

Path upgrading

Fine-tuning existing technologies and competencies

Major intra-path changes, that is, changes of an existing regional industrial path into a new direction.

Case Lapland

- ”Help us” -> champions of experience economy
- From seeing darkness, long distances and low population density as weaknesses to seeing them as assets





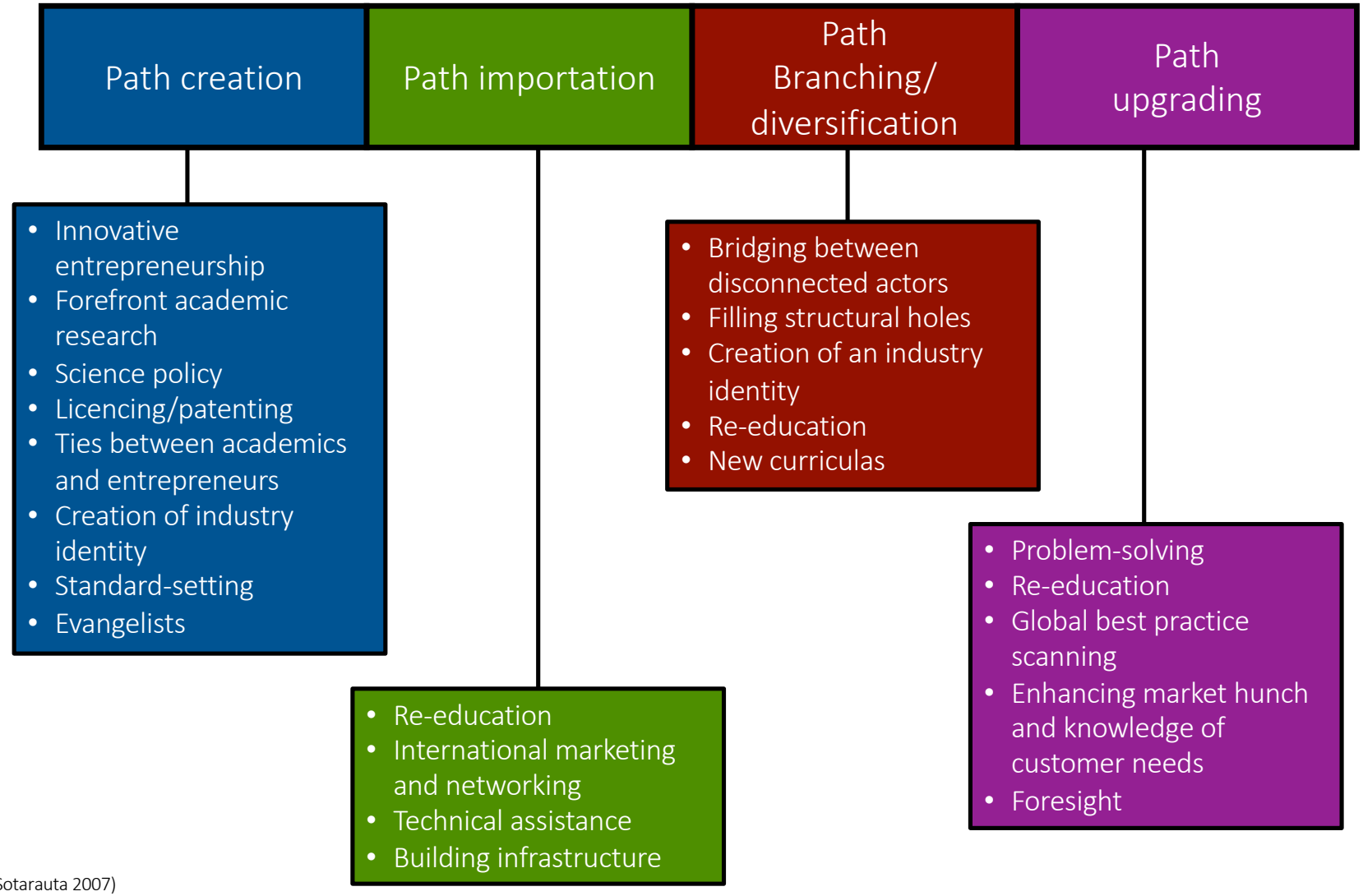








Key mechanisms in path development



(Modified from Lester & Sotarauta 2007)

DECLINE AND DESTRUCTION

Path exhaustion

Downgrading

Lower-value functions remain while strategic and R&D functions leave

Contraction

Employment, firms and capabilities shrink

Delocalisation

Activities and decision-making move elsewhere

Disappearance

The path loses the dynamism of organisational renewal and new knowledge generation

The closure of the Australian car manufacturing industry (Beer 2018)

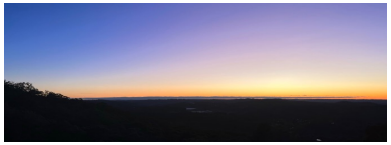
Was decline inevitable, and was it the product of a strong currency buoyed by a mining boom?

What	Announced (Closure)	Outcome
Toyota	2014 (2017)	• 30 000 jobs in South Australia • 100 000 jobs in Victoria
General Motors Holden (GMH)	2013 (2017)	
Ford Australia	(2013)	
Mitsubishi	(2008)	
Nissan	(1992)	
Chrysler	(1981)	
Leyland	(1971)	





- All sectors are potentially vulnerable in a globalised economy
- Relative labour costs alone are not the sole determinant of an industry's capacity to survive







Why

- A peripheral position in global production networks -> limited knowledge base and innovation capacity
- The small scale of local production - no cluster effect
- High cost structures relative to competitor plants
- No supportive industrial ecology around the major producers - limited knowledge base and innovation capacity
- A strong currency
- The shifting priorities of parent corporations

(Beer 2018)

Five propositions

History is active today	Inherited assets structure current possibilities.
Lock-in is relational	Technology, institutions, cognition and politics reinforce one another.
Novelty is usually recombinative	Most new paths connect local capabilities with non-local knowledge and capabilities.
Agency is conditioned, not absent	Actors interpret, mobilise and modify structures.
Transformation is contested	Path development creates benefits, losses and political conflict.

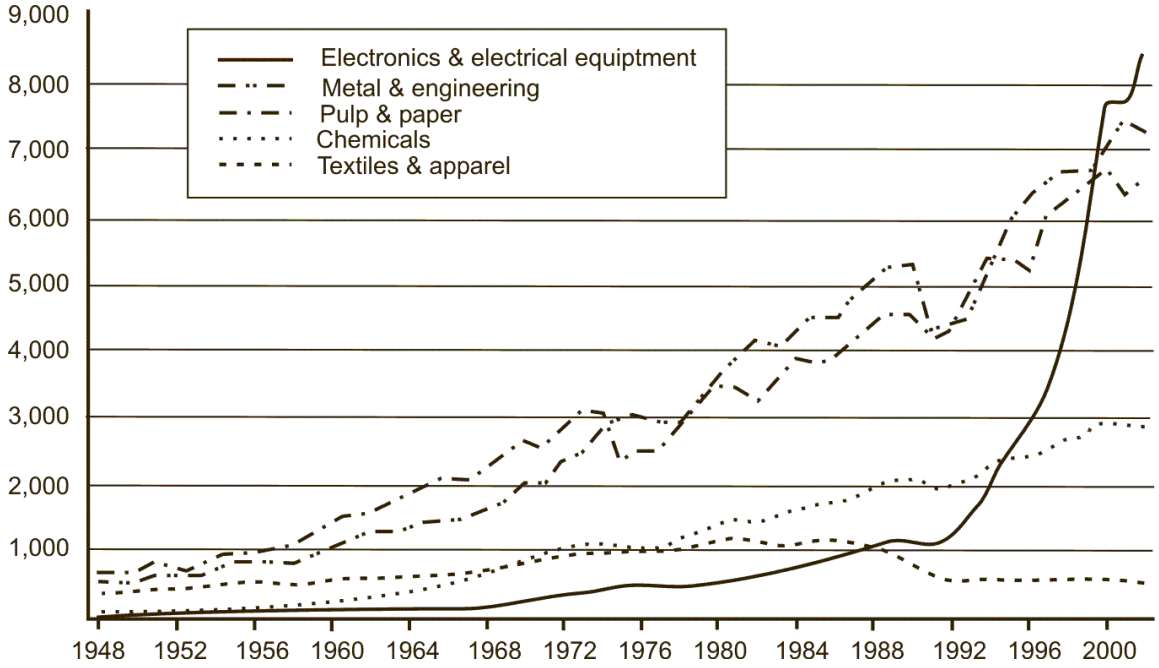
Case Nokia – a long path

Nokia-led ICT Industry in Finland

In its heyday (2000), Nokia:

- held a 40% share of the world's mobile phone market
- appr. 4% of Finnish GDP
- 1/3 of R&D expenditure
- appr. 50% of business R&D
- 20% of exports

Finnish manufacturing production volume by industry (€ billions in 2000 prices) (Rouvinen et. al. 2003)



How it all came about

ICT's success in the 90's was made possible by…

- evolution of specialized skills
- a result of the mix of technical solutions chosen by the many competing telecom operators (variety)
- Finnish telecommunications engineers became leading experts in interface technology
- institutions supporting all this

Late 1800's

(Blomström et al., 2002)

The Telephony Decree of the Finnish Senate (1886)

WHAT: Numerous private operator licenses granted to circumvent Russian telegraph regulations

WHY: To create an obstacle to Russian efforts to nationalise the Finnish telephone system.

RESULT

- Finland became one of the few European countries where private operators competed with the state in local operations -> strong local capabilities
- Finnish telecommunications equipment markets were open to foreign suppliers - small multioperator market
- Finland became very early a test market for the latest technology

1920’s

Radio technology ‘lurked in the shadows’ in many Finnish firms well before it had commercial applications

(Ylä-Anttila 2003)

1960’s / 1970’s

(Rouvinen &Ylä-Anttila, 2003)

A call for tenders by the Finnish army for a battlefield radio spurred companies to capitalize their earlier accumulated expertise (1963)

- Ultimately the army did not have the resources to purchase the system
- the prototypes served as the forerunners of commercial handsets

The Auto Radio Puhelin (ARP, Car Radio Telephone) network was introduced in 1971

- Finland’s first mobile telephone network



In Tampere

- Professorship in computer sciences in 1965 (University of Tampere)
  - The first in the Nordic Countries
  - Professor and students established Softplan (later merged with Nokia)
- Professor of electronics, digital signal processing in 1977 (Tampere University of Technology)



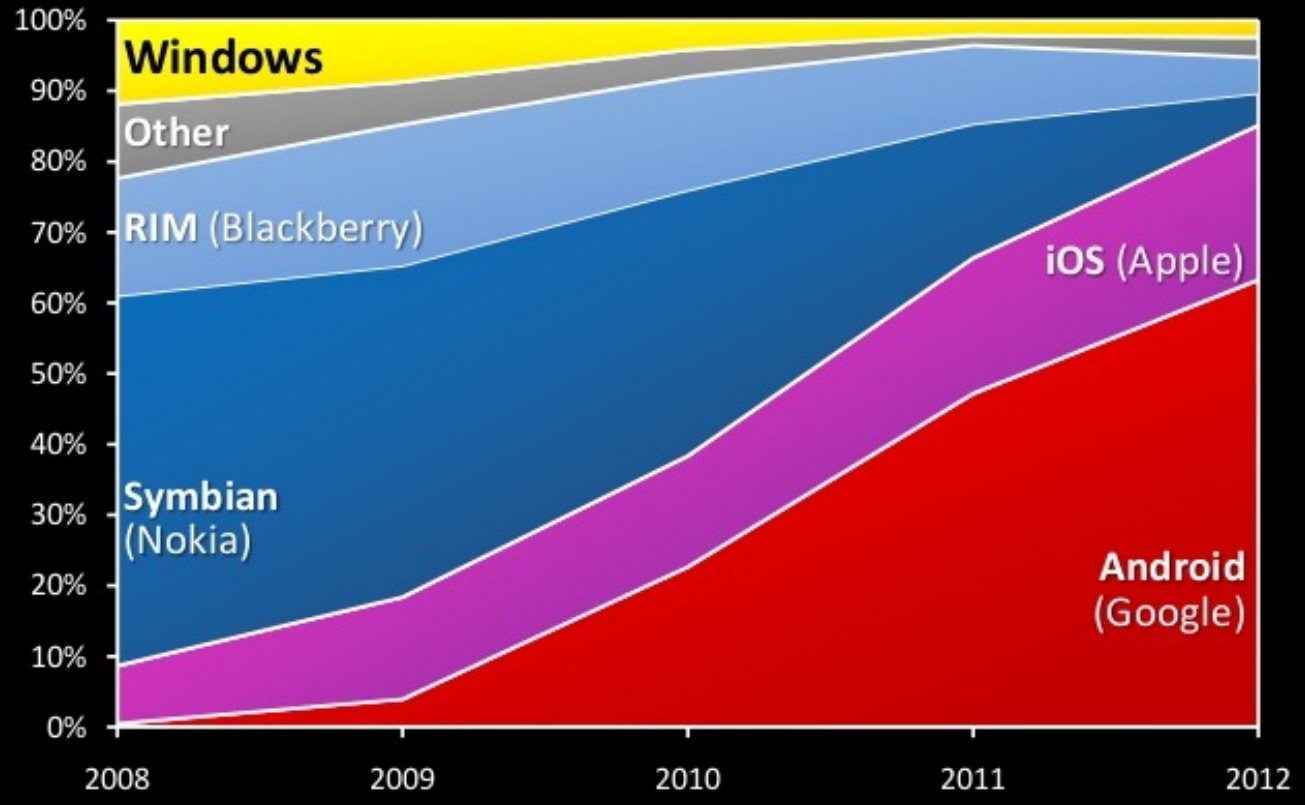
1970’s / 1980’s

- Telecommunications standardisation in the Nordic and European contexts
  - Finland was an early adopter of NMT in the 1970s (Nordic Mobile Telephone)
  - NMT was open to third country suppliers as well later GSM (Groupe Spécial Mobile).
- Nokia and Ericsson were among the first to adopt GSM, which eventually became almost universally accepted





Market Shares of Smartphone OSs

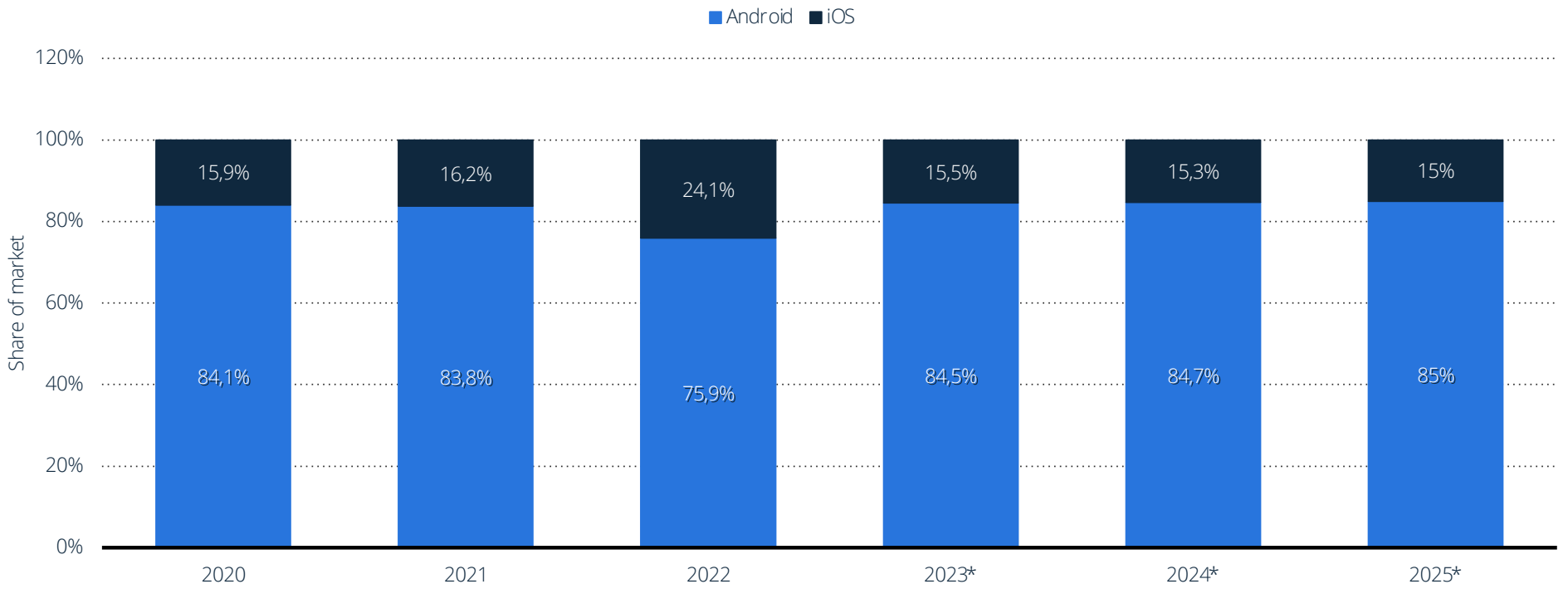


Data: Gartner

Petri Rouvinen, Etla

Smartphone operating system (OS) shipment market share worldwide from 2020 to 2025

Smartphone OS shipment market share worldwide 2020-2025



Note(s): Worldwide; 2022
Further information regarding this statistic can be found on page 8.
Source(s): IDC; ID 1236760

statista uta.info

2010's

The New York Times

Business Day

Technology

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Nokia to Eliminate 3,500 Mo





The Telegraph

calcutta, india

| Sunday , February 13 , 2011 |

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Nokia admits failure, inks Microsoft deal

KEVIN J. 'BRIEN



Nokia Chief Executive Stephen Elop (left) with Microsoft CEO Steve Ballmer in London. (AFP)

London, Feb. 12: Nokia, the struggling world leader in mobile phones, said yesterday that it would discard its own mobile phone operating system and begin using software made by Microsoft, in an alliance to shore up the halting efforts in smartphones of two market leaders.

The announcement by Stephen Elop, the former Microsoft executive hired by Nokia in September as the company's first non-Finnish chief executive, was an admission of failure by Nokia, which had helped define the mobile phone age in its infancy.

The alliance is also a gamble, perhaps a last-ditch effort for both Nokia and Microsoft to gain a lasting foothold in the booming market for sophisticated smartphones, where Apple's iPhone and Google's Android software are leading the way in technology innovation.

"Nokia is at a critical juncture, where significant change is necessary and inevitable in our journey forward," Elop, a Canadian who led Microsoft's business software division before moving to Nokia, said in a statement.

2015

Microsoft wrote off $7.6 billion from Nokia deal, announced 7,800 job cuts

- That's more than the $7.2 billion Microsoft paid for Nokia's phone business year earlier

Technology | Thu Jul 16, 2015 8:19am EDT

Related: TECH

Lines go silent in Finnish town of Salo as Microsoft shuts Nokia phone unit

HELSINKI | BY ANNA ERCANBRACK



A Microsoft employee walks at its Finnish headquarters in Espoo, Finland July 8, 2015.
REUTERS/MIKKO STIG/LEHTIKUVA



Our top photos from the last 24 hours. **Slideshow »**

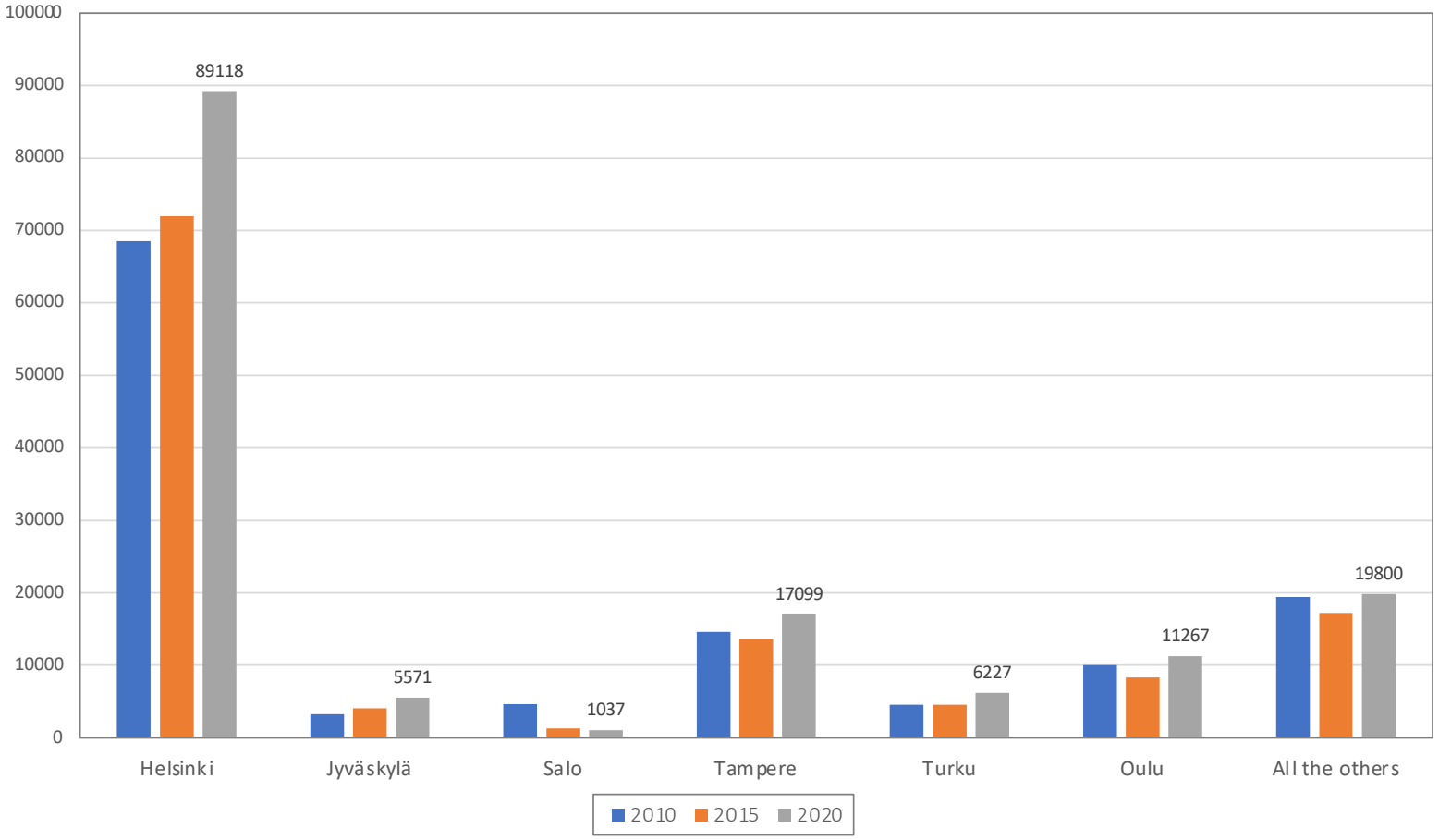
Police close in on Paris attackers

Faces of Islamic State

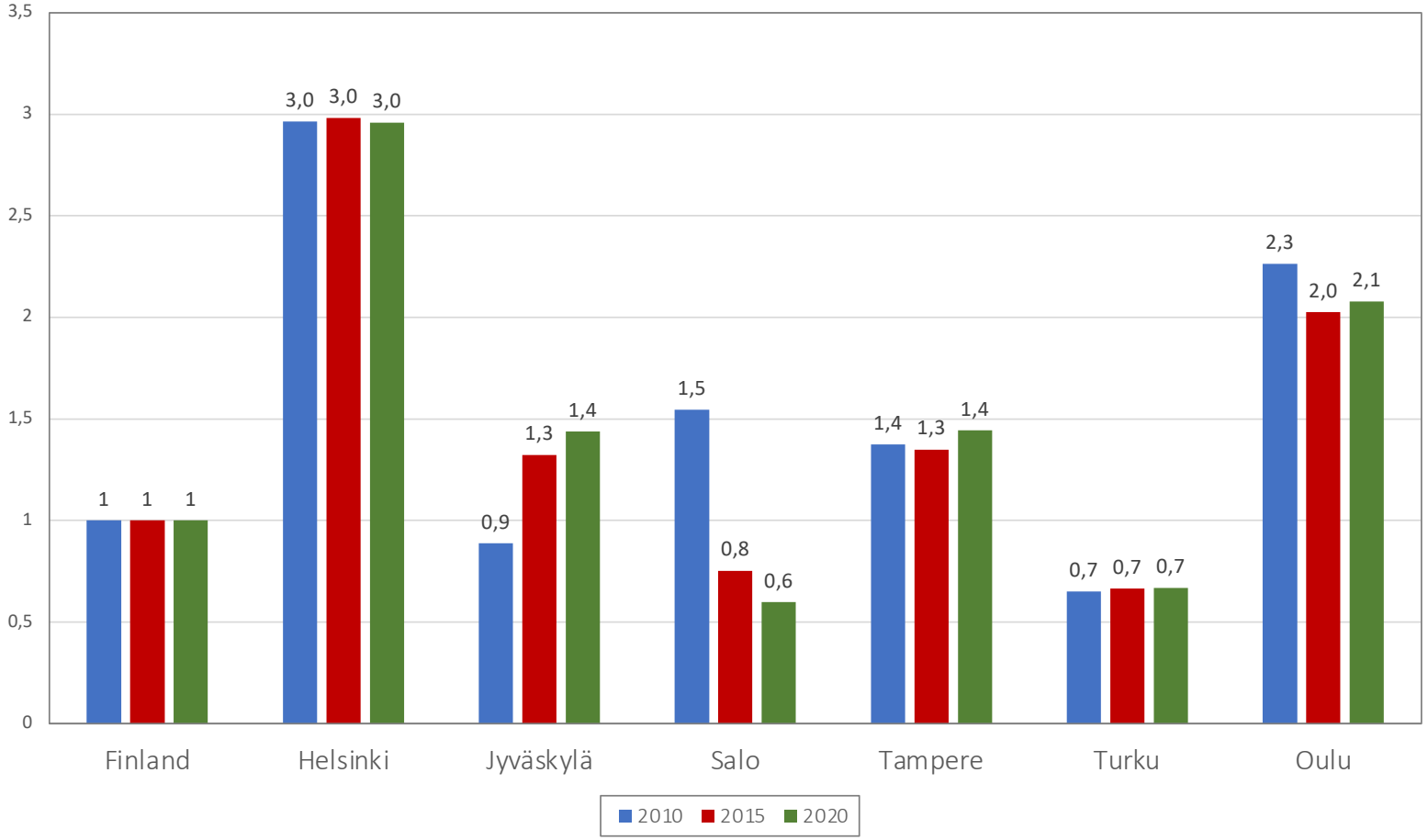
Syrians seek refuge



The most ICT specialised sub-regions in Finland, employment



The most ICT specialised sub-regions in Finland (Location Quotients)



$$LQ = \frac{e_i/e}{E_i/E}$$

Where:

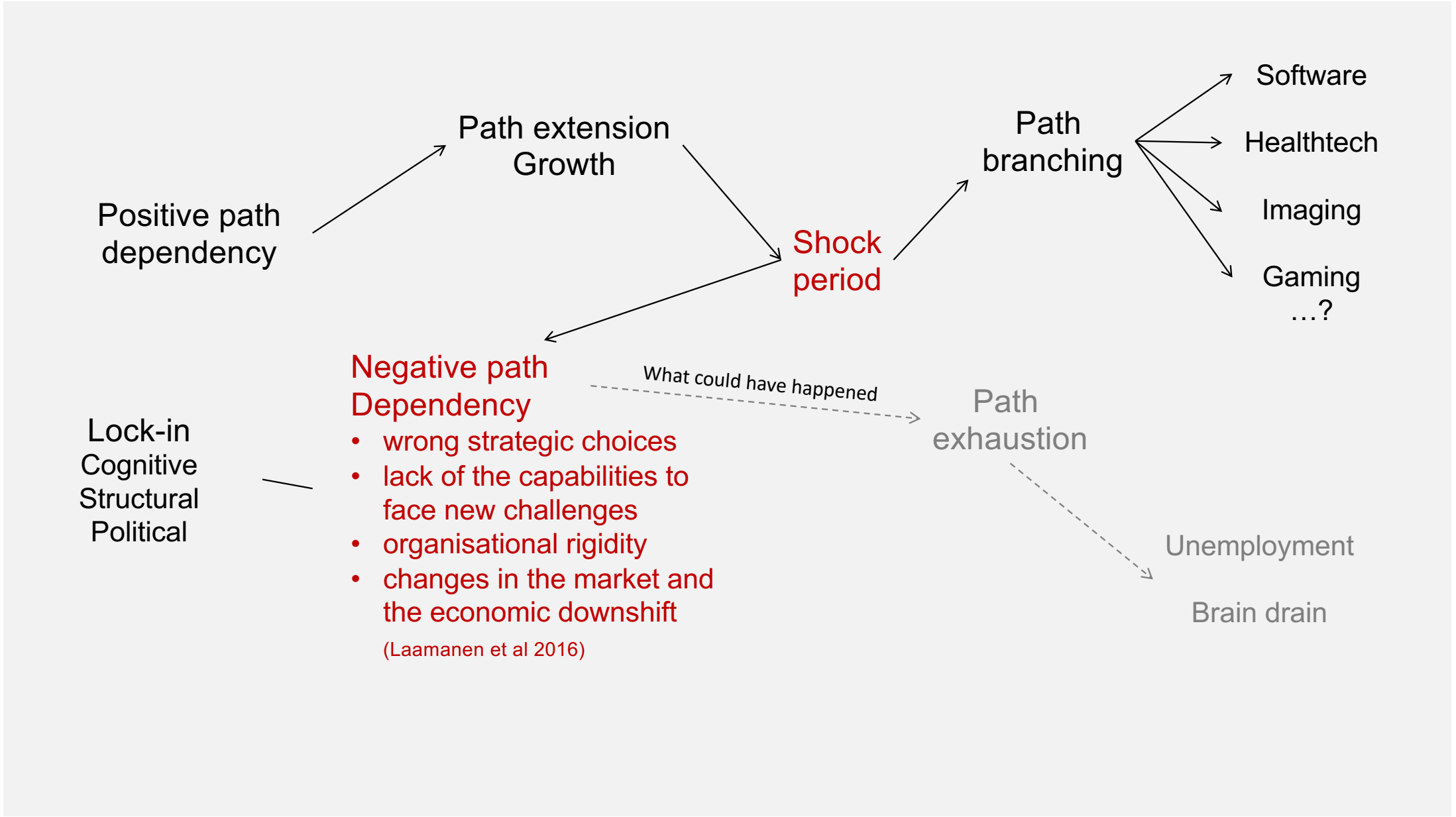
e_i = Local employment in industry i

e = Total local employment

E_i = Reference area employment in industry i

E = Total reference area employment

It is assumed that the base year is identical in all of the above variables.


Positive path dependency
Path extension Growth
Shock period
Path branching
Software
Healthtech
Imaging
Gaming
…?
Negative path Dependency
• wrong strategic choices
• lack of the capabilities to face new challenges
• organisational rigidity
• changes in the market and the economic downshift
(Laamanen et al 2016)
What could have happened
Path exhaustion
Unemployment
Brain drain
Lock-in
Cognitive
Structural
Political



Innovation and innovation policy

From the big picture to some grassroots activities

Very basics

Innovation seeks to reorder path development

Innovation = something new + implemented + value added (Ståhle & Sotarauta 2003; Schumpeterian view)

Innovation policy is actions by public organisations that influence innovation processes (Edquist 2008)

Innovation system consists of interacting private and public firms, universities, and government agencies aiming at the production of new knowledge and exploitation of it (Freeman 1989)

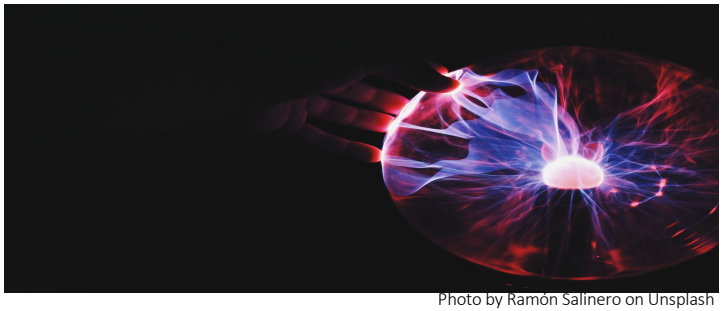


Photo by Ramón Salinero on Unsplash

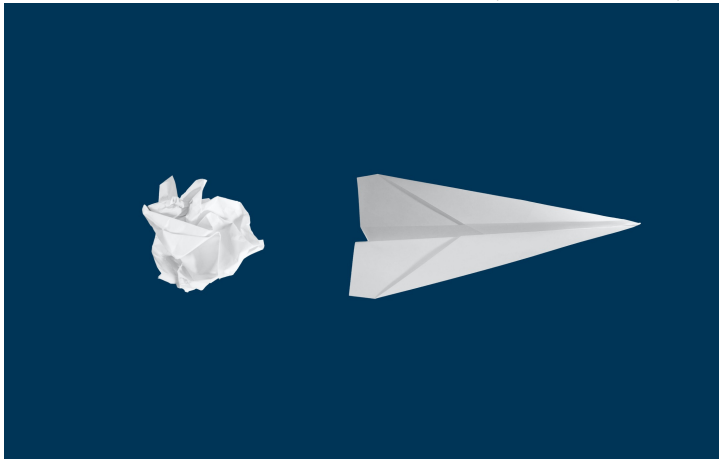
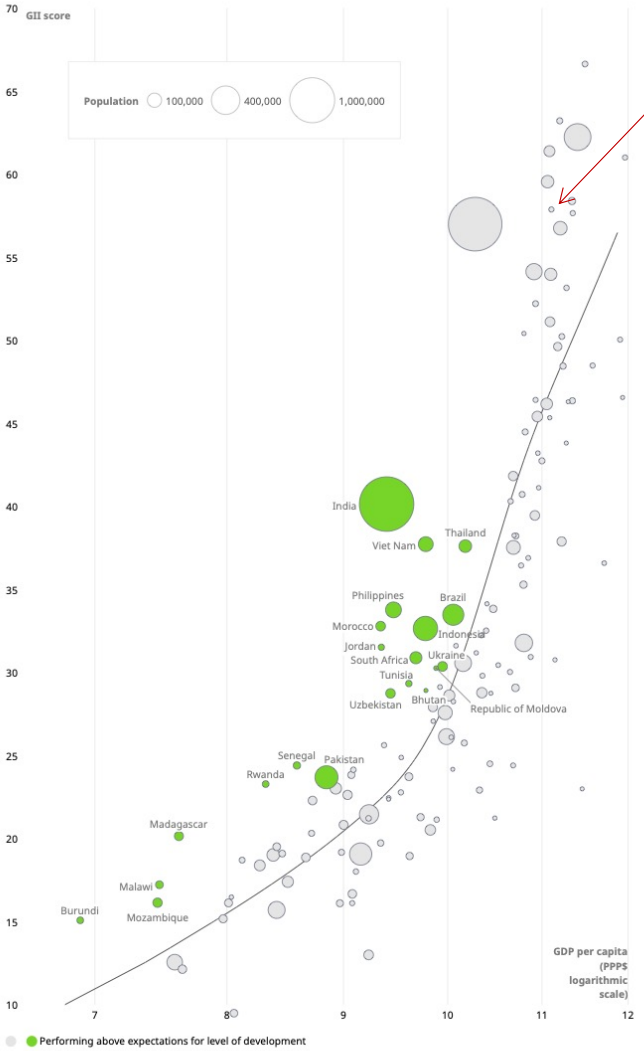


Photo by Matt Ridley on Unsplash

Figure 4 Innovation overperformers, relative to economic development

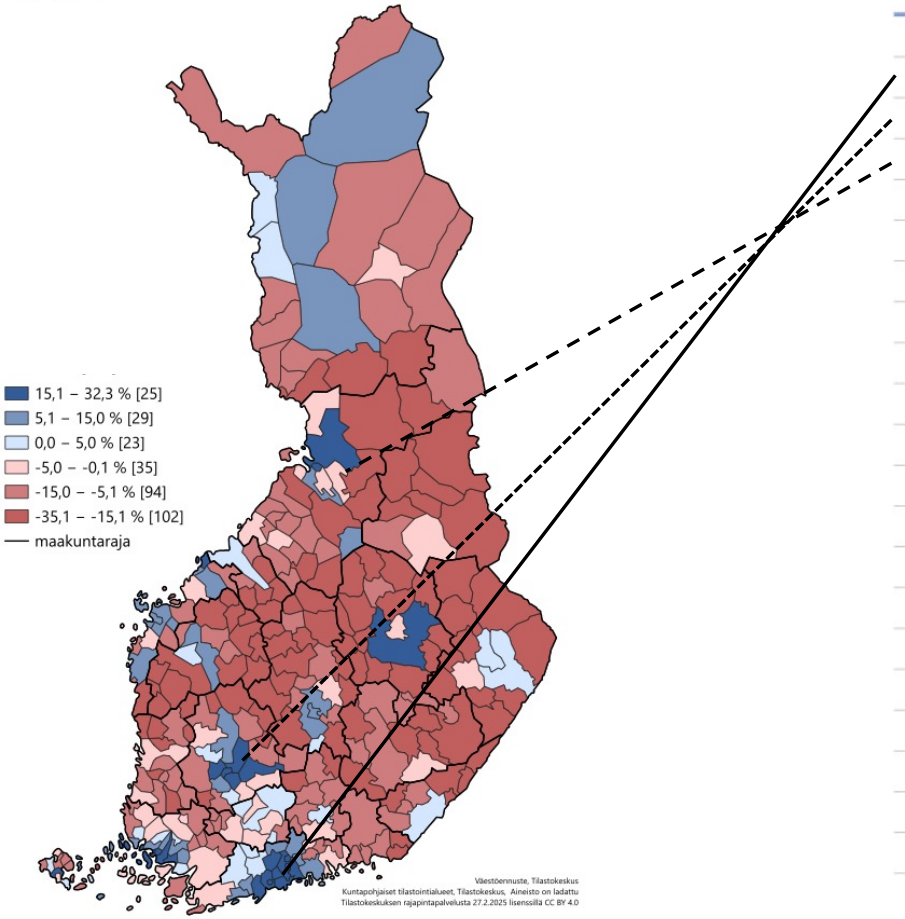


Note: Bubbles sized according to population. The cubic spline trendline shows the expected level of innovation performance at different levels of GDP per capita for all the economies covered by the GII 2026.

Source: Global Innovation Index Database, WIPO, 2026.

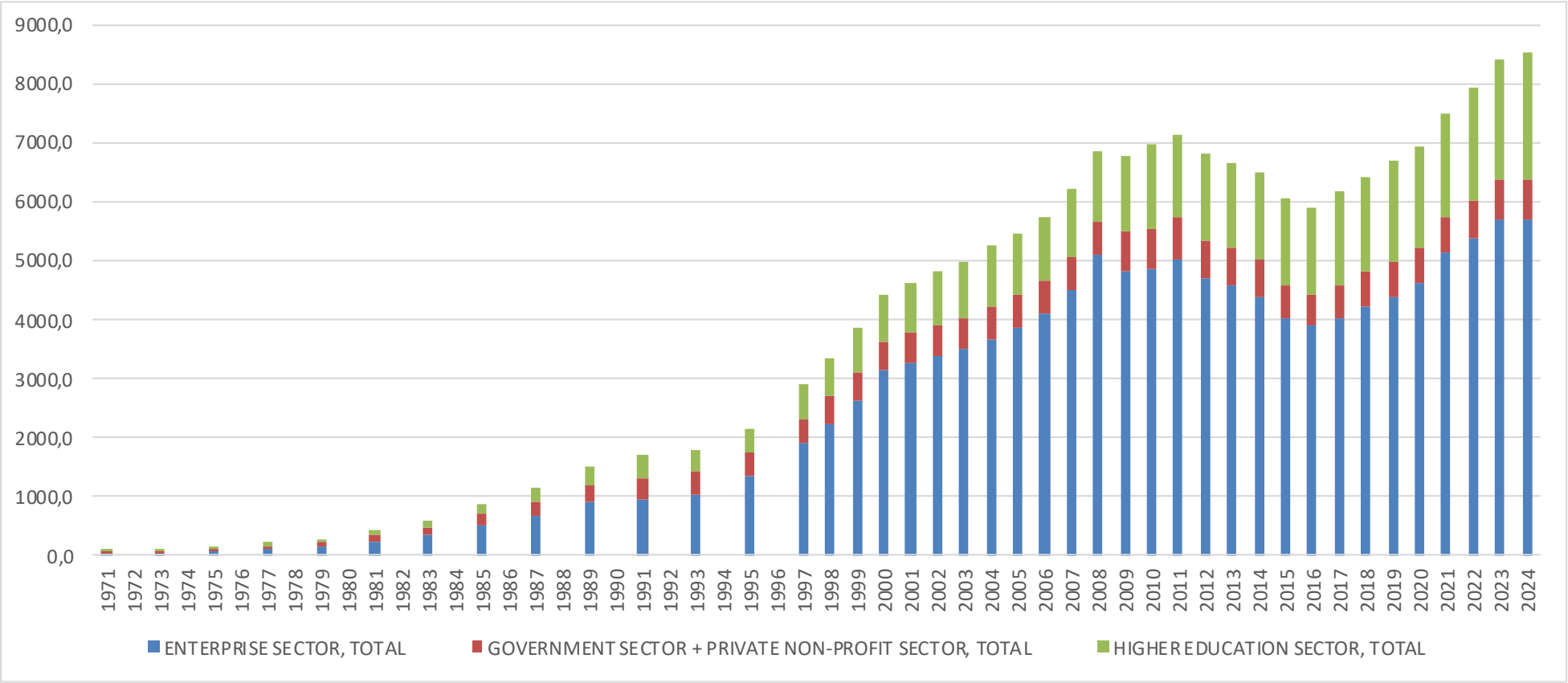
Finland

Predicted population change
by municipalities 2024-2045
(Statistics Finland 2024)



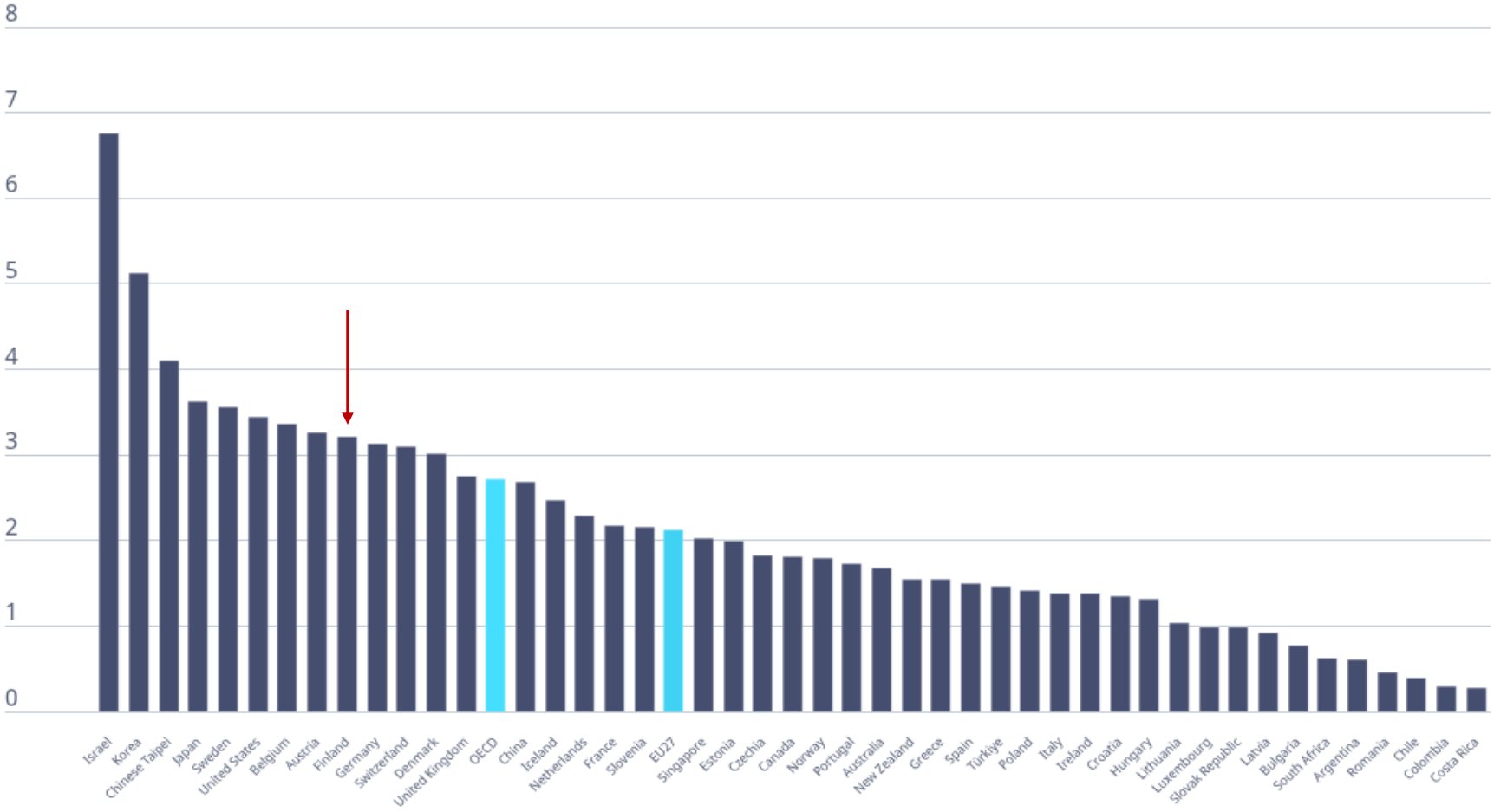
Finland	R&D expenditure (mil. €) 2024	Share of Finland
KOKO MAA	8 892,6	100,0 %
SK Helsinki	4 266,6	48,0 %
SK Tampere	1 047,1	11,8 %
SK Oulu	907,4	10,2 %
SK Turku	593,2	6,7 %
SK Vaasa	319,2	3,6 %
SK Jyväskylä	264,0	3,0 %
SK Kuopio	167,6	1,9 %
SK Porvoo	161,0	1,8 %
SK Joensuu	134,8	1,5 %
SK Lappeenranta	131,5	1,5 %
SK Lahti	116,6	1,3 %
SK Salo	67,1	0,8 %
SK Pori	64,3	0,7 %
SK Rovaniemi	49,8	0,6 %
SK Seinäjoki	46,5	0,5 %
SK Hämeenlinna	41,2	0,5 %
SK Kotka-Hamina	33,3	0,4 %
SK Mikkeli	29,1	0,3 %
SK Kouvola	12,0	0,1 %
C21-seudut yhteensä	**8 452,3**	**95,0 %**

R&D Expenditure in Finland 1971-2024



Gross domestic expenditures on R&D as a percentage of GDP

%, 2024 or latest year available



Source: OECD, Main Science and Technology Indicators (MSTI) Database, March 2026, https://oe.cd/msti.

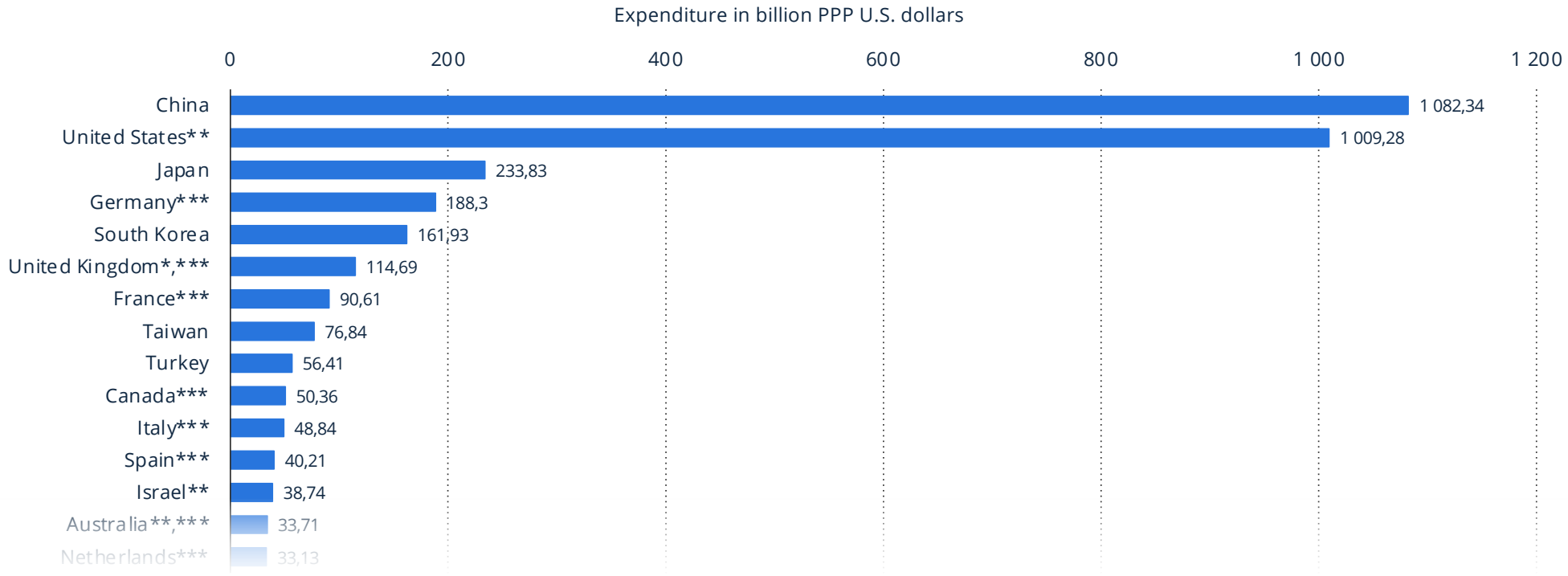
Find this MSTI indicator in the OECD Data Explorer.

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https://www.oecd.org/en/data/datasets/main-science-and-technology-indicators.html

Leading countries by gross research and development (R&D) expenditure worldwide in 2024 (in billion PPP U.S. dollars)

Leading countries by R&D spending worldwide 2024

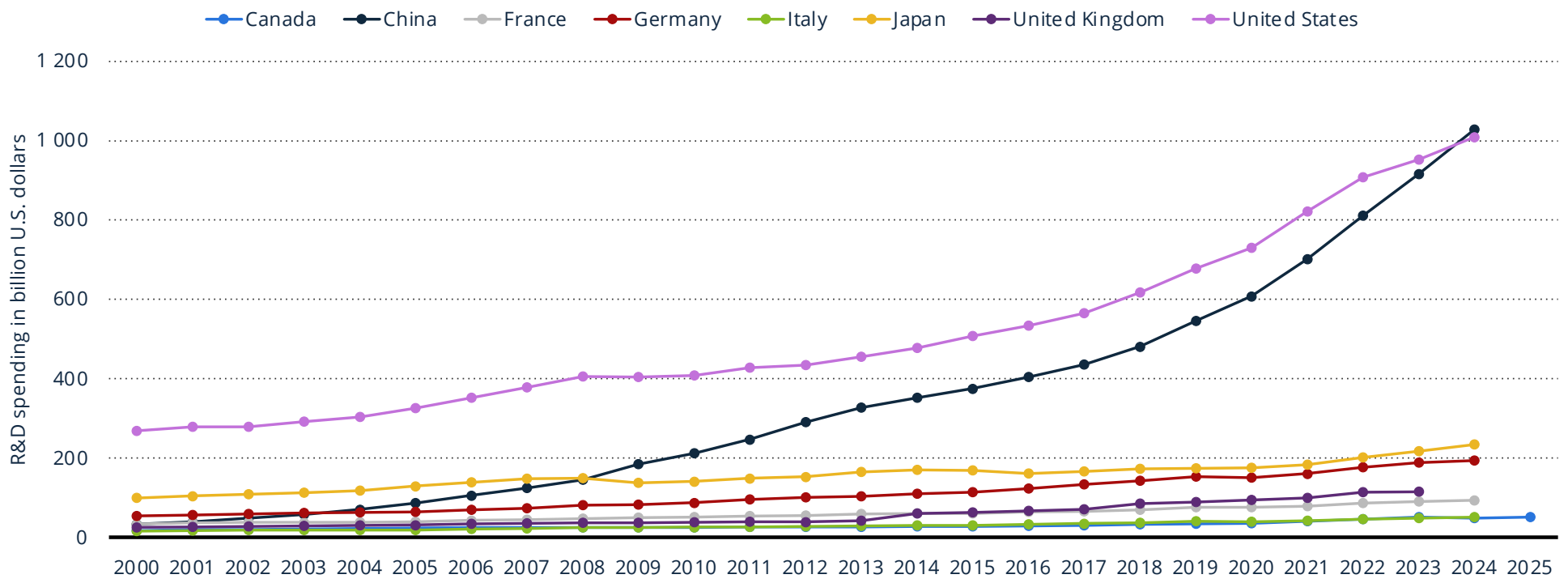


6

Description: China is the leading country worldwide in terms of spending on research and development (R&D), with R&D expenditure exceeding 1082 billion purchasing power parity (PPP) U.S. dollars. The United States are invested about 1009 billion U.S. dollars into R&D. Read more
Note(s): Worldwide, OECD; 2020 to 2024; Derived from purchasing power parity calculations, constant prices; *Provisional value. **Estimates. ***Data from 2023 ****Data from 2022. Read more
Source(s): OECD

Gross domestic spending on research and development (R&D) in G7 countries and China from 2000 to 2025, by country (in billion U.S. dollars)

Gross domestic R&D spending in G7 countries and China 2000-2025



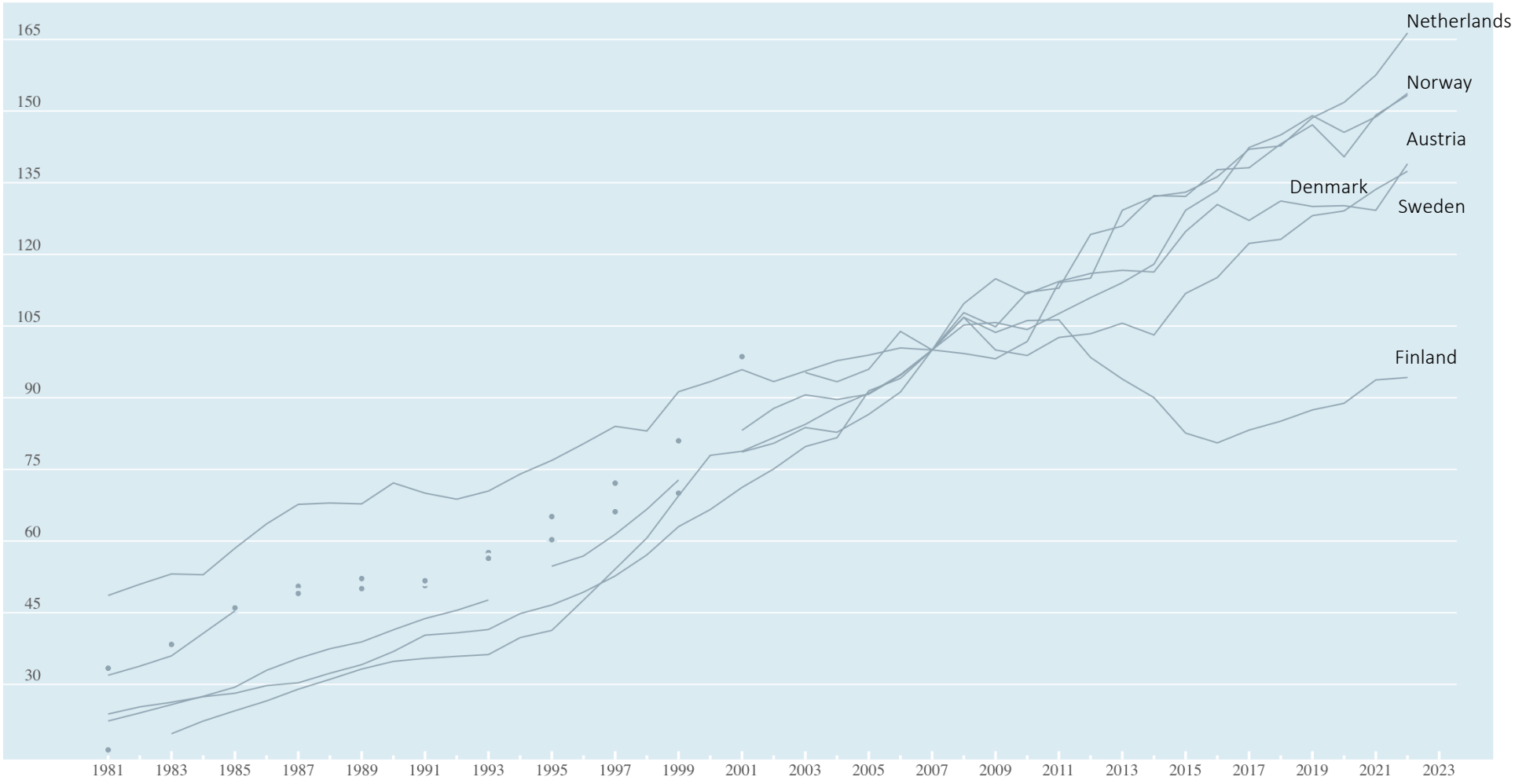
5

Description: In 2024, gross domestic spending on research and development (R&D) in China surpassed that of the United States, reaching 1,028.34 billion U.S. dollars, compared to 1,009.28 billion U.S. dollars in the United States. In 2024, Japan came a distant third, spending 233.83 billion U.S. dollars on R&D. Read more
Note(s): Worldwide; 2000 to 2025; Current prices
Source(s): OECD

Main Science and Technology Indicators (MSTI database)

Measure: Gross Domestic Expenditure on R&D (GERD)

Combined unit of measure: US dollars, PPP converted, Constant prices, Index, 2007

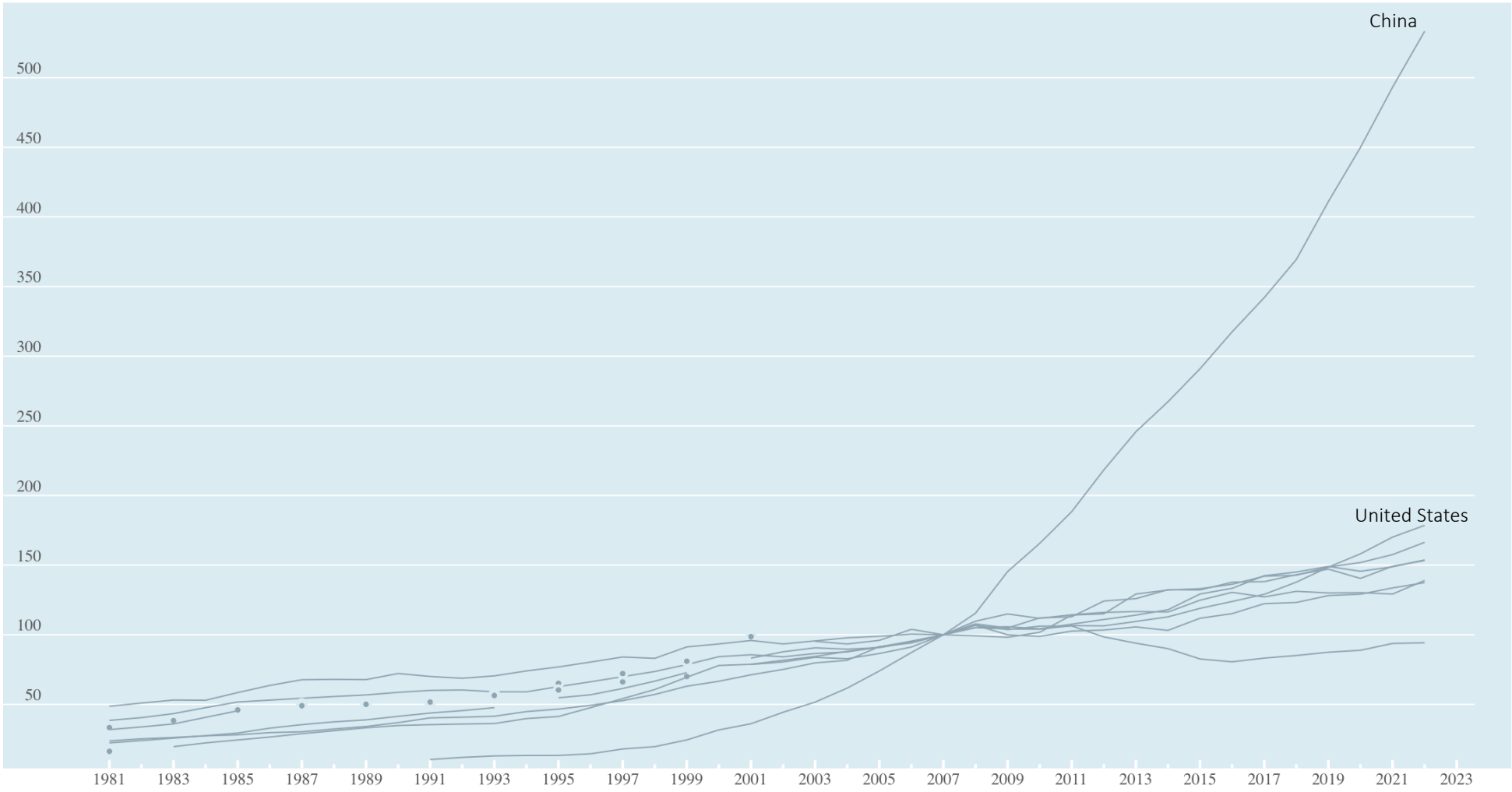


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Main Science and Technology Indicators (MSTI database)

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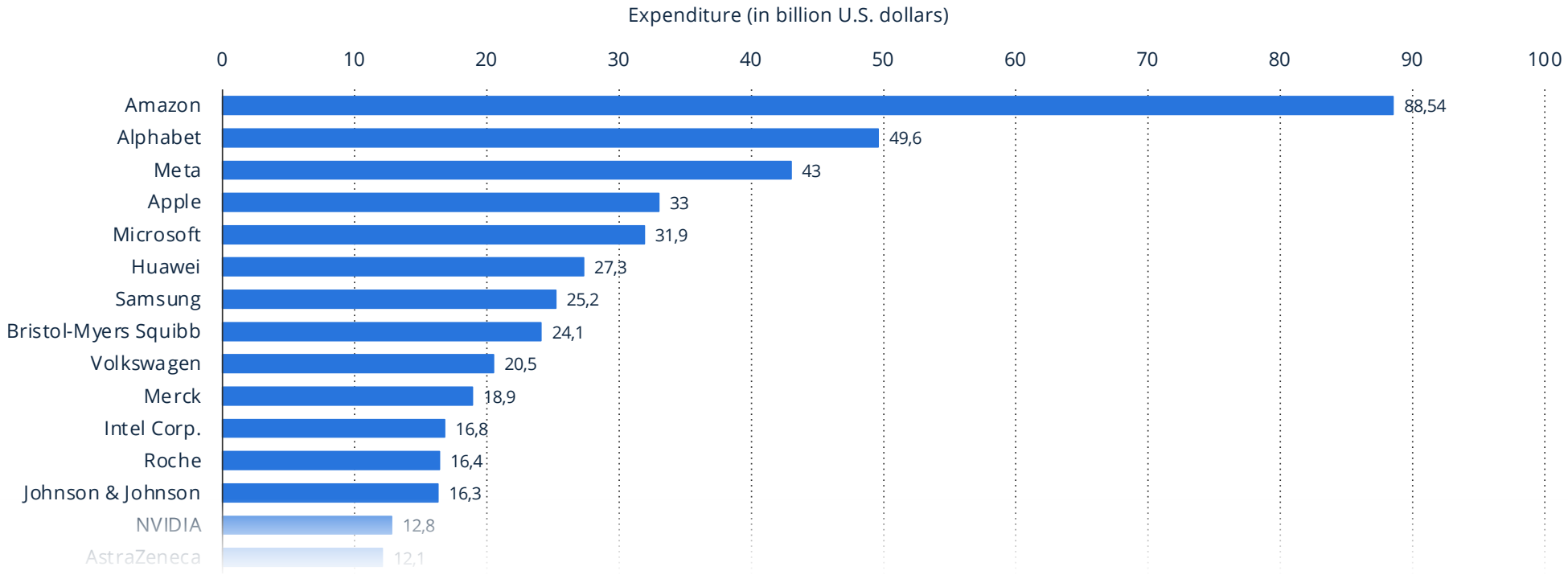
Combined unit of measure: US dollars, PPP converted, Constant prices, Index, 2007



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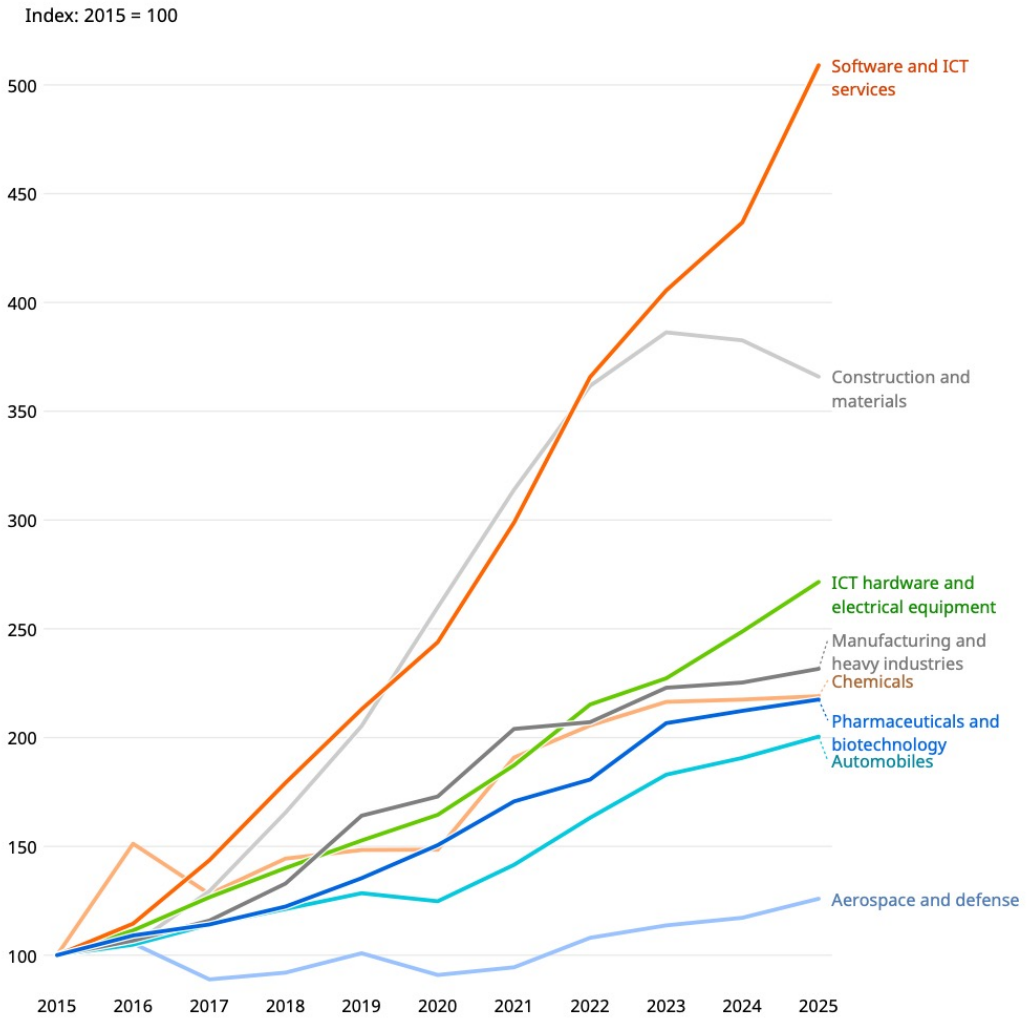
Ranking of the companies with the highest spending on research and development worldwide in 2024 (in billion U.S. dollars)

Companies with the highest spending on research and development 2024



Description: Amazon spent the most on research and development in the fiscal year 2024, with over 88 billion U.S. dollars. Alphabet, Meta, Apple, and Microsoft rounded out the top five of companies with the highest R&D spending that year. Leading by innovation Spending money on research and development, or R&D, is how a company innovates new technologies and conducts research to develop new products and services. R&D allows companies, such as Amazon, to stay ahead of [...] Read more
Note(s): Worldwide; 2024
Source(s): Insider Monkey; Macrotrends; R&D WORLD

Figure 4 R&D investment trends, by industry, 2015–2025



Source: WIPO, based on Moody's Orbis database and the 2025 EU Industrial R&D Investment Scoreboard.

Global Innovation Index 2026 rankings

GII rank	Economy	Score	Income group rank	Region rank	GII rank	Economy	Score	Income group rank	Region rank
1	Switzerland	66.7	1	1	71	Tunisia	29.3	6	14
2	Sweden	63.2	2	2	72	Mongolia	29.1	16	13
3	United States	62.3	3	1	73	Kazakhstan	29.1	17	2
4	Republic of Korea	61.4	4	1	74	Bhutan	28.9	7	3
5	Singapore	61.0	5	2	75	Argentina	28.8	18	6
6	United Kingdom	59.6	6	3	76	Montenegro	28.8	19	36
7	Netherlands (Kingdom of the)	58.4	7	4	77	Uzbekistan	28.7	8	4
8	Finland	57.9	8	5	78	Colombia	28.6	20	7
9	Denmark	57.7	9	6	79	Albania	28.3	21	37
10	China	57.0	1	3	80	Peru	27.9	22	8
11	Germany	56.8	10	7	81	Iran (Islamic Republic of)	27.6	23	5
12	Japan	54.1	11	4	82	Botswana	27.1	24	3
13	France	54.0	12	8	83	Egypt	26.1	9	15
14	Hong Kong, China	53.2	13	5	84	Bosnia and Herzegovina	26.1	25	38
15	Israel	52.2	14	1	85	Azerbaijan	25.8	26	16
16	Canada	51.1	15	2	86	Lebanon	25.6	10	17
17	Estonia	50.4	16	9	87	Jamaica	24.9	27	9
18	Austria	50.2	17	10	88	Belarus	24.5	28	39
19	Ireland	50.1	18	11	89	Panama	24.4	51	10
20	Australia	49.6	19	6	90	Senegal	24.4	11	4
21	Norway	48.5	20	12	91	Barbados	24.2	52	11
22	Belgium	48.5	21	13	92	Kyrgyzstan	24.1	12	6
23	Luxembourg	46.6	22	14	93	Cambodia	23.8	13	14
24	New Zealand	46.4	23	7	94	Sri Lanka	23.7	14	7
25	United Arab Emirates	46.4	24	2	95	Pakistan	23.7	15	8
26	Iceland	46.3	25	15	96	Rwanda	23.3	1	5
27	Italy	46.2	26	16	97	Kenya	23.0	16	6
28	Spain	45.4	27	17	98	Brunei Darussalam	23.0	53	15
29	Cyprus	45.3	28	3	99	Dominican Republic	22.9	29	12
30	Portugal	44.5	29	18	100	El Salvador	22.8	30	13
31	Malta	43.8	30	19	101	Ghana	22.6	17	7
32	Lithuania	43.2	31	20	102	Namibia	22.5	18	8
33	Czech Republic	42.8	32	21	103	Cabo Verde	22.4	31	9
34	Malaysia	41.8	2	8	104	Nepal	22.3	19	9
35	Slovenia	41.1	33	22	105	Bangladesh	21.5	20	10
36	Hungary	40.7	34	23	106	Ecuador	21.3	32	14
37	Bulgaria	40.3	35	24	107	Trinidad and Tobago	21.2	54	15
38	India	40.1	1	1	108	Lao People's Democratic Republic	21.2	21	16
39	Poland	39.5	36	25	109	Paraguay	21.1	33	16
40	Latvia	38.3	37	26	110	Côte d'Ivoire	20.8	22	10
41	Greece	38.2	38	27	111	Algeria	20.5	34	18
42	Saudi Arabia	37.9	39	4	112	Tajikistan	20.3	23	11
43	Viet Nam	37.7	2	9	113	Madagascar	20.2	2	11
44	Thailand	37.6	3	10	114	Bolivia (Plurinational State of)	19.7	24	17
45	Türkiye	37.5	4	5	115	Zambia	19.5	25	12
46	Croatia	36.9	40	28	116	Honduras	19.2	26	18
47	Qatar	36.6	41	6	117	Benin	19.1	27	13
48	Slovakia	36.5	42	29	118	Nigeria	19.1	28	14
49	Romania	35.3	43	30	119	United Republic of Tanzania	19.0	29	15
50	Mauritius	34.1	5	1	120	Guatemala	19.0	35	19
51	Chile	33.8	44	1	121	Cameroon	18.9	30	16
52	Philippines	33.8	3	11	122	Togo	18.7	3	17
53	Brazil	33.5	6	2	123	Uganda	18.4	4	18
54	Morocco	32.8	4	7	124	Nicaragua	18.0	31	20
55	Indonesia	32.7	7	12	125	Myanmar	17.4	32	17
56	Serbia	32.5	8	31	126	Malawi	17.2	5	19
57	Georgia	32.2	9	8	127	Venezuela (Bolivarian Republic of)	16.7		21
58	Russian Federation	31.8	45	32	128	Lesotho	16.5	33	20
59	Armenia	31.6	10	9	129	Mozambique	16.1	6	21
60	Jordan	31.5	5	10	130	Burkina Faso	16.1	7	22
61	North Macedonia	31.2	11	33	131	Mauritania	16.1	34	23
62	Kuwait	30.9	46	11	132	Zimbabwe	16.1	35	24
63	South Africa	30.9	12	2	133	Ethiopia	15.7		25
64	Bahrain	30.8	47	12	134	Mali	15.2	8	26
65	Mexico	30.6	13	3	135	Burundi	15.1	9	27
66	Uruguay	30.5	48	4	136	Angola	13.0	36	28
67	Ukraine	30.4	14	34	137	Democratic Republic of the Congo	12.6	10	29
68	Republic of Moldova	30.3	15	35	138	Niger	12.1	11	30
69	Oman	30.0	49	13	139	Chad	9.5	12	31
70	Costa Rica	29.8	50	5					

Global Innovation Index 2026 rankings

- Institutions (FIN 4th)
- Human capital and research (FIN 4th)
- Infrastructure (FIN 4rd)
- Market sophistication (FIN 18th)
- Business sophistication (FIN 11th)
- Knowledge and technology outputs (FIN 9th)
- Creative outputs (FIN 17 th)

https://www.wipo.int/web-publications/global-innovation-index-2026/assets/110523/2000-GII-2026%20-%20EN-local_150dpi.pdf

GII 2026 rank

Finland

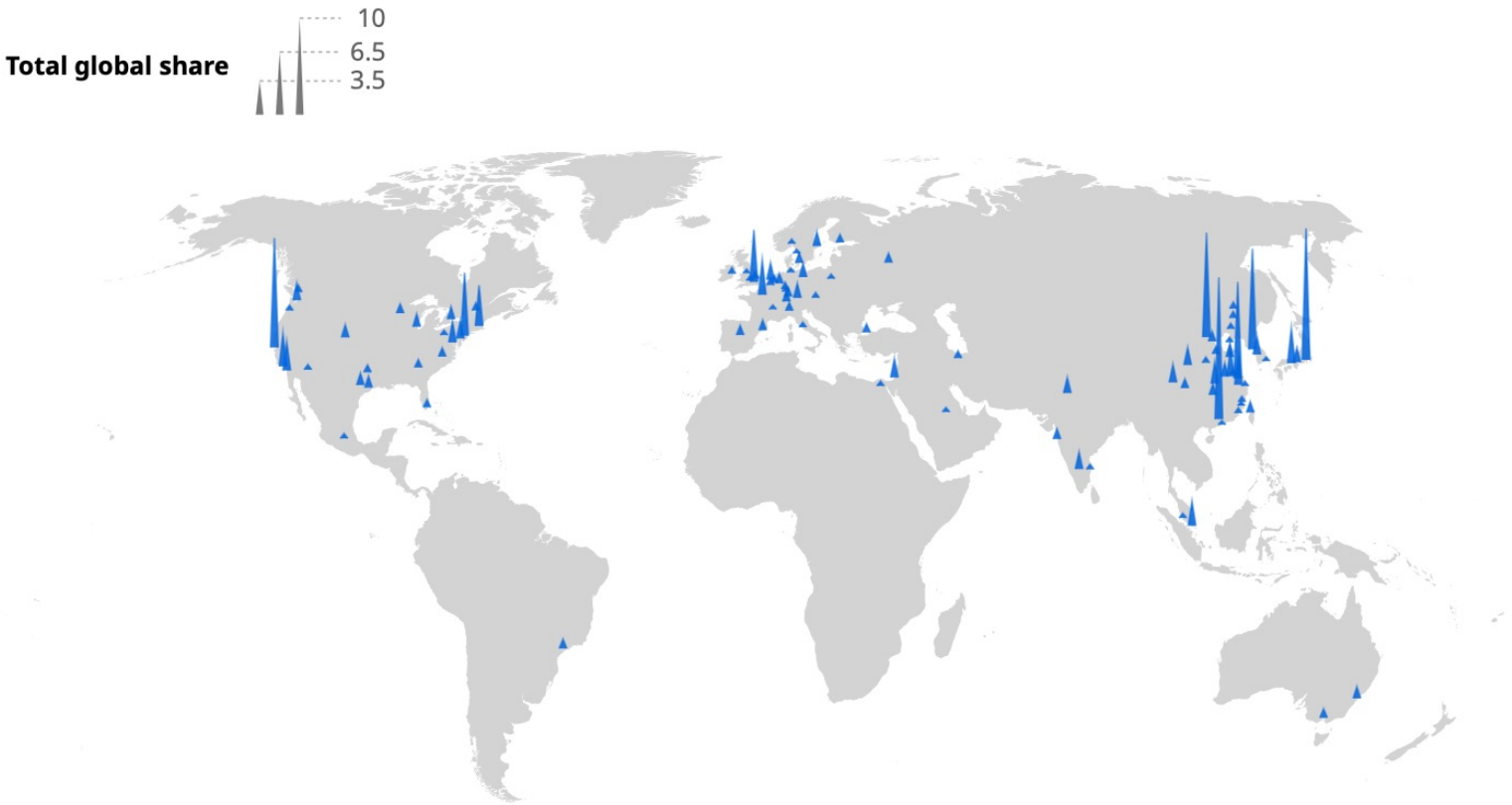
8

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$ (bn)	GDP per capita, PPP$
10	6	High	EUR	5.6	373.2	66,512

		Score/ Value	Rank
Institutions		**84.8**	**4** ●
1.1	**Institutional environment**	**87.9**	**10**
1.1.1	Operational stability for businesses*	87.5	12
1.1.2	Government effectiveness*	88.4	8
1.2	**Regulatory environment**	**97.9**	**1** ● ◆
1.2.1	Regulatory quality*	95.8	2 ● ◆
1.2.2	Rule of law*	100.0	1 ● ◆
1.3	**Business environment**	**68.7**	**19**
1.3.1	Policy stability for doing business†	78.4	10
1.3.2	Entrepreneurship policies and culture†	59.1	18
Human capital and research		**63.9**	**4** ● ◆
2.1	**Education**	**71.3**	**5** ● ◆
2.1.1	Expenditure on education, % GDP ⊙	6.4	13 ◆
2.1.2	Government funding/pupil, secondary, % GDP/cap	23.9	20
2.1.3	School life expectancy, years	19.6	3 ● ◆
2.1.4	PISA scales in reading, maths and science	495.1	11
2.1.5	Pupil–teacher ratio, secondary	12.7	60 ○
2.2	**Tertiary education**	**55.4**	**10**
2.2.1	Tertiary enrolment, % gross	110.3	5 ◆
2.2.2	Graduates in science and engineering, %	30.8	18
2.2.3	Tertiary inbound mobility, %	10.5	32
2.3	**Research and development (R&D)**	**64.8**	**10**
2.3.1	Researchers, FTE/mn pop.	8,706.7	4 ● ◆
2.3.2	Gross expenditure on R&D, % GDP	3.2	8
2.3.3	Global corporate R&D investors, top 3, mn US$	68.6	13
2.3.4	QS university ranking, top 3*	58.8	24
Infrastructure		**67.3**	**4** ● ◆
3.1	**Information and communication technologies (ICTs)**	**95.2**	**8**
3.1.1	ICT access*	99.0	19
3.1.2	ICT use*	97.6	5 ◆
3.1.3	Government online service*	89.1	19
3.2	**General infrastructure**	**69.3**	**7**
3.2.1	Electricity output, GWh/mn pop.	14,570.7	9 ◆
3.2.2	Aviation import dwell time	1.5	26
3.2.3	Logistics performance*	95.5	2 ● ◆
3.2.4	Gross capital formation, % GDP	22.6	71 ○
3.3	**Ecological sustainability**	**37.2**	**18**
3.3.1	GDP/unit of energy use	9.6	97 ○
3.3.2	Low-carbon energy use, %	59.0	4 ● ◆
3.3.3	ISO 14001 environment/bn PPP$ GDP	3.7	28
Market sophistication		**57.3**	**18**
4.1	**Credit**	**50.6**	**27**
4.1.1	Finance for startups and scaleups†	87.8	6 ◆
4.1.2	Domestic credit to private sector, % GDP	92.0	24
4.1.3	Loans from microfinance institutions, % GDP	2.9	17
4.2	**Investment**	**40.6**	**11**
4.2.1	Market capitalization, % GDP	n/a	n/a
4.2.2	Venture capital (VC) received, deal count/bn PPP$ GDP	0.7	7
4.2.3	Late-stage VC deal count, % global VC	0.2	23
4.2.4	VC investors, deal count/bn PPP$ GDP	0.8	13
4.3	**Trade, diversification, and market scale**	**80.7**	**28**
4.3.1	Applied tariff rate, weighted avg., %	1.3	20
4.3.2	Domestic industry diversification	96.0	17
4.3.3	Domestic market scale, bn PPP$	373.2	60 ○

		Score/ Value	Rank
Business sophistication		**55.4**	**11**
5.1	**Knowledge workers**	**59.8**	**9**
5.1.1	Knowledge-intensive employment, %	48.1	17
5.1.2	Females employed w/advanced degrees, %	27.4	16
5.1.3	Youth demographic dividend, %	25.6	114 ○
5.1.4	GERD performed by business, % GDP	2.2	8
5.1.5	GERD financed by business, %	57.0	15
5.2	**Innovation linkages**	**60.2**	**18**
5.2.1	Public research–industry co-publications, %	4.8	15
5.2.2	University–industry R&D collaboration†	62.8	22
5.2.3	University-industry and international engagement, top 5*	65.5	30 ◇
5.2.4	State of cluster development†	66.0	38
5.2.5	Patent families/bn PPP$ GDP	6.5	5 ● ◆
5.3	**Knowledge absorption**	**46.3**	**12**
5.3.1	Intellectual property payments, % total trade	0.8	50
5.3.2	High-tech imports, % total trade	7.5	79 ○
5.3.3	ICT services imports, % total trade	5.8	4 ● ◆
5.3.4	FDI net inflows, % GDP	2.5	71 ○
5.3.5	Green-field R&D & high-tech FDI ⊙	4.4	10
5.3.6	Research talent, % in businesses	60.0	16
Knowledge and technology outputs		**53.3**	**9**
6.1	**Knowledge creation**	**57.2**	**9**
6.1.1	Patents by origin/bn PPP$ GDP	11.5	5 ●
6.1.2	PCT patents by inventor origin/bn PPP$ GDP	4.3	1 ● ◆
6.1.3	Utility models by origin/bn PPP$ GDP	0.5	30
6.1.4	Scientific and technical articles/bn PPP$ GDP	41.2	10 ◆
6.1.5	Citable documents H-index	42.0	21
6.2	**Knowledge impact**	**48.0**	**8**
6.2.1	Labor productivity growth, %	–0.5	125 ○ ◇
6.2.2	Unicorn valuation, % GDP	5.3	9
6.2.3	Software spending, % GDP	0.6	12
6.2.4	High-tech manufacturing, %	36.8	30
6.3	**Knowledge diffusion**	**54.7**	**8**
6.3.1	Intellectual property receipts, % total trade	2.9	8
6.3.2	Production and export complexity	89.7	15
6.3.3	High-tech exports, % total trade	4.4	43
6.3.4	ICT services exports, % total trade	11.0	5 ● ◆
6.3.5	ISO 9001 quality/bn PPP$ GDP	5.7	47
Creative outputs		**46.8**	**17**
7.1	**Intangible assets**	**46.9**	**20**
7.1.1	Intangible asset intensity, top 15, %	71.1	17
7.1.2	Trademarks by origin/bn PPP$ GDP	23.8	84 ○
7.1.3	Global brand value, top 5,000, % GDP	11.6	14
7.1.4	Industrial designs by origin/bn PPP$ GDP	2.1	37
7.2	**Creative goods and services**	**26.3**	**46**
7.2.1	Cultural and creative services exports, % total trade	0.7	50
7.2.2	National feature films/mn pop. 15–69	7.6	21
7.2.3	Entertainment and media market/th pop. 15–69	49.5	11
7.2.4	Creative goods exports, % total trade	0.4	63 ○ ◇
7.3	**Online creativity**	**66.9**	**7**
7.3.1	Top-level domains (TLDs)/th pop. 15–69	33.7	21
7.3.2	GitHub commits/mn pop. 15–69	88.7	4 ● ◆
7.3.3	Mobile app creation/bn PPP$ GDP	78.4	13

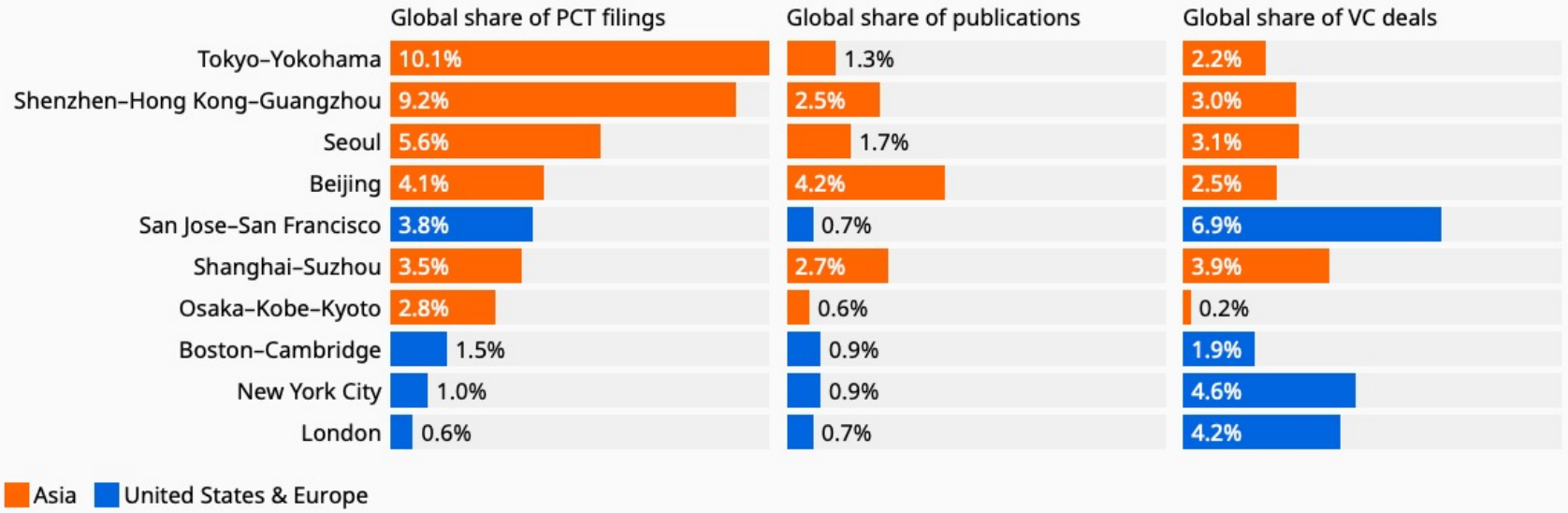
Map 1 Top 100 innovation clusters worldwide, 2026



Source: WIPO Statistics Database, June 2026.

Figure 1 Global share of publications, PCT filings, and venture capital deals for the top 10 innovation clusters, 2026

Among the top 10, Asian clusters lead in patents and publications – the US and European clusters in venture capital

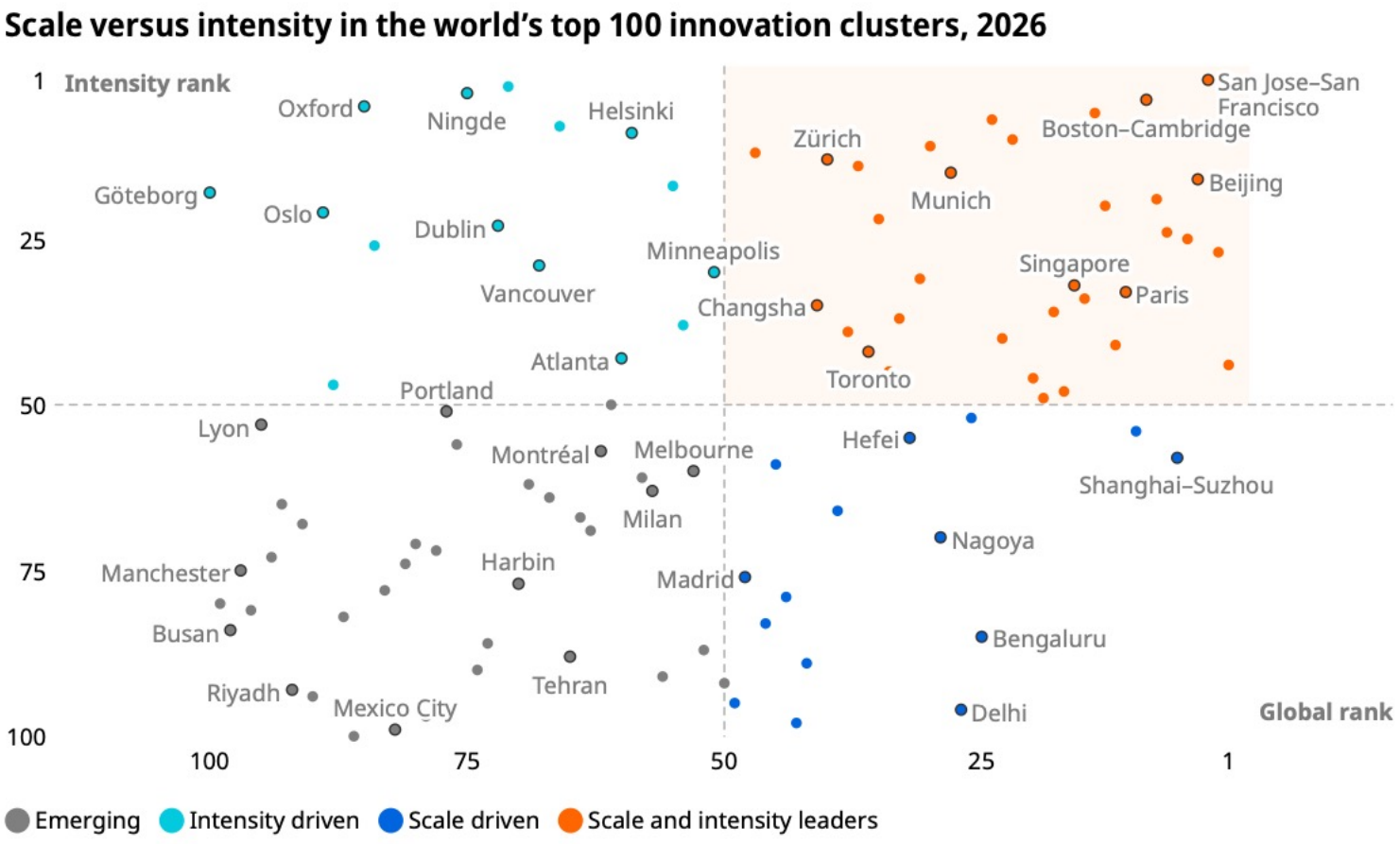


Source: WIPO Statistics Database, June 2026 • Get the data • Download image

Top innovation cluster by economy or cross-border region among the top 100, 2026



Note: Squares with numbers show cluster ranks.
Map: © OpenMapTiles, © OpenStreetMap contributors https://www.openstreetmap.org/copyright.
Source: Global Innovation Index Database, WIPO, 2026.

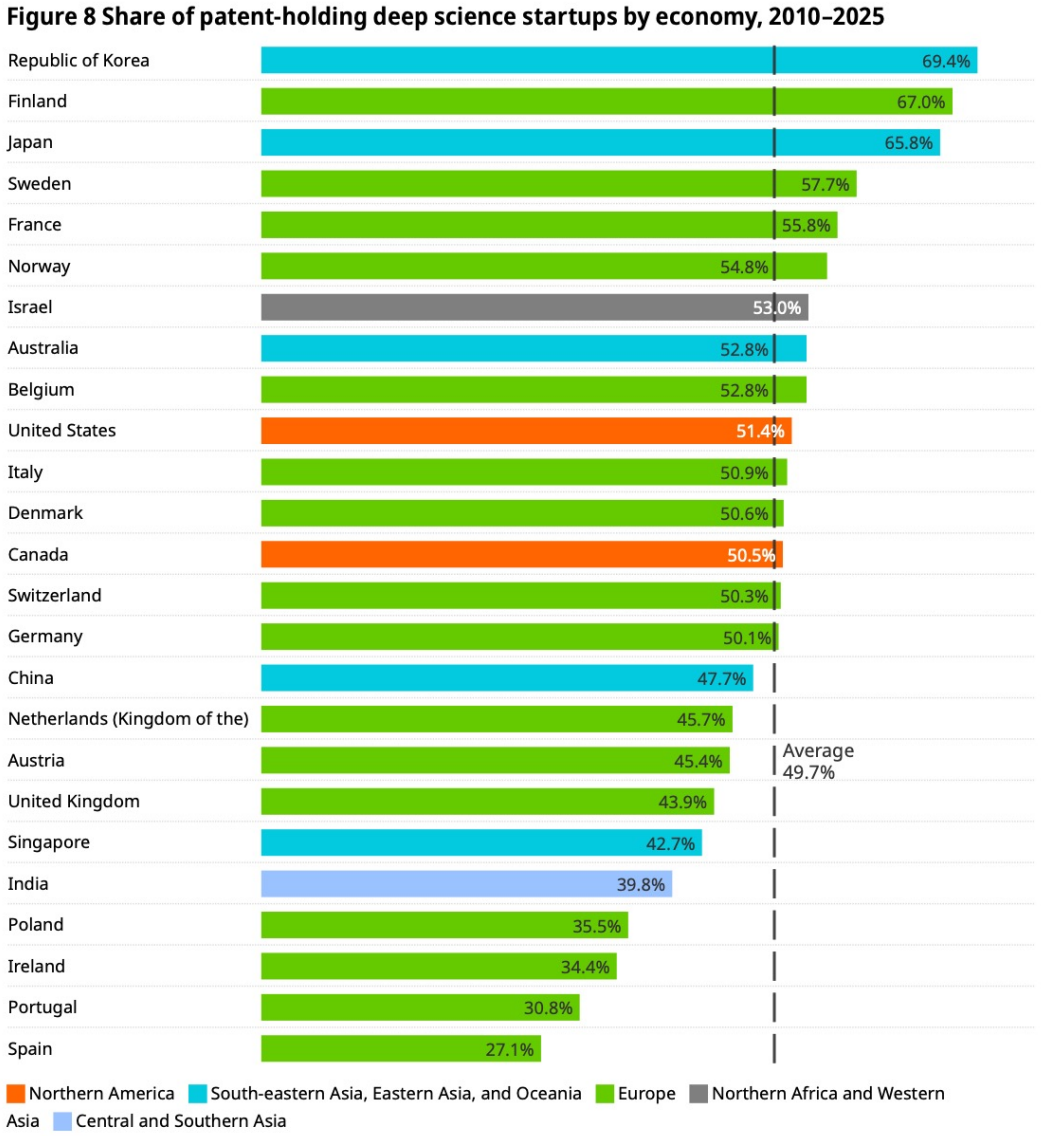


Source: Global Innovation Index Database, WIPO, 2026.

Eindhoven and Helsinki lead the European Union in innovation cluster intensity

Deep tech (deep technology) refers to companies and innovations rooted in substantial scientific research, hard engineering breakthroughs, or novel materials rather than incremental software updates or new business models.

Enabling path creation



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