Diary 2

What is smart specialization? What are the potential success factors and pitfalls of it - in other words, **what might make it fail or produce results**?

Clusters and innovation ecosystems are closely related conceptually but have some essential differences. **What are the pros and cons of shifting from clusters to innovation ecosystems?**

Nov. 25 – Dec. 5
Registration is open

Path diversification

New technology and competencies based on unrelated knowledge combinations

…is explained as a micro-level process, where firms move into new industries by combining their existing knowledge base with new, unrelated knowledge.

(Grillitsch et al. 2018; Isaksen et al. 2018)

A quick case of Rochester – path upgrading

(source: Sean Safford)

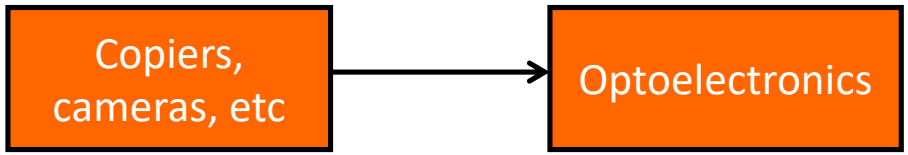
Rochester

Rochester - The Silicon Valley of its Day

(source: Sean Safford)

Kodak, Xerox and Bausch & Lomb

- By the 1980s, companies had moved manufacturing to lower cost regions
- Broadened research and development beyond local area
- Moved away from optics and optical electronics and into new technologies



the study and application of electronic devices that source, detect and control light

Rochester, New York

The Silicon Valley of its Day

(source: Sean Safford)

What was there to build on:

- Strong community of scientists and researchers
- Significant wealth and access to funding
- Well established manufacturing infrastructure
- Commitment of policy makers
- Strong universities

What proved crucial

- Absorptive capacity
- Unlocking capabilities
- Generating the broader social and institutional context for something new to emerge

Path exhaustion

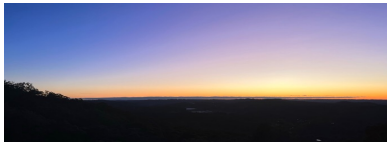
Loss of technologies and competencies

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)

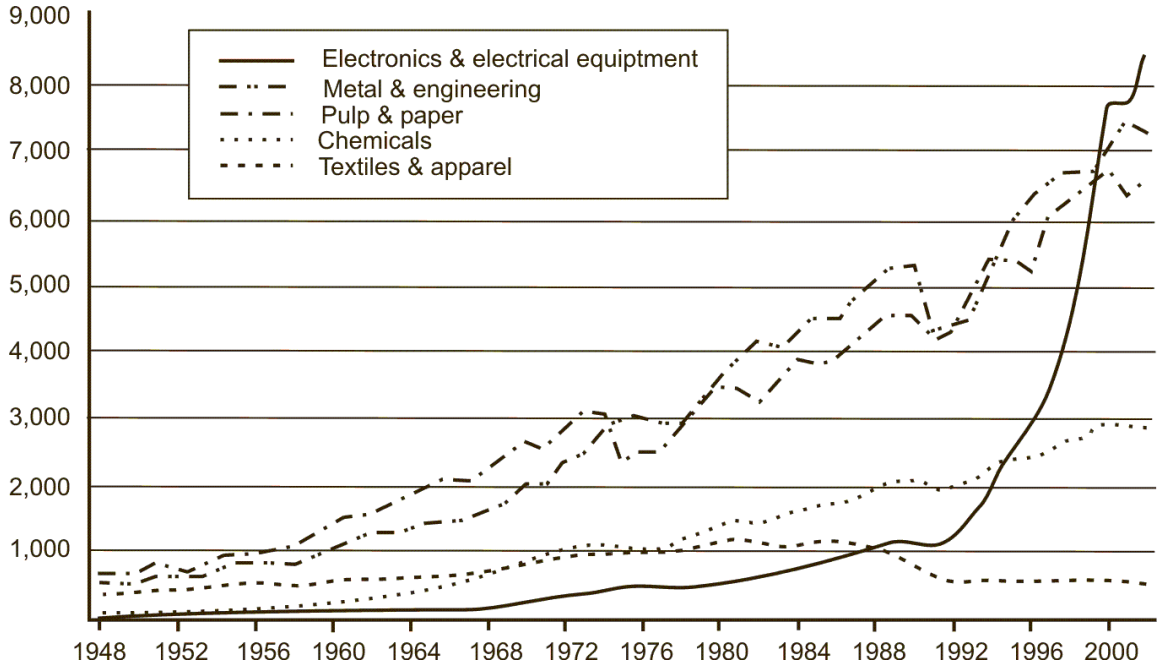
Case Nokia

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) and
- thus Finnish telecommunications engineers became recognized as 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

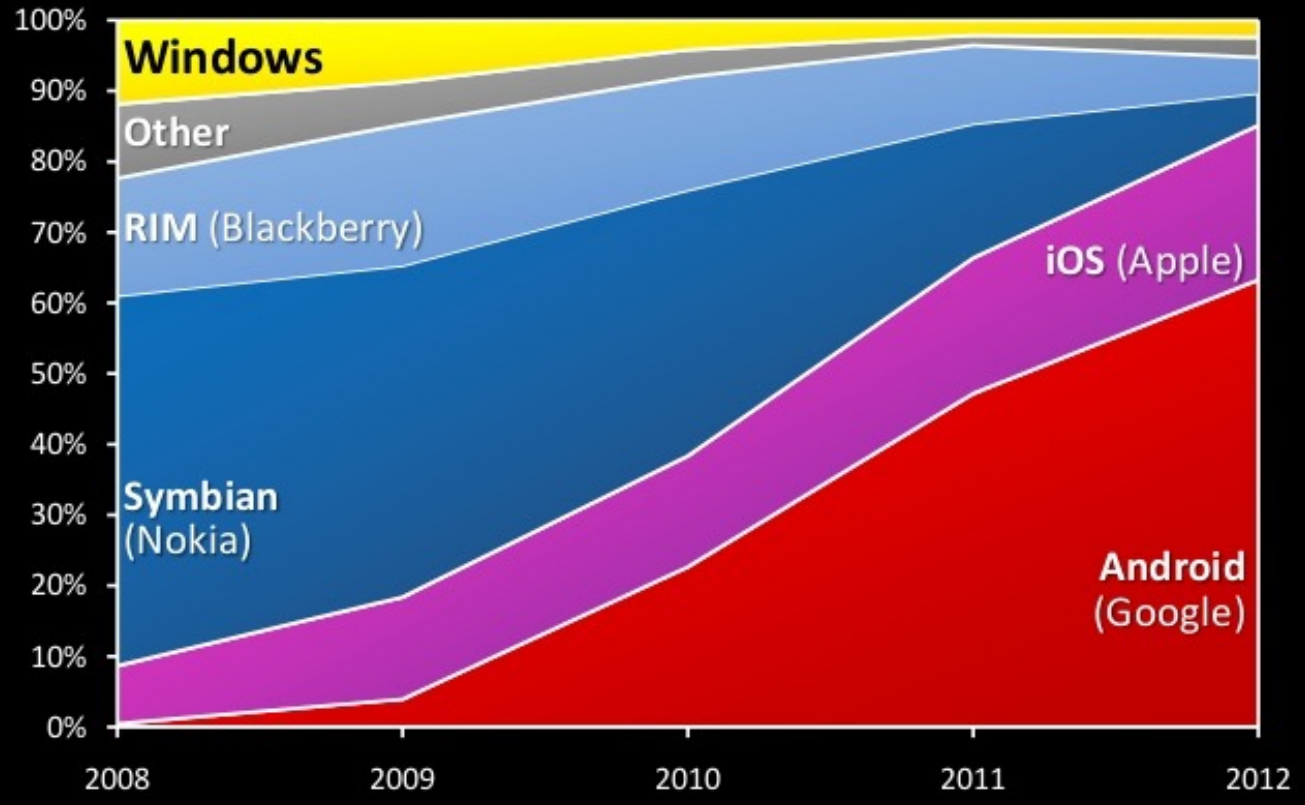
In Tampere

- 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

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 |

Front Page > International > Story

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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

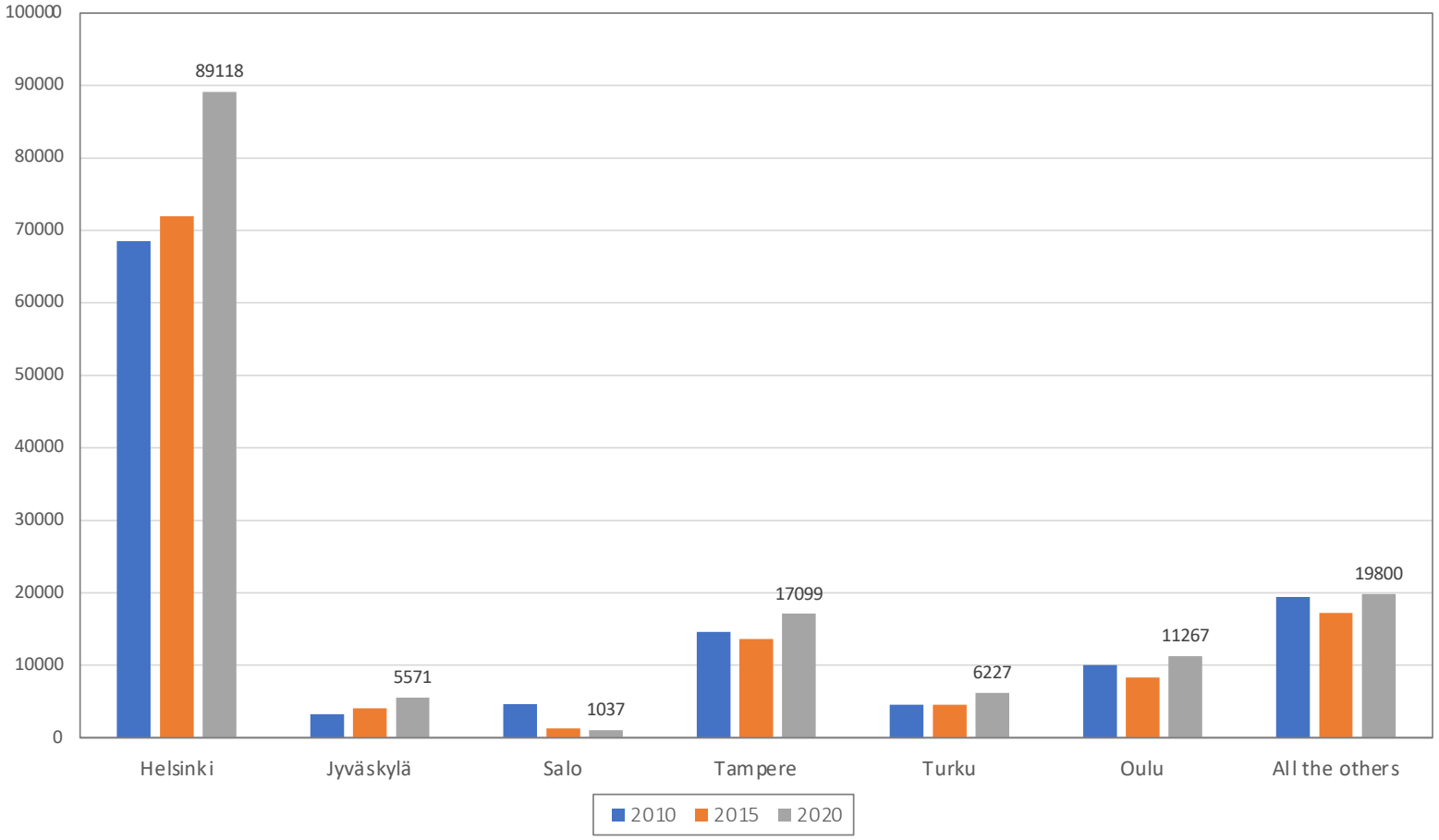
Our top photos from the last 24 hours. Slideshow »

Police close in on Paris attackers

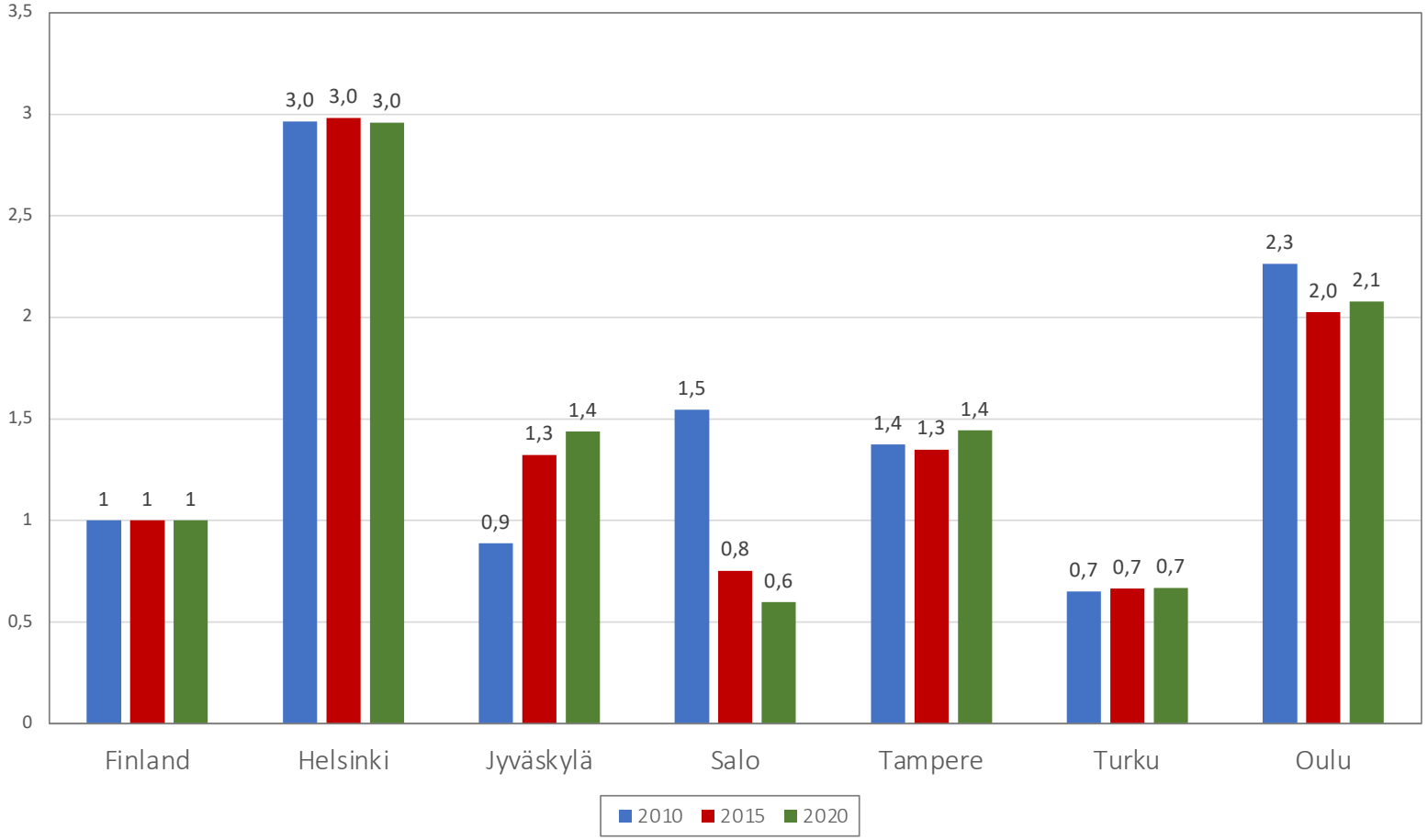
Faces of Islamic State

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:

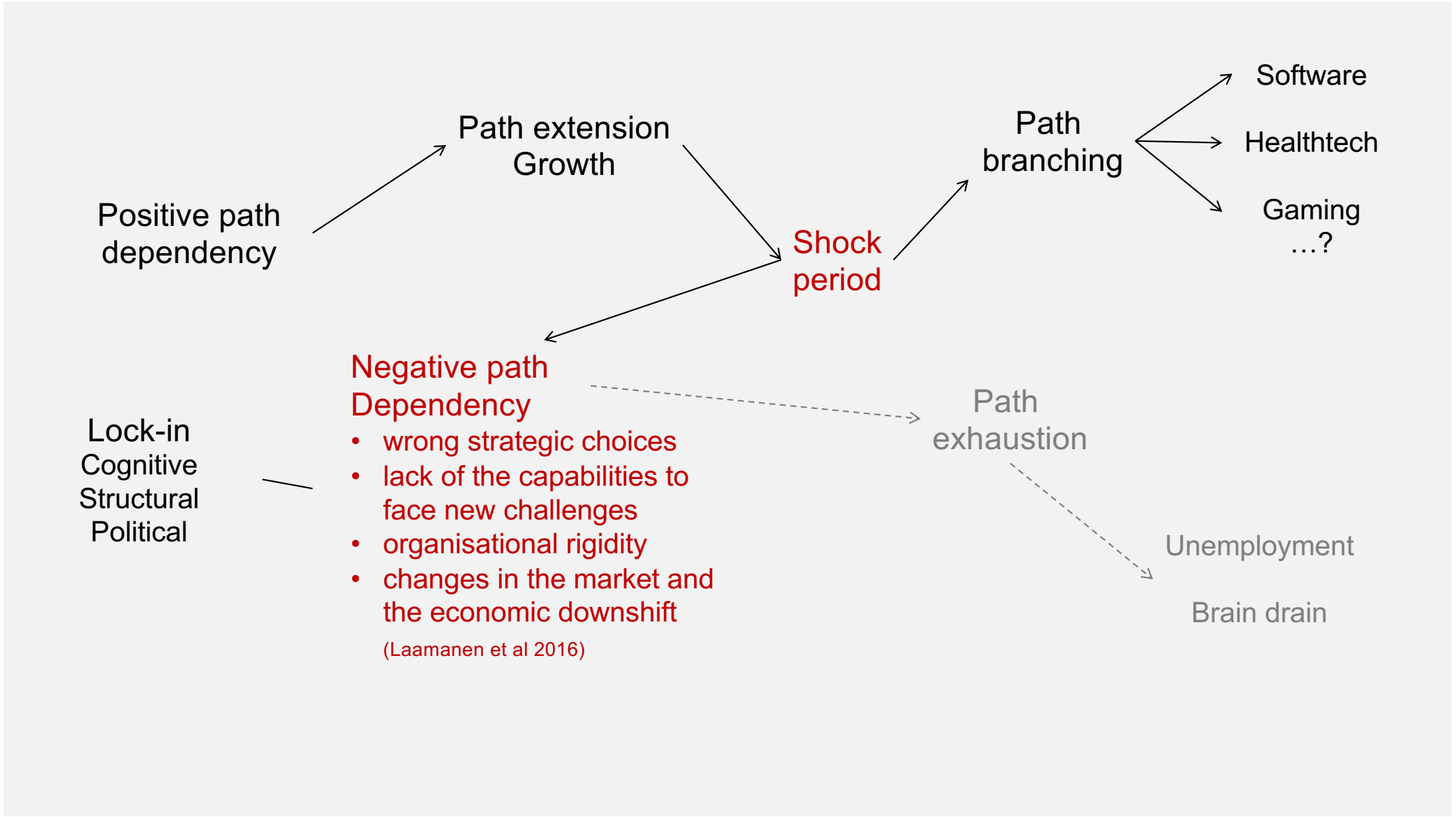
e_i = Local employment in industry i

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
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)
Lock-in
Cognitive
Structural
Political
Path exhaustion
Unemployment
Brain drain

Why do well-doing cities/regions turn into stagnant regions?

- Stable trust-based linkages between regional core firms and other actors
- Reduce transaction costs but do not boost innovation
- Long-term R&D becomes an end in itself

- Source of ideas too narrow
- Quality of marketing and distribution too local / national
- Localized / national personal connections rather than constantly evolving open networks

Innovation policy in Finland

Very basics

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)

Innovation seeks to reorder society

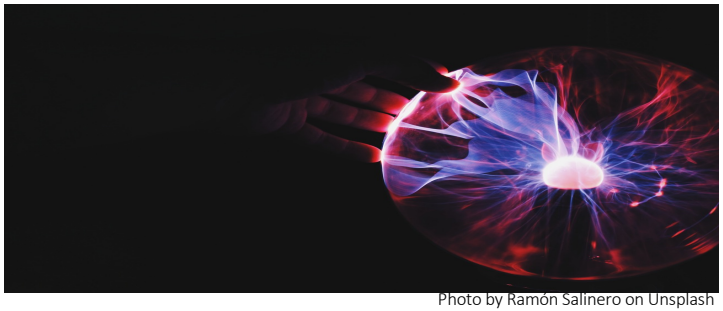


Photo by Ramón Salinero on Unsplash

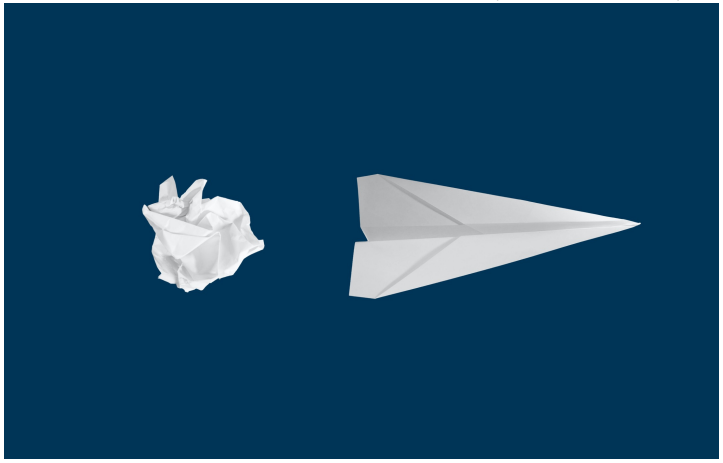
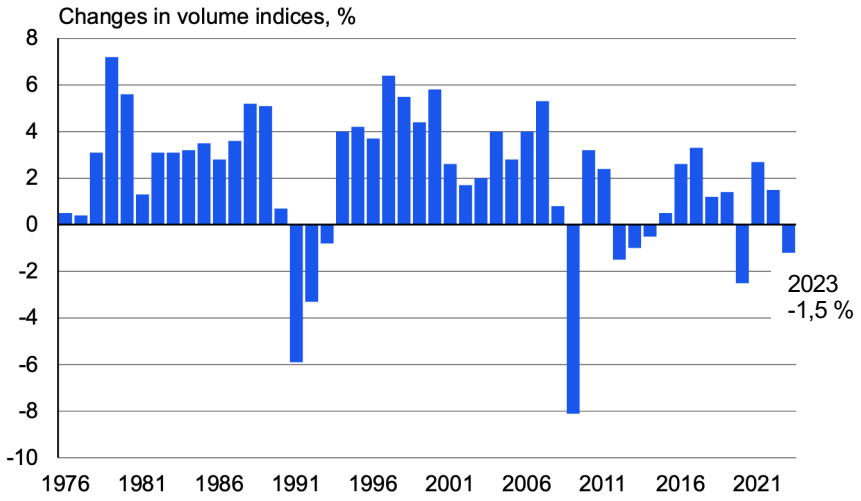
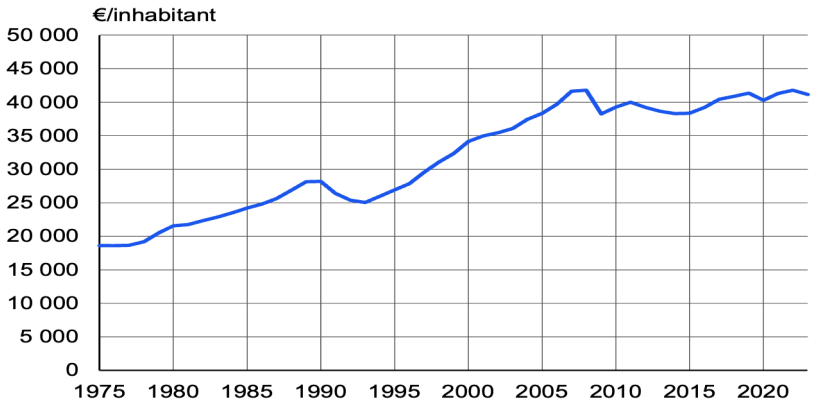


Photo by Matt Ridley on Unsplash

Annual change in the volume of gross domestic product, 1976–2023*





https://stat.fi/tup/suoluk/suoluk_kansantalous_en.html

Cluster policy and innovation system enter Finland

- Deep recession of the early 90's
- High-road targeted - continuing with the old path simply was not an option
- **Cluster and innovation system as key focusing devices**

Platforms and innovation ecosystems enter Finland

- Lost 15 years (2009/10->)
- Something more dynamic called for
- **Platform and innovation ecosystems as key focusing devices**

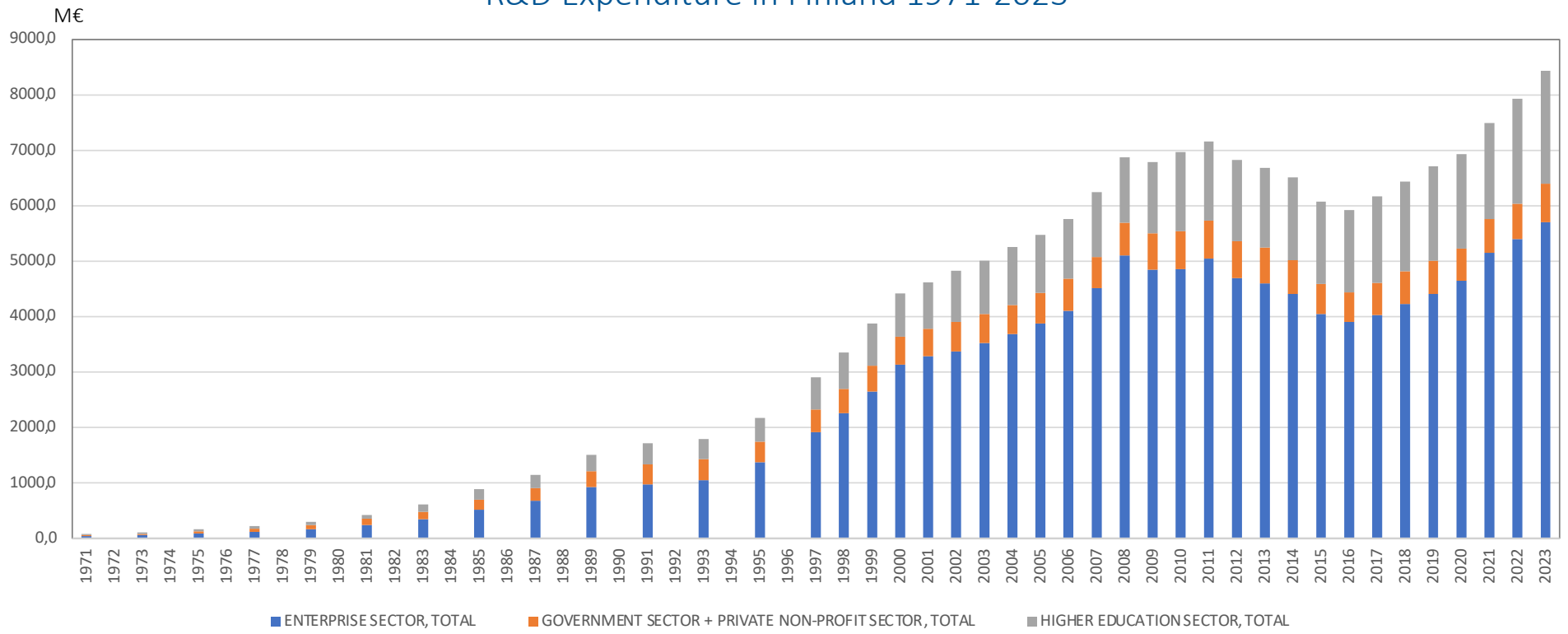
Prime minister Juha Sipilä expressed his doubts about the long-held innovation policy logics by asking:

"…how in the world this happened? Why weren't we better able to exploit global economic growth in spite of exceptional investments in expertise and R&D"

(free translation from Finnish by MS)

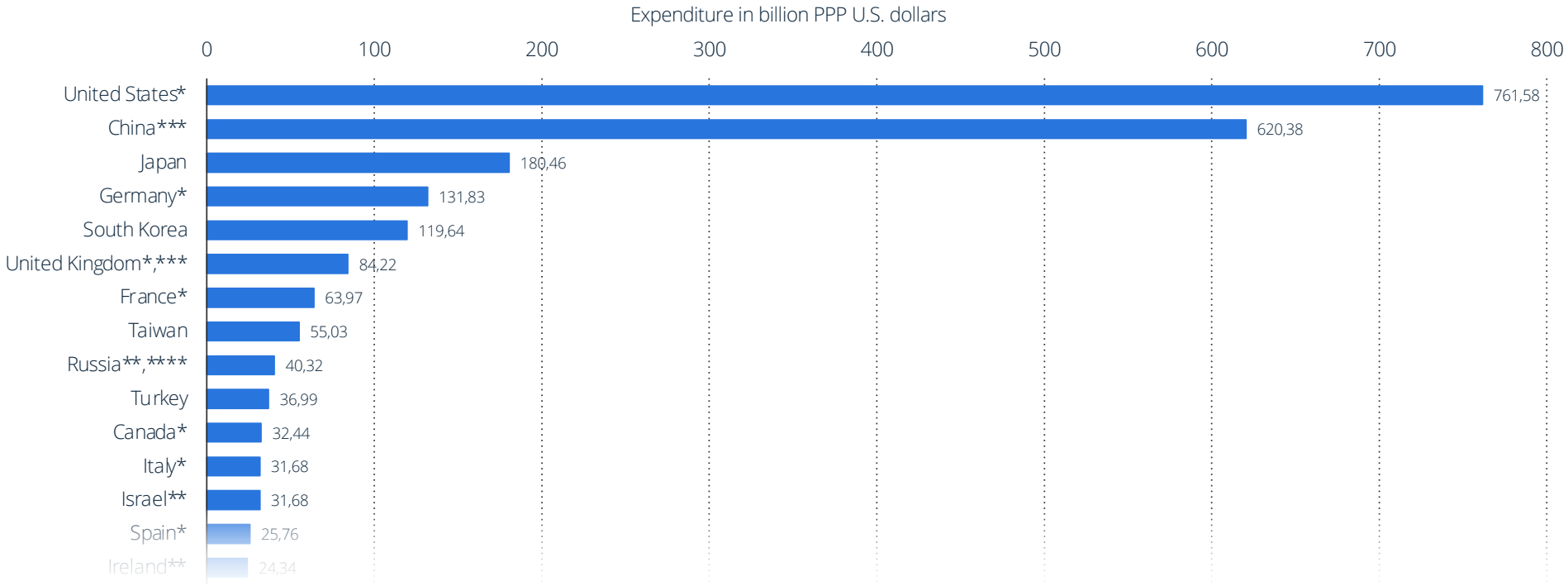
The Summer Conference of the Finnish Union of University Professors and the Finnish Union of University Researchers and Teachers (2016)

R&D Expenditure in Finland 1971-2023



Leading countries by gross research and development (R&D) expenditure worldwide in 2022 (in billion PPP U.S. dollars)

Leading countries by R&D spending worldwide 2022



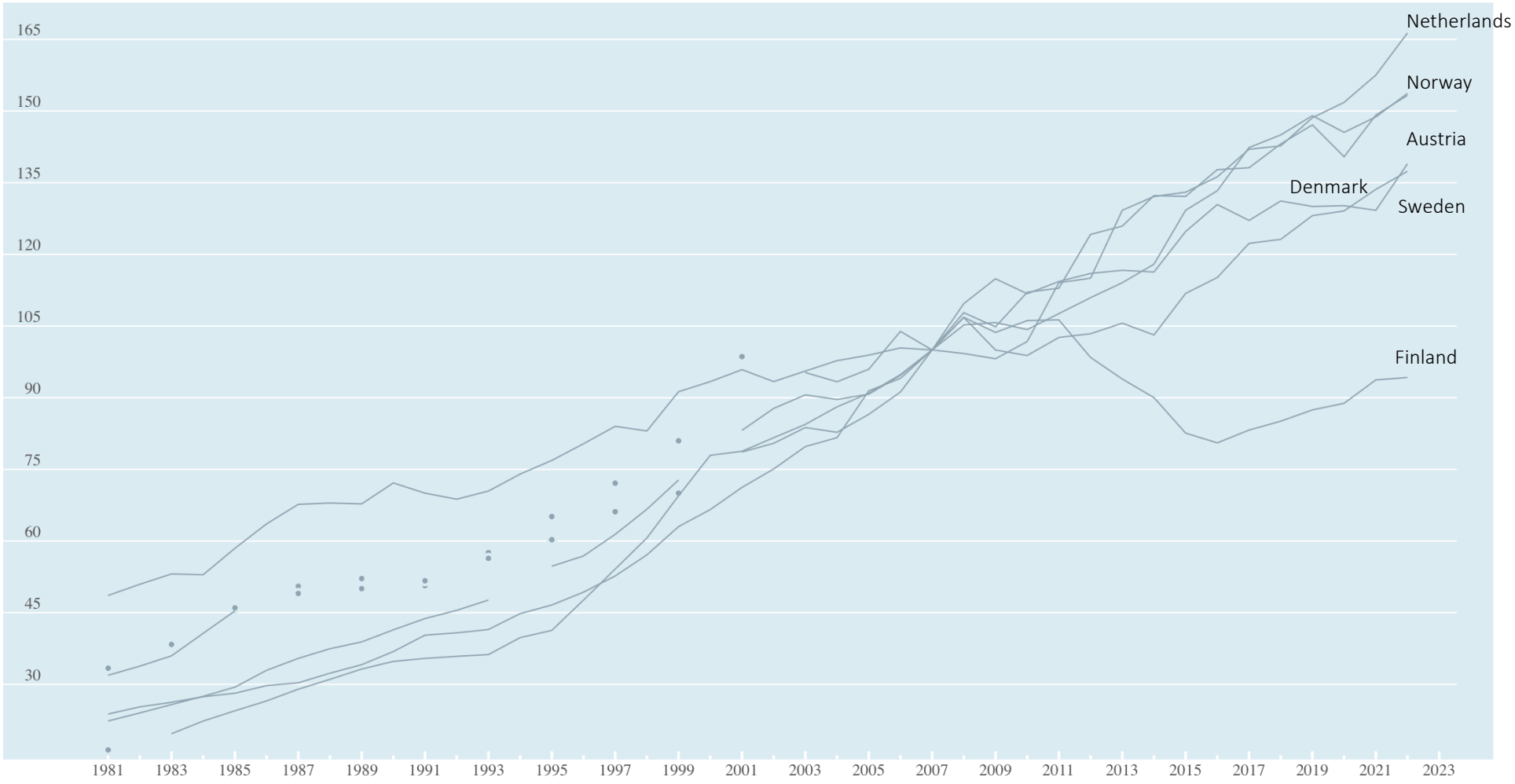
Note(s): Worldwide, OECD; 2020 to 2022; Derived from purchasing power parity calculations, constant prices
Further information regarding this statistic can be found on page 8.
Source(s): OECD; ID 732247

statista

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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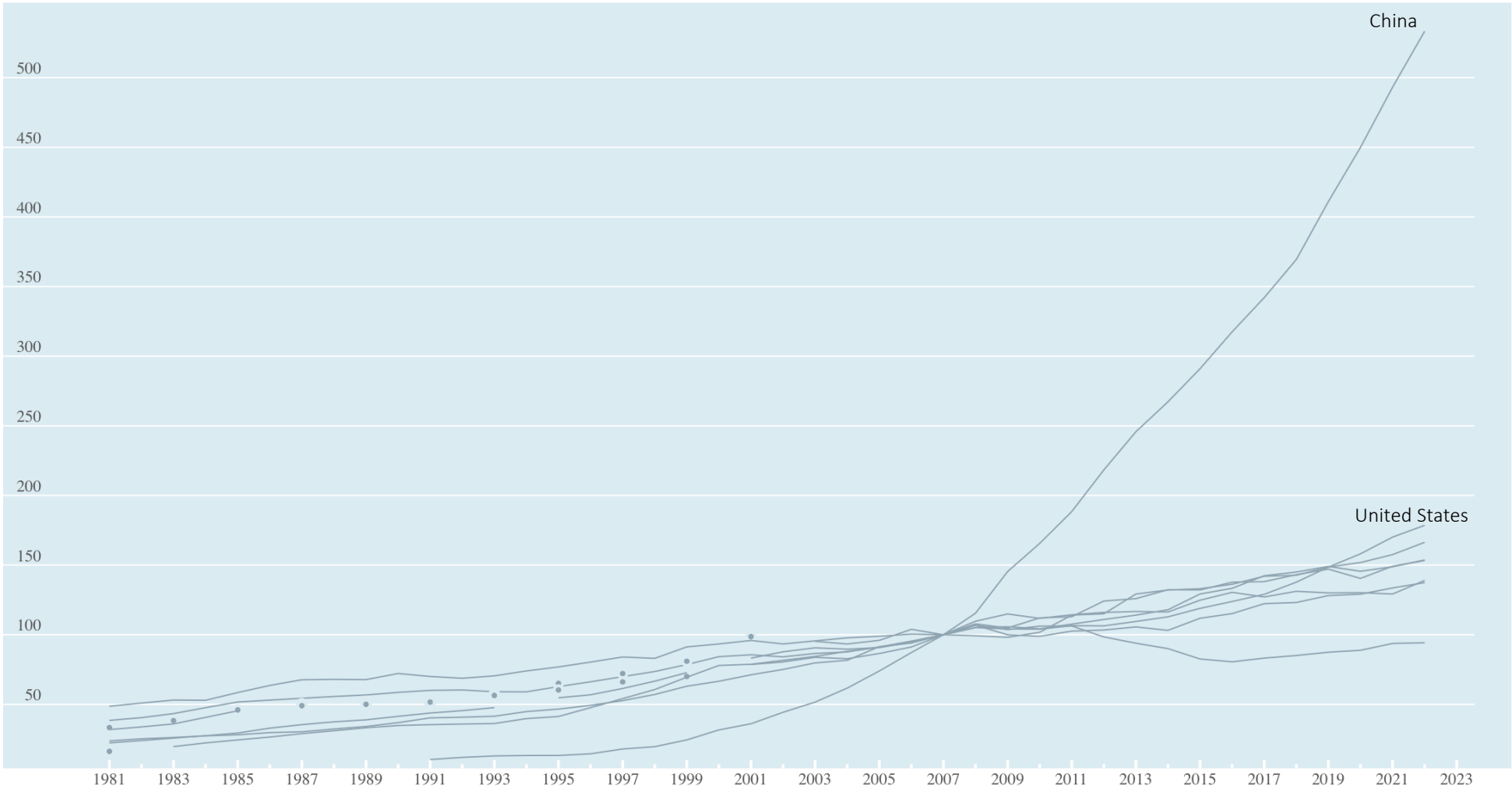
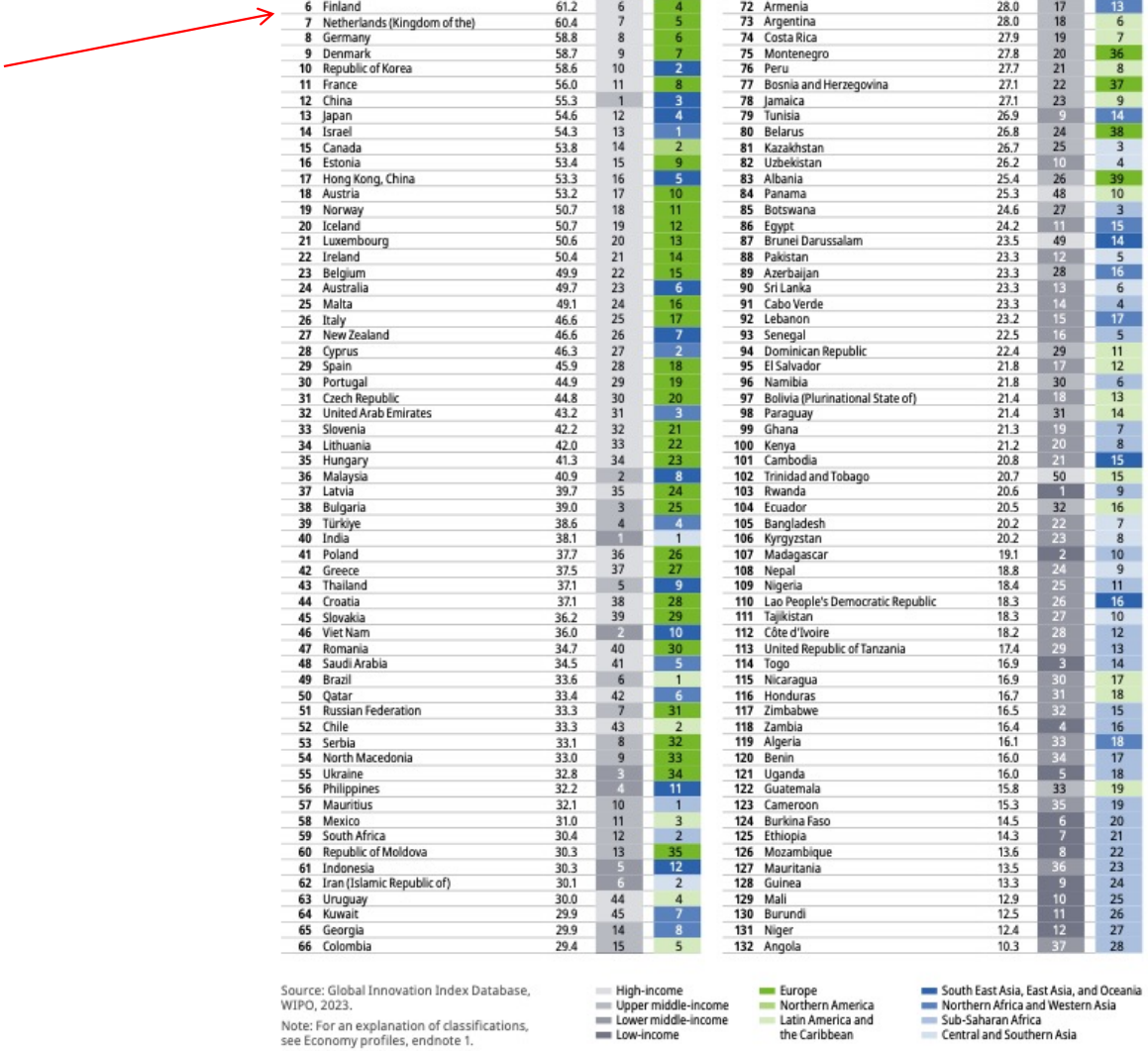




GII rank	Economy	Score	Income group rank	Region rank
1	Switzerland	67.6	1	1
2	Sweden	64.2	2	2
3	United States	63.5	3	1
4	United Kingdom	62.4	4	3
5	Singapore	61.5	5	1
6	Finland	61.2	6	4
7	Netherlands (Kingdom of the)	60.4	7	5
8	Germany	58.8	8	6
9	Denmark	58.7	9	7
10	Republic of Korea	58.6	10	2
11	France	56.0	11	8
12	China	55.3	1	3
13	Japan	54.6	12	4
14	Israel	54.3	13	1
15	Canada	53.8	14	2
16	Estonia	53.4	15	9
17	Hong Kong, China	53.3	16	5
18	Austria	53.2	17	10
19	Norway	50.7	18	11
20	Iceland	50.7	19	12
21	Luxembourg	50.6	20	13
22	Ireland	50.4	21	14
23	Belgium	49.9	22	15
24	Australia	49.7	23	6
25	Malta	49.1	24	16
26	Italy	46.6	25	17
27	New Zealand	46.6	26	7
28	Cyprus	46.3	27	2
29	Spain	45.9	28	18
30	Portugal	44.9	29	19
31	Czech Republic	44.8	30	20
32	United Arab Emirates	43.2	31	3
33	Slovenia	42.2	32	21
34	Lithuania	42.0	33	22
35	Hungary	41.3	34	23
36	Malaysia	40.9	2	8
37	Latvia	39.7	35	24
38	Bulgaria	39.0	3	25
39	Türkiye	38.6	4	4
40	India	38.1	1	1
41	Poland	37.7	36	26
42	Greece	37.5	37	27
43	Thailand	37.1	5	9
44	Croatia	37.1	38	28
45	Slovakia	36.2	39	29
46	Viet Nam	36.0	2	10
47	Romania	34.7	40	30
48	Saudi Arabia	34.5	41	5
49	Brazil	33.6	6	1
50	Qatar	33.4	42	6
51	Russian Federation	33.3	7	31
52	Chile	33.3	43	2
53	Serbia	33.1	8	32
54	North Macedonia	33.0	9	33
55	Ukraine	32.8	3	34
56	Philippines	32.2	4	11
57	Mauritius	32.1	10	1
58	Mexico	31.0	11	3
59	South Africa	30.4	12	2
60	Republic of Moldova	30.3	13	35
61	Indonesia	30.3	5	12
62	Iran (Islamic Republic of)	30.1	6	2
63	Uruguay	30.0	44	4
64	Kuwait	29.9	45	7
65	Georgia	29.9	14	8
66	Colombia	29.4	15	5
67	Bahrain	29.1	46	9
68	Mongolia	28.8	7	13
69	Oman	28.4	47	10
70	Morocco	28.4	8	11
71	Jordan	28.2	16	12
72	Armenia	28.0	17	13
73	Argentina	28.0	18	6
74	Costa Rica	27.9	19	7
75	Montenegro	27.8	20	36
76	Peru	27.7	21	8
77	Bosnia and Herzegovina	27.1	22	37
78	Jamaica	27.1	23	9
79	Tunisia	26.9	9	14
80	Belarus	26.8	24	38
81	Kazakhstan	26.7	25	3
82	Uzbekistan	26.2	10	4
83	Albania	25.4	26	39
84	Panama	25.3	48	10
85	Botswana	24.6	27	3
86	Egypt	24.2	11	15
87	Brunei Darussalam	23.5	49	14
88	Pakistan	23.3	12	5
89	Azerbaijan	23.3	28	16
90	Sri Lanka	23.3	13	6
91	Cabo Verde	23.3	14	4
92	Lebanon	23.2	15	17
93	Senegal	22.5	16	5
94	Dominican Republic	22.4	29	11
95	El Salvador	21.8	17	12
96	Namibia	21.8	30	6
97	Bolivia (Plurinational State of)	21.4	18	13
98	Paraguay	21.4	31	14
99	Ghana	21.3	19	7
100	Kenya	21.2	20	8
101	Cambodia	20.8	21	15
102	Trinidad and Tobago	20.7	50	15
103	Rwanda	20.6	1	9
104	Ecuador	20.5	32	16
105	Bangladesh	20.2	22	7
106	Kyrgyzstan	20.2	23	8
107	Madagascar	19.1	2	10
108	Nepal	18.8	24	9
109	Nigeria	18.4	25	11
110	Lao People's Democratic Republic	18.3	26	16
111	Tajikistan	18.3	27	10
112	Côte d'Ivoire	18.2	28	12
113	United Republic of Tanzania	17.4	29	13
114	Togo	16.9	3	14
115	Nicaragua	16.9	30	17
116	Honduras	16.7	31	18
117	Zimbabwe	16.5	32	15
118	Zambia	16.4	4	16
119	Algeria	16.1	33	18
120	Benin	16.0	34	17
121	Uganda	16.0	5	18
122	Guatemala	15.8	33	19
123	Cameroon	15.3	35	19
124	Burkina Faso	14.5	6	20
125	Ethiopia	14.3	7	21
126	Mozambique	13.6	8	22
127	Mauritania	13.5	36	23
128	Guinea	13.3	9	24
129	Mali	12.9	10	25
130	Burundi	12.5	11	26
131	Niger	12.4	12	27
132	Angola	10.3	37	28

Source: Global Innovation Index Database, WIPO, 2023.

Note: For an explanation of classifications, see Economy profiles, endnote 1.

High-income
Upper middle-income
Lower middle-income
Low-income

Europe
Northern America
Latin America and the Caribbean

South East Asia, East Asia, and Oceania
Northern Africa and Western Asia
Sub-Saharan Africa
Central and Southern Asia

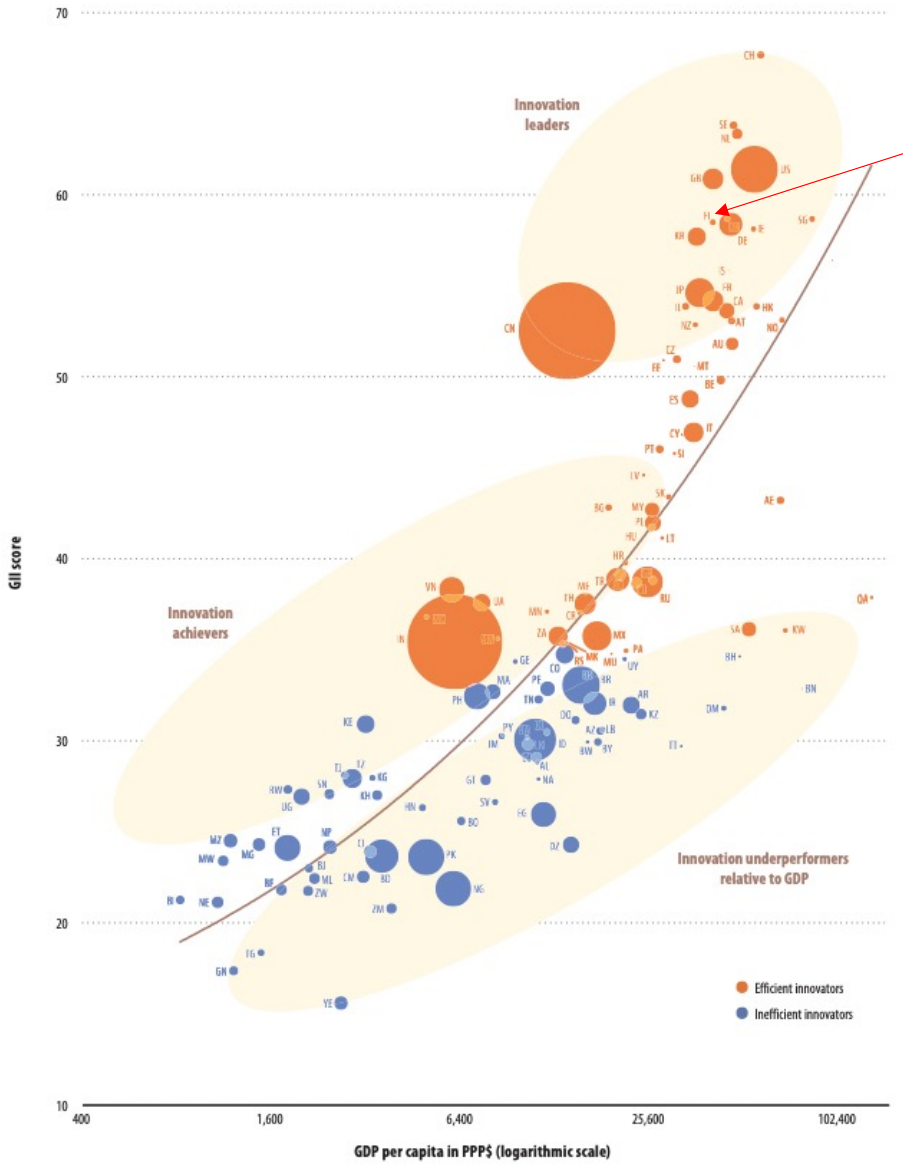
Global Innovation Index 2023 rankings

(https://www.wipo.int/edocs/pubdocs/en/wipo-pub-2000-2023-section1-en-gii-2023-at-a-glance-global-innovation-index-2023.pdf

- Institutions
- Regulatory environment
- Business environment
- Human capital and research
- Infrastructure
- Market sophistication
- Business sophistication
- Knowledge and technology outputs
- Creative outputs

Ingredients of economic development

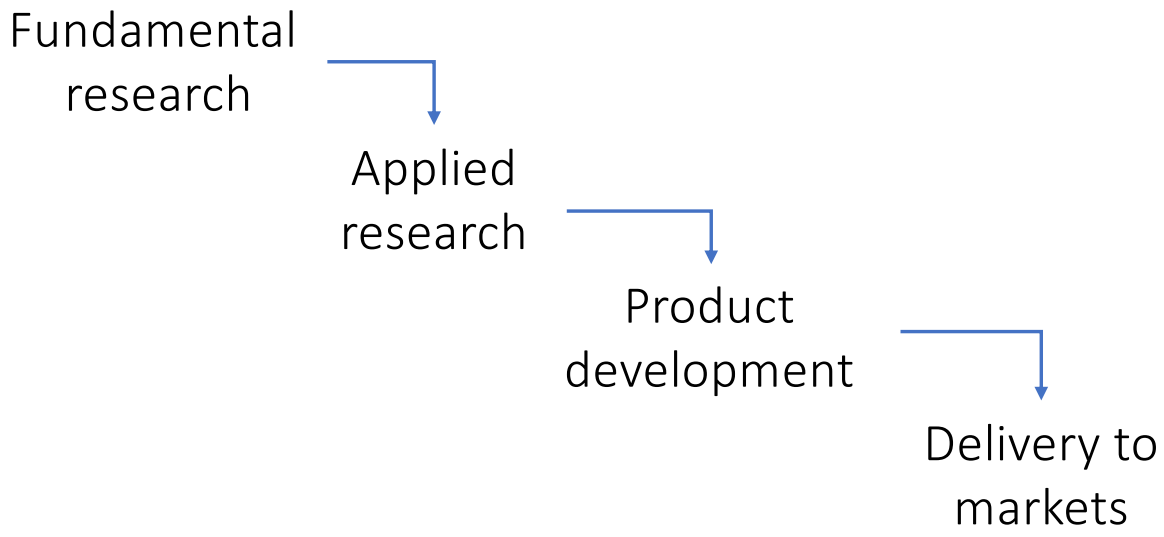
- Human capital
- Innovation – research and development
- Distance from markets
- Infrastructure
- Spatial effects



https://www.globalinnovationindex.org/UploadedFiles/Indepths/Files/Indepths_48eb307c08434750a0b4ecaf49fb3697.PDF


Global Innovation Index 2023
Top 10
Science and Technology Clusters

Innovation is usually **not** linear process like this



Innovation is a complex non-linear process

The promise

- The systems of innovation literature are careful in its promises
  - Most associate innovation systems with economic growth
  - Some explicitly argue that a successful innovation system generates economic growth (Carlsson 2006; Ernst 2002)
  - Today focus more and more on climate change related issues
- For policy making, a generic model to see beyond…
  - individual organisations, and
  - the siloes of public policy making
  - Comprehensive policy -> innovation -> economic growth and employment
- The promise is being renewed

The changing rationales – three framings of innovation policy

(Schot and Steinmueller 2018)

- Innovation policy 1.0 draws on a linear model of innovation, privileging the technological discovery process – focus is on scientific breakthroughs, technological development and the commercialization of new technologies
- Innovation policy 2.0 turned the gaze to innovation systems
- Innovation policy 3.0 focuses on solving grand challenges by utilizing innovation policy approaches and instruments - strategies are openly built upon social values and focus on solving selected social, ecological and economic challenges.

Innovation sources

STI (Science, Technology, Innovation)

- high-tech / science push / supply driven

DUI (Doing, Using, Interacting)

- competence building / organisational innovations / social innovations / market - demand - user driven

(Lorenz & Lundvall 2006)

An extreme example of STI
How to grow an upper jaw inside a muscle

In 2008, for the first time in the world, a patient's upper jaw was replaced with a bone transplant cultivated from stem cells isolated from the patient's own fatty tissue

- **Social innovation** refers to the design and implementation of new solutions that imply conceptual, process, product, or organisational change, which ultimately aim to improve the welfare and wellbeing of individuals and communities.
- Many initiatives undertaken by the civil society have proven to be innovative in dealing with socio-economic and environmental problems, while contributing to economic development.

An every-day example of DUI

Finnish Maternity Package

Why Finnish babies sleep in cardboard boxes

COMMENTS (491)

By Helena Lee
BBC News

For 75 years, Finland's expectant mothers have been given by the state. It's like a starter kit of clothes, sheets and toys can even be used as a bed. And some say it helped Finland achieve one of the world's lowest infant mortality rates.


A • 90m • 8

Innovation,
an analytical tool,
became a political symbol

But…
new products and services
that benefit societies are
needed also in the future