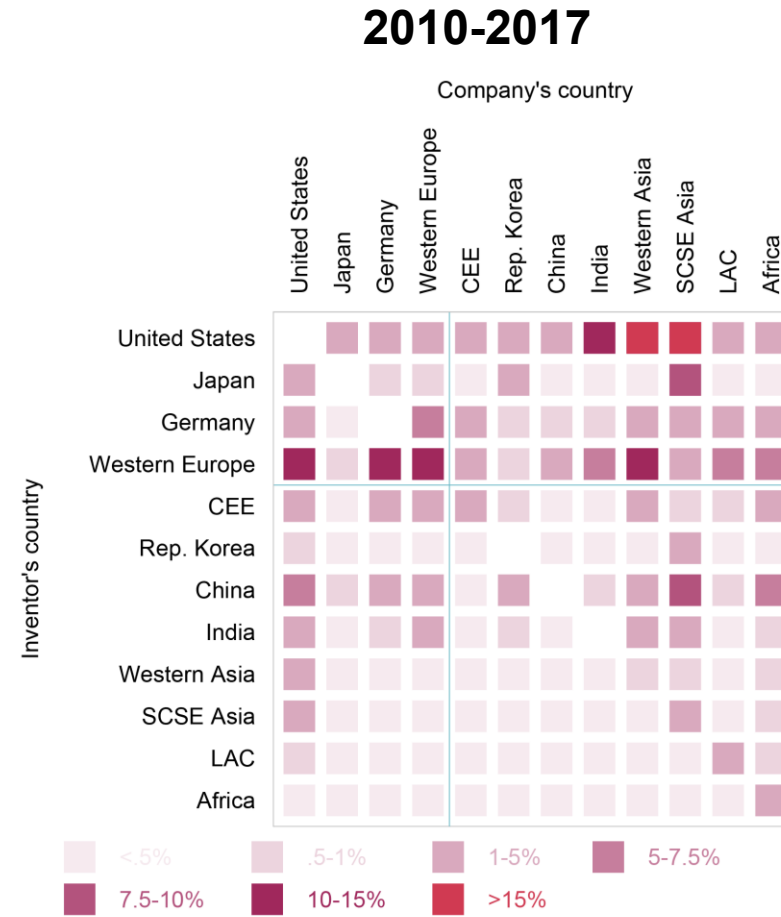
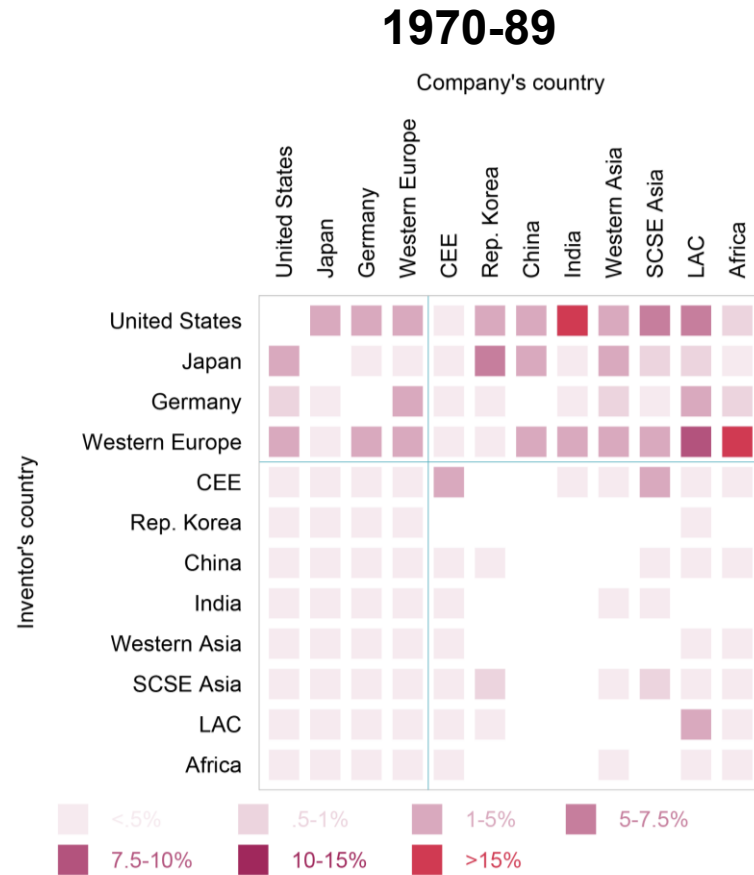
— 2,000 — 5,000

Multinational companies are at the heart of global innovation networks.

International patent sourcing

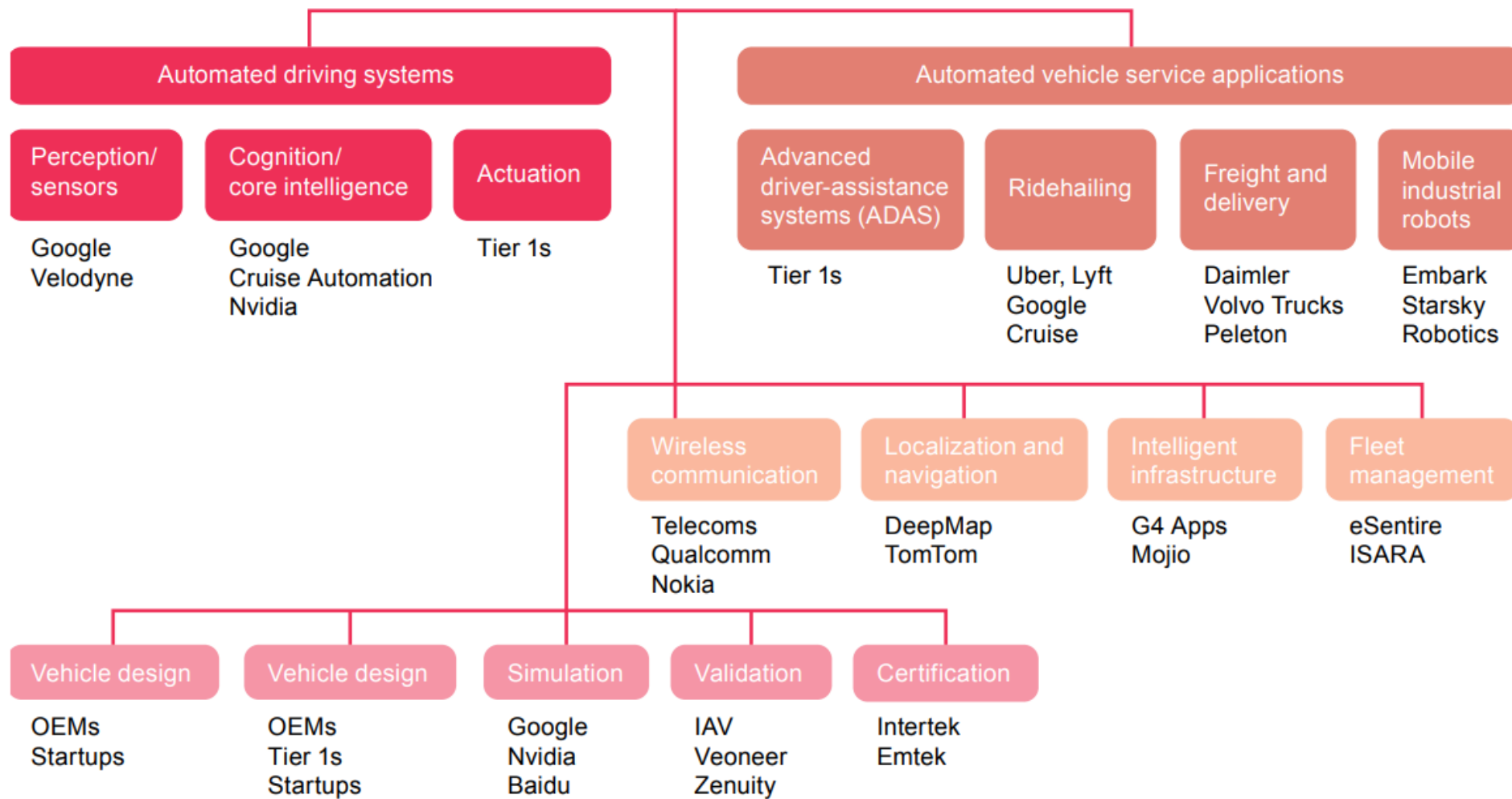
(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)	
(19) World Intellectual Property Organization International Bureau	
(43) International Publication Date 2 April 2015 (02.04.2015)	 (10) International Publication Number WO 2015/047123 A1
(51) International Patent Classification: <i>H02H 3/04</i> (2006.01) <i>H01H 47/00</i> (2006.01) <i>G01R 31/327</i> (2006.01) <i>H02H 3/05</i> (2006.01) <i>G05B 23/02</i> (2006.01) <i>H02H 1/00</i> (2006.01)	(81) Designated States (<i>unless otherwise indicated, for every kind of national protection available</i>): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
(21) International Application Number: PCT/RU2013/000836	(84) Designated States (<i>unless otherwise indicated, for every kind of regional protection available</i>): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).
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(26) Publication Language: English	
(71) Applicant: SIEMENS AKTIENGESELLSCHAFT [DE/DE]; Wittelsbacherplatz 2, 80333 Muenchen (DE).	
(72) Inventors: DORRER, Johann; Diendorfer Str. 18, 92431 Neunburg v. Wald (DE). PARFENOV, Stanislav Sergeevich; Lunacharskogo pr. 19-1-340, St. Petersburg, 194354 (RU). VINOGRADOV, Sergey Valerievich; Rimskogo-Korsakova str., St. Petersburg, 190121 (RU). NIKOLAEV, Maxim Alexandrovich; Savushkina str. 131-64, St. Petersburg, 197374 (RU).	
(74) Agents: LAW FIRM "GORODISSKY & PARTNERS "	

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 (%)	Cluster name	Total share (%)	AV share (%)
Audi			GM		
Ingolstadt	60.1	60	Detroit–Ann Arbor	45.3	54.7
Munich	10.7	18.8	Waterford	5.1	11.3
Frankfurt	3.9	6.2	Los Angeles	4.5	8.5
San Jose–San Francisco	0.4	6.2	Frankfurt	16.6	7.5
BMW			Honda		
Munich	72.5	84.1	Tokyo	90.8	82.3
Nürnberg	1.3	6.1	Los Angeles	0.2	3.7
Würzburg	0.4	3.7	Osaka	2.6	2.4
San Jose–San Francisco	0.4	3.7	Nagoya	3.1	1.8
Bosch			Nissan		
Stuttgart	69.1	77.6	Tokyo	97.0	87.7
Munich	2.6	5.0	Osaka	1.5	8.6
San Jose–San Francisco	1.0	4.6	San Jose–San Francisco	0.0	3.1
Braunschweig	0.5	4.1	Nagoya	1.2	2.5

Sub National innovation ecosystems



Government



Local Human Capital

Specific Infrastructure

Local entrepreneurial culture

Specific financing



Academia

Companies



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*

Entrepreneurial 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.

(12) International Application Status Report

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Information valid as of: (..)

Report generated on: 15 August 2025 (15.08.2025)

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(26) Publication language: English (EN)

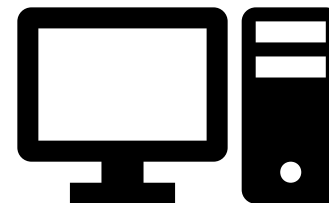
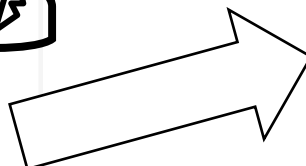
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(31) Priority number(s): 60/577,523 (US)
(31) Priority date(s): 07 June 2004 (07.06.2004)
(31) Priority status: Priority document received (in compliance with PCT Rule 17.1)

(51) International Patent Classification:
G06F 17/30 (2006.01); *G06Q 10/00* (2012.01)

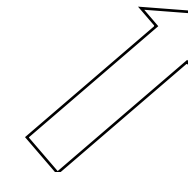
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Statistics package

- Text cleanup
- Information standardization



Position (GPScoordinates)

Innovation ecosystem of Bhutan

Figure 13. Samdrup Jongkhar and Thimphu concentrate most of the entrepreneurial activity

Trademark applications per region

	2000-2011	2012-2023
Samdrup Jongkhar	1	493
Thimphu	36	330
Paro	0	29
Chukha	16	36
Sarpang	0	4
Punakha	0	2
Trongsa	0	2
Wangdue Phodrang	0	2
Haa	0	1

Source: IPAS, DoMCIIP and WIPO collection

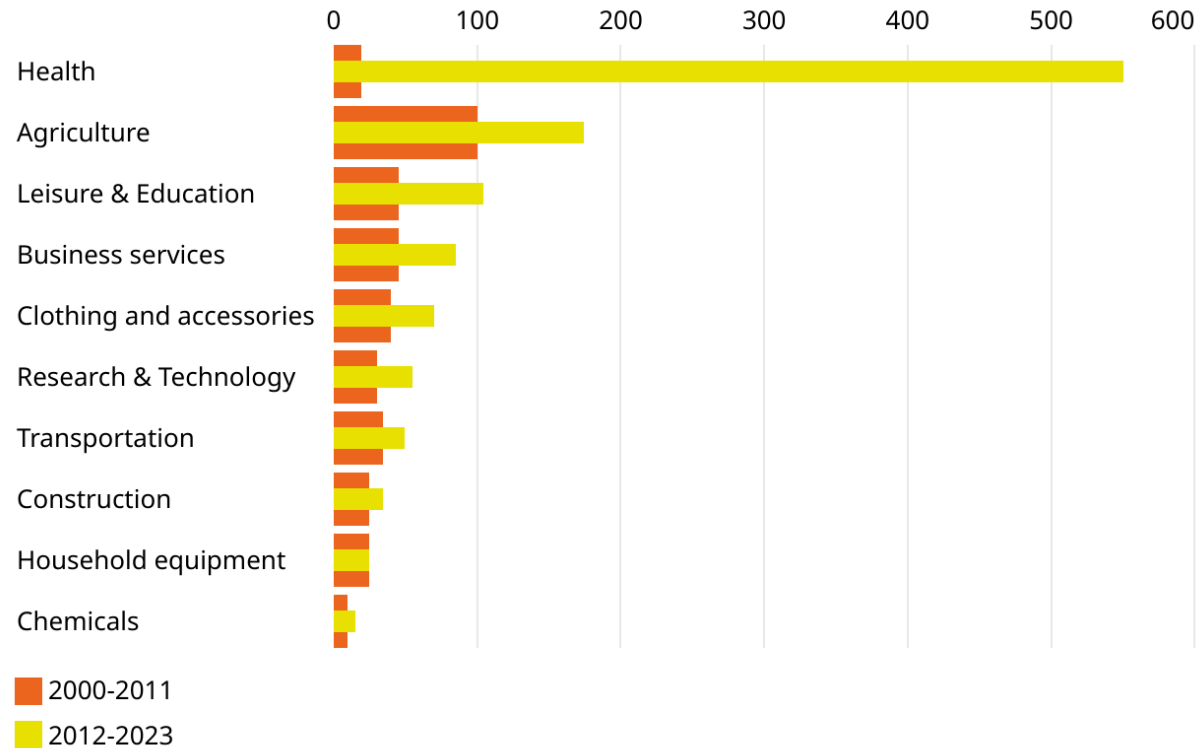
With geocoding we can perform analysis at the sub-national level.

Where is most of the Bhutanese entrepreneurial activity concentrated?

Innovation ecosystems of Bhutan (2)

National

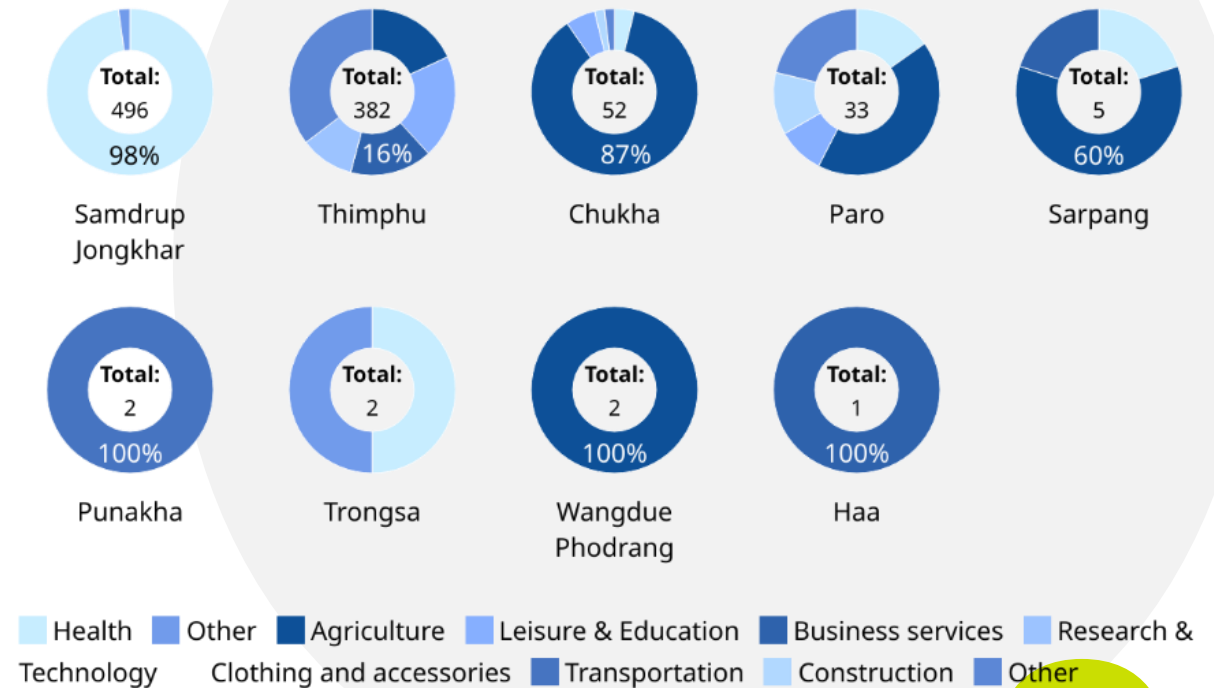
Trademark applications by field



Sub-national

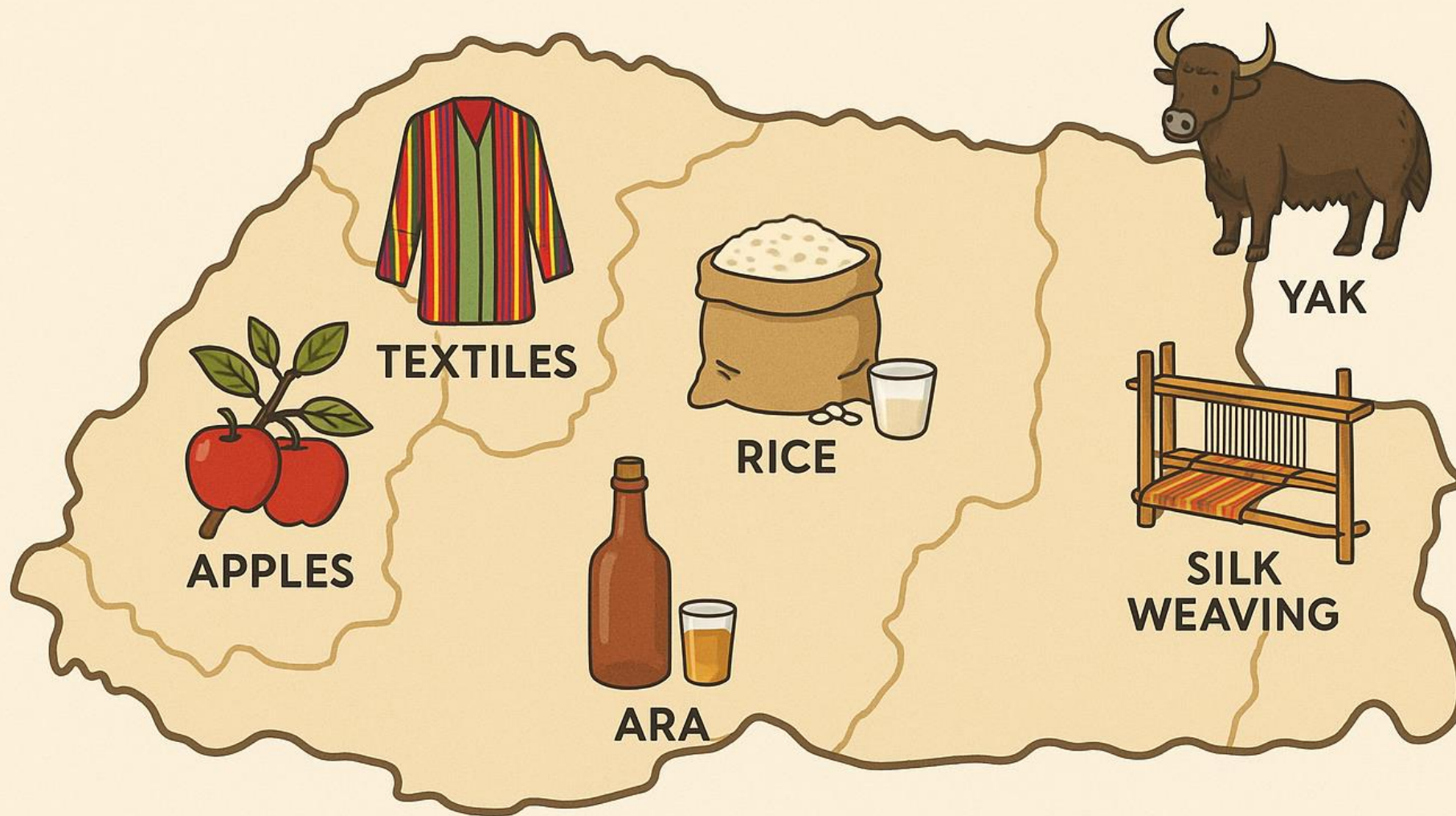
Figure 14. Thimphu displays an equilibrated profile

Trademark application share per sector per region



Source: IPAS, DoMCIIP and WIPO collection

BHUTAN



Thank you!

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