



Innovation policy and innovation (eco)systems

From a big picture to some grassroots activities



Very basics

Innovation seeks to reorder society

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

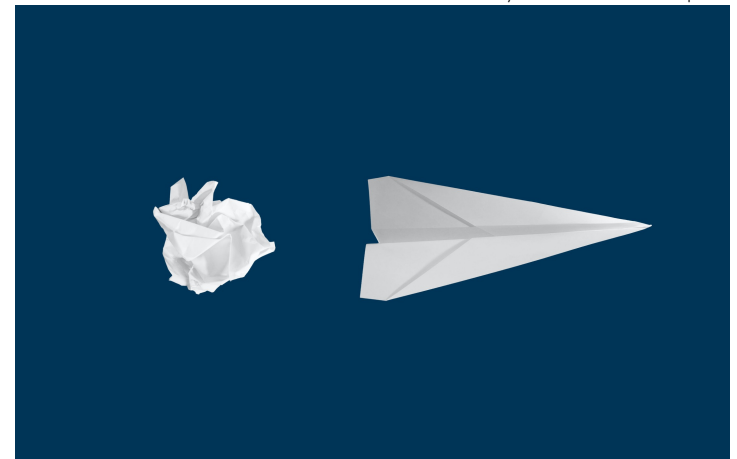


Photo by Matt Ridley on Unsplash

Positive impacts of the innovation system approach

(Björn Asheim)

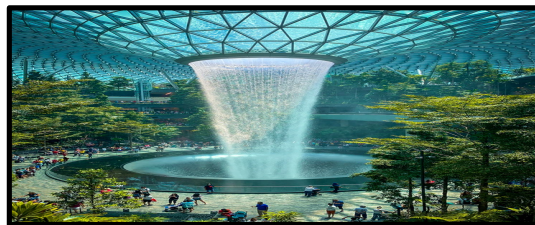
New view in the 1990's on what constitutes international competitiveness

- From relative wages (low road or weak competition) to non-price competitiveness national policies of promoting innovation and learning (high road or strong competition)

The 'system' dimension moved attention from linear to interactive thinking of innovation

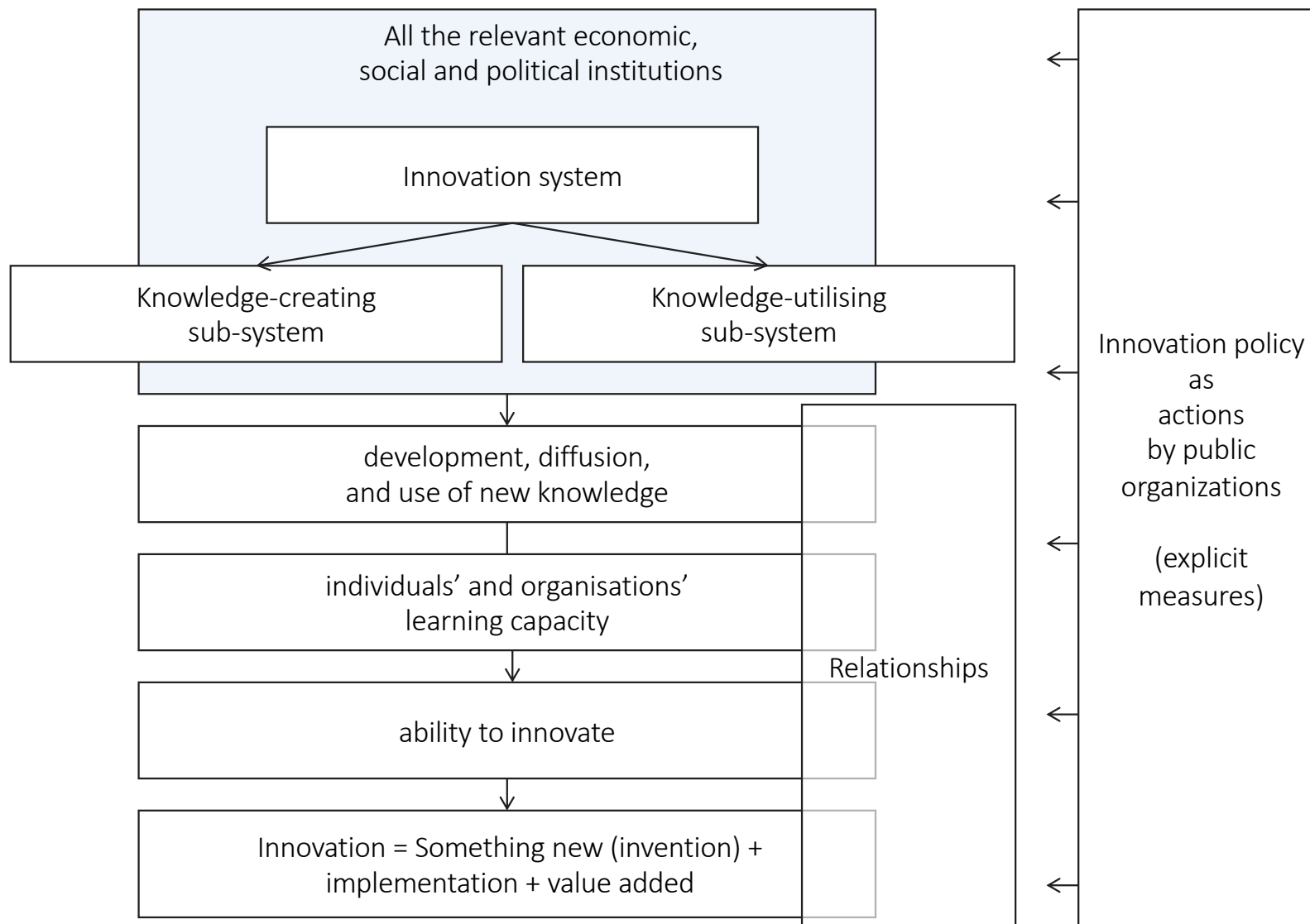
- from science and technology policies to innovation policy

From fountain to forum

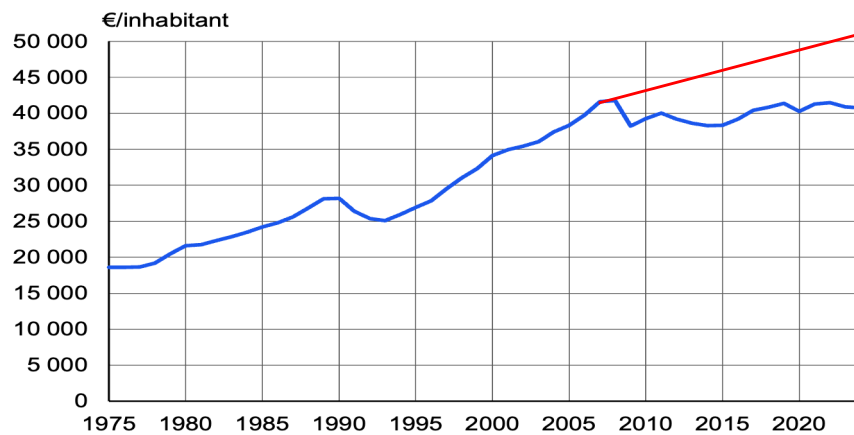
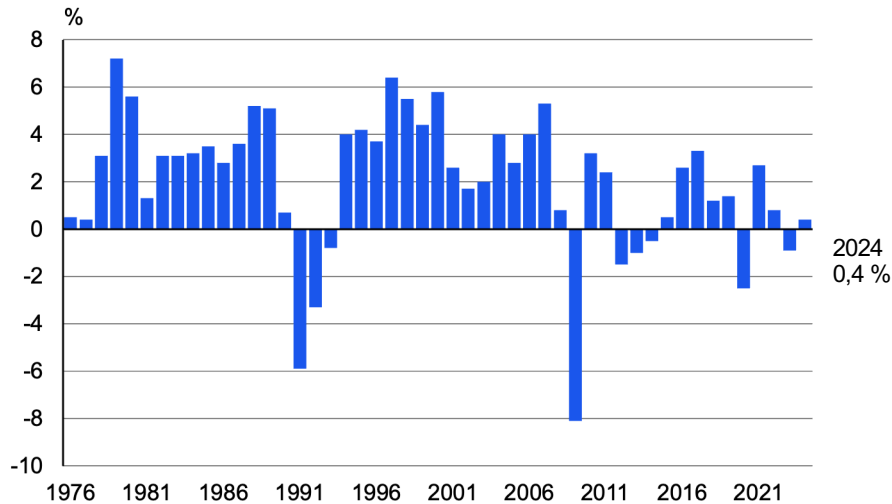


The promise

- 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 (and security)
- 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



Annual change in the volume of gross domestic product, 1976–2024*



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

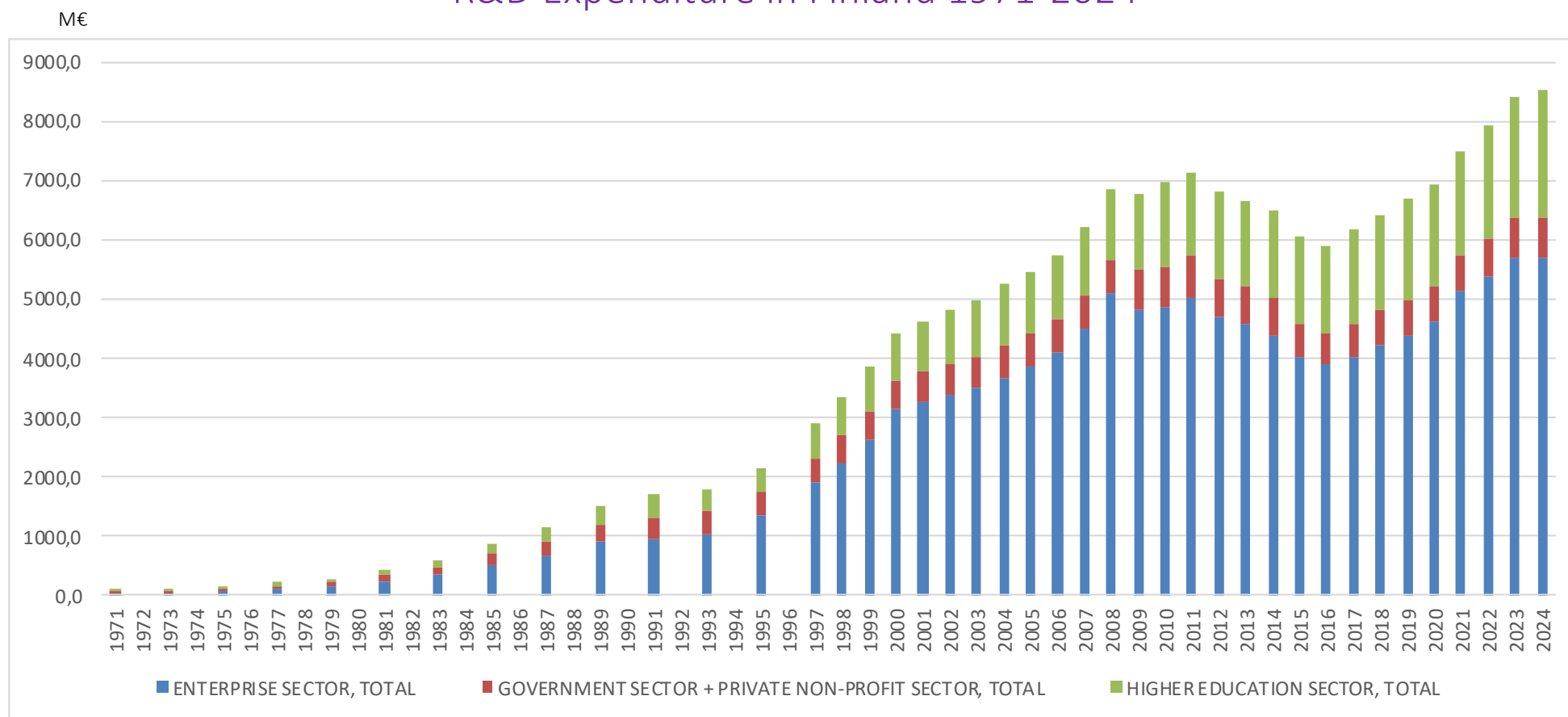
Prime minister Juha Sipilä expressed his doubts about the long-held innovation policy logics by asking:

“...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”

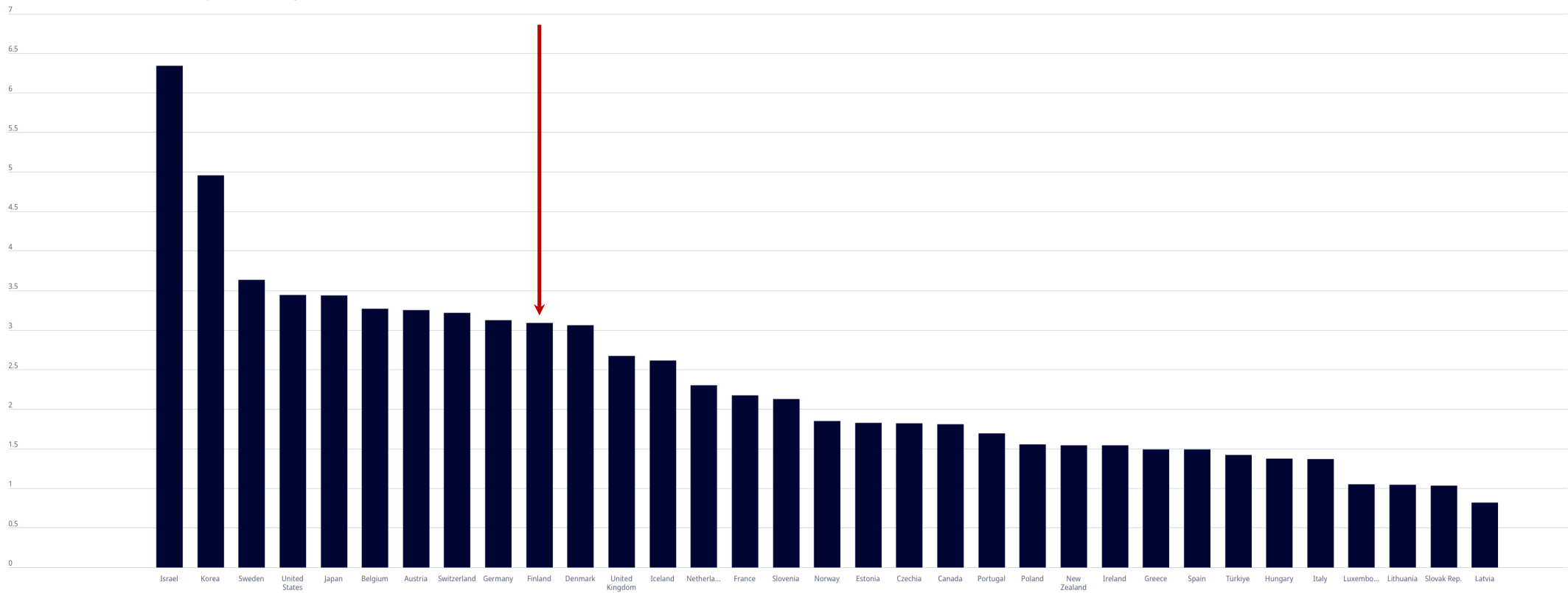
(free translation from Finnish by MS)

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 1971-2024



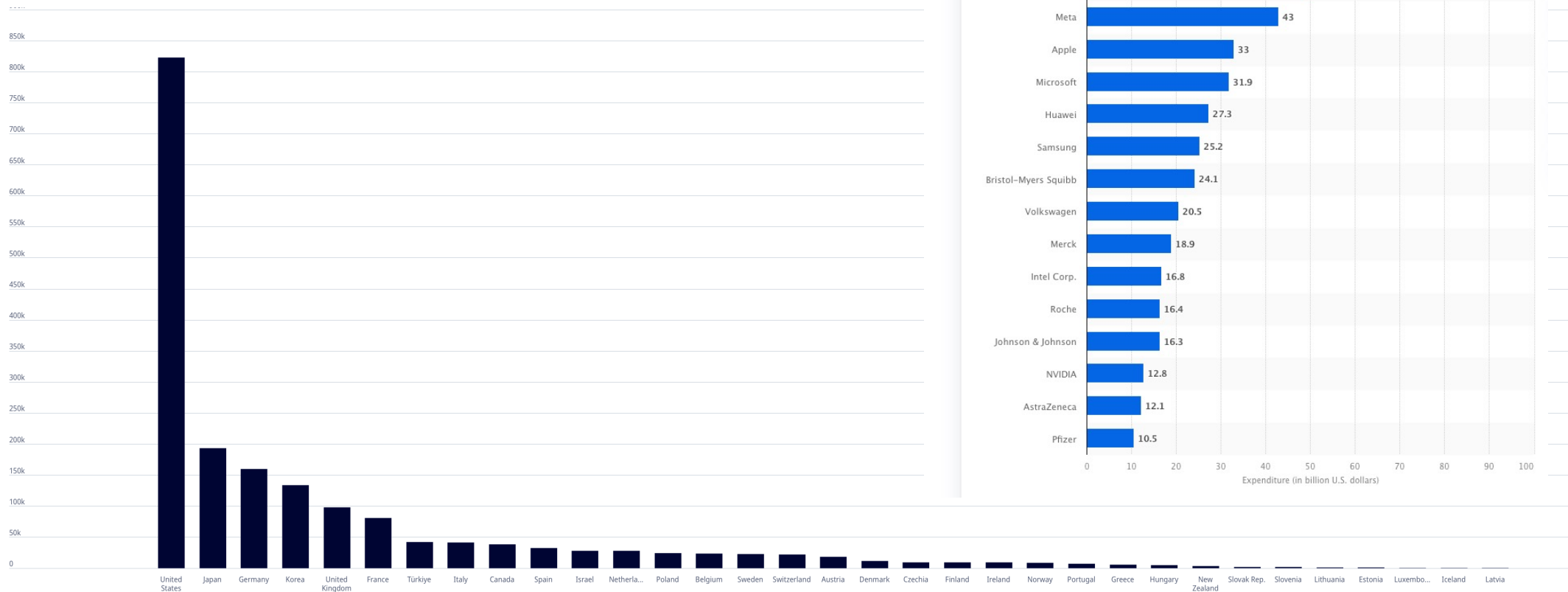
Gross domestic spending on R&D % of GDP, 2023



Source: [Main Science and Technology Indicators \(MSTI database\)](#)
© OECD

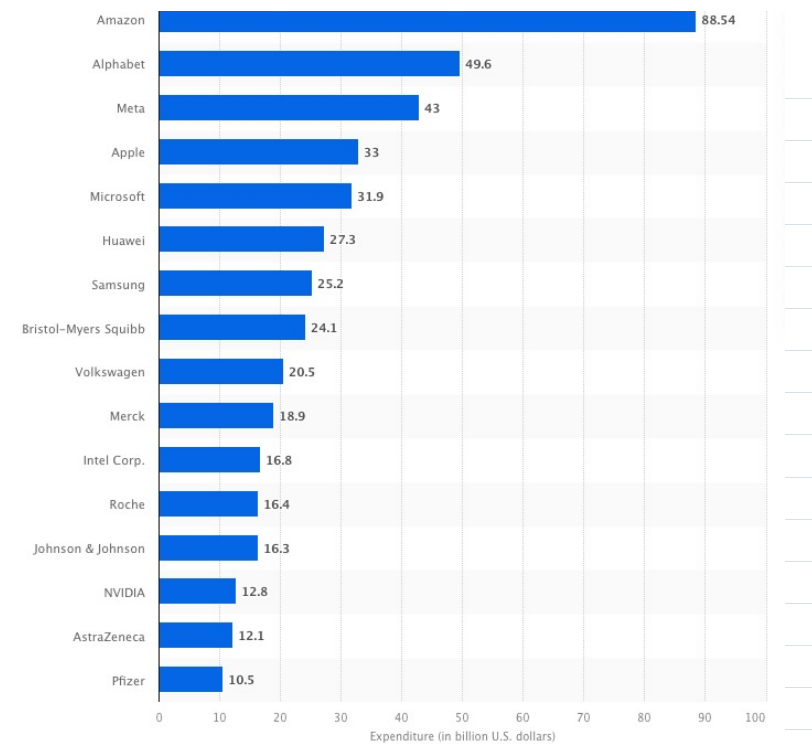
<https://www.oecd.org/en/data/indicators/gross-domestic-spending-on-r-d.html>

Gross domestic spending on R&D, million US Dollars (2023)



Source: [Main Science and Technology Indicators \(MSTI database\)](#)
© OECD

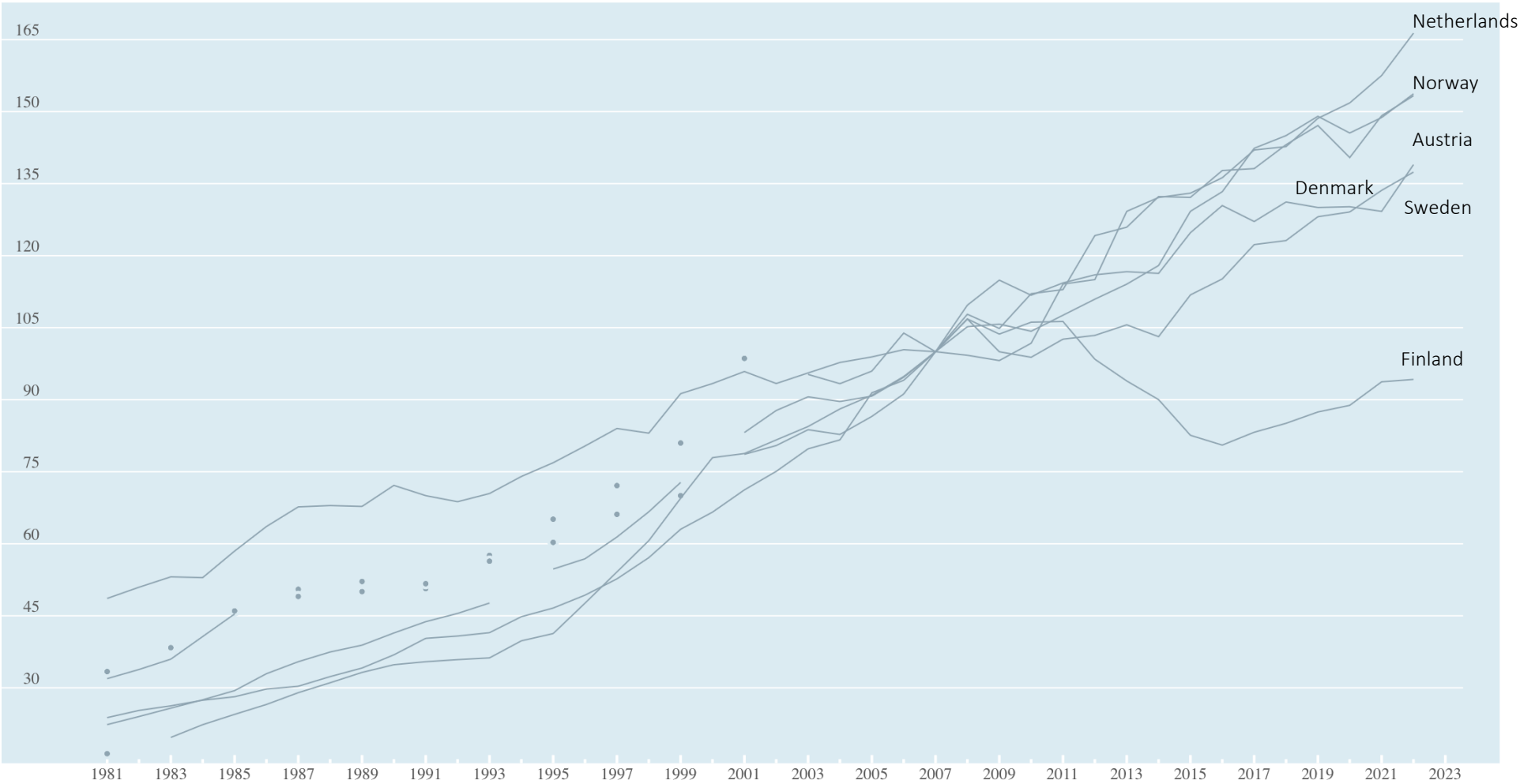
Ranking of the companies with the highest spending on research and development worldwide in 2024 (in billion U.S. dollars) (Statista)



Main Science and Technology Indicators (MSTI database) ⓘ

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

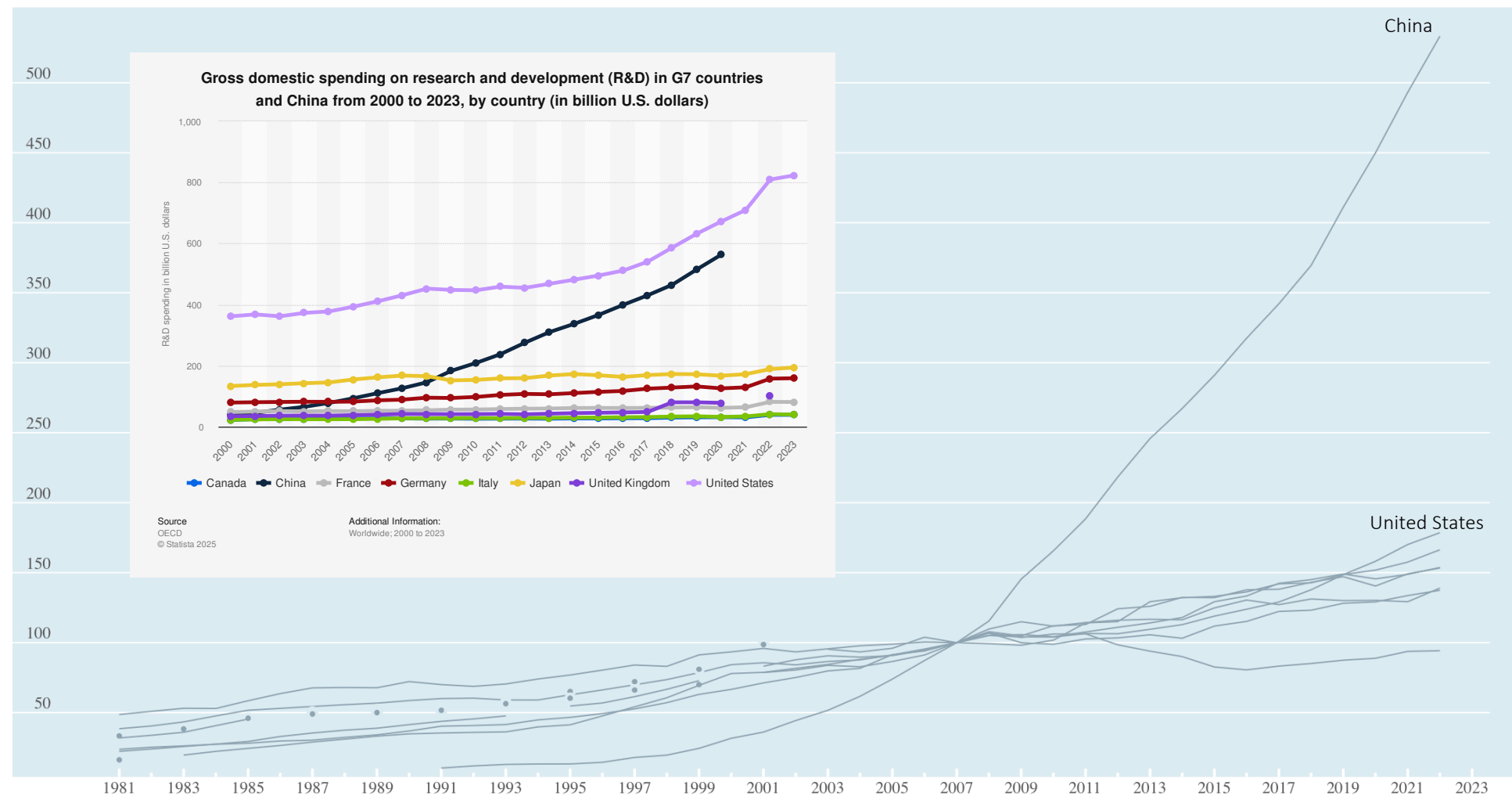
Combined unit of measure: US dollars, PPP converted, Constant prices, Index, 2007



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





GII rank	Economy	Score	Income group	Region	GII rank	Economy	Score	Income group	Region
1	Switzerland	66.0	1	1	71	Colombia	28.5	18	5
2	Sweden	62.6	2	2	72	Costa Rica	28.4	19	6
3	United States	61.7	3	1	73	Kuwait	28.2	49	13
4	Republic of Korea	60.0	4	1	74	Republic of Moldova	27.4	20	37
5	Singapore	59.9	5	2	75	Seychelles	27.2	50	3
6	United Kingdom	59.1	6	3	76	Tunisia	27.0	6	14
7	Finland	57.7	7	4	77	Argentina	26.8	21	7
8	Netherlands (Kingdom of the)	57.0	8	5	78	Mongolia	26.7	22	13
9	Denmark	56.9	9	6	79	Uzbekistan	26.5	7	3
10	China	56.6	1	3	80	Peru	26.5	23	8
11	Germany	55.5	10	7	81	Kazakhstan	26.3	24	4
12	Japan	53.6	11	4	82	Panama	25.9	51	9
13	France	53.4	12	8	83	Jamaica	25.2	25	10
14	Israel	52.3	13	1	84	Barbados	25.1	52	11
15	Hong Kong, China	51.5	14	5	85	Belarus	25.1	26	38
16	Estonia	51.1	15	9	86	Egypt	24.7	8	15
17	Canada	51.1	16	2	87	Botswana	24.6	27	4
18	Ireland	50.4	17	10	88	Brunei Darussalam	24.5	53	14
19	Austria	50.1	18	11	89	Senegal	23.8	9	5
20	Norway	49.2	19	12	90	Lebanon	23.6	10	16
21	Belgium	48.5	20	13	91	Namibia	23.5	28	6
22	Australia	48.0	21	6	92	Bosnia and Herzegovina	23.4	29	39
23	Luxembourg	47.3	22	14	93	Sri Lanka	22.9	11	5
24	Iceland	47.0	23	15	94	Azerbaijan	22.9	30	17
25	Cyprus	45.5	24	2	95	Cabo Verde	22.6	12	7
26	New Zealand	45.5	25	7	96	Kyrgyzstan	22.6	13	6
27	Malta	45.4	26	16	97	Dominican Republic	22.6	31	12
28	Italy	44.9	27	17	98	El Salvador	22.2	32	13
29	Spain	44.6	28	18	99	Pakistan	22.1	14	7
30	United Arab Emirates	44.2	29	3	100	Cambodia	22.0	15	15
31	Portugal	43.9	30	19	101	Ghana	21.9	16	8
32	Czech Republic	42.0	31	20	102	Kenya	21.4	17	9
33	Lithuania	40.8	32	21	103	Paraguay	21.4	33	18
34	Malaysia	40.6	2	8	104	Rwanda	21.1	1	10
35	Slovenia	40.1	33	22	105	Nigeria	21.1	18	11
36	Hungary	40.0	34	23	106	Bangladesh	21.0	19	8
37	Bulgaria	39.1	35	24	107	Nepal	20.2	20	9
38	India	38.2	1	1	108	Tajikistan	20.2	21	10
39	Poland	37.7	36	25	109	Lao People's Democratic Republic	20.1	22	16
40	Croatia	37.7	37	26	110	Côte d'Ivoire	19.7	23	12
41	Latvia	37.5	38	27	111	Bolivia (Plurinational State of)	19.6	24	15
42	Greece	37.4	39	28	112	Zambia	19.6	25	13
43	Türkiye	37.2	3	4	113	Ecuador	19.5	34	16
44	Viet Nam	37.1	2	9	114	Trinidad and Tobago	19.3	54	17
45	Thailand	36.7	4	10	115	Algeria	18.9	35	18
46	Saudi Arabia	36.0	40	5	116	Cameroon	18.2	26	14
47	Slovakia	35.5	41	29	117	Togo	18.1	2	15
48	Qatar	34.6	42	6	118	Benin	17.8	27	16
49	Romania	34.3	43	30	119	Honduras	17.7	28	18
50	Philippines	33.6	3	11	120	Madagascar	17.6	3	17
51	Chile	33.1	44	1	121	United Republic of Tanzania	17.5	29	18
52	Brazil	32.9	5	2	122	Myanmar	17.3	30	17
53	Mauritius	32.5	6	1	123	Guatemala	17.1	36	19
54	Serbia	31.7	7	31	124	Uganda	17.1	4	19
55	Indonesia	31.3	8	12	125	Malawi	16.0	5	20
56	Georgia	31.2	9	7	126	Burkina Faso	15.9	6	21
57	Morocco	31.1	4	8	127	Burundi	15.8	7	22
58	Mexico	30.5	10	3	128	Mozambique	15.4	8	23
59	Armenia	30.5	11	9	129	Zimbabwe	15.4	31	24
60	Russian Federation	30.3	45	32	130	Nicaragua	15.4	32	25
61	South Africa	30.1	12	2	131	Mauritania	15.4	33	25
62	Bahrain	30.0	46	10	132	Lesotho	14.9	34	26
63	North Macedonia	29.8	13	33	133	Guinea	14.9	35	27
64	Montenegro	29.8	14	34	134	Ethiopia	14.4	9	28
65	Jordan	29.7	5	11	135	Mali	14.0	10	29
66	Ukraine	29.7	15	35	136	Venezuela (Bolivarian Republic of)	13.7		21
67	Albania	29.6	16	36	137	Congo	13.6	36	30
68	Uruguay	28.8	47	4	138	Angola	13.0	37	31
69	Oman	28.7	48	12	139	Niger	11.9	11	32
70	Iran (Islamic Republic of)	28.5	17	2					

Low-income

Lower middle-income

Upper middle-income

High-income

Sub-Saharan Africa

Central and Southern Asia

South East Asia, East Asia, and Oceania

Northern Africa and Western Asia

Latin America and the Caribbean

Northern America

Europe

Note: The World Bank classified Venezuela (Bolivarian Republic of) as an upper-middle income economy until 2021 and has been unclassified since then due to the unavailability of data.
Source: Global Innovation Index Database, WIPO, 2025.

Global Innovation Index 2025 rankings

<https://www.wipo.int/web-publications/global-innovation-index-2025/assets/80937/global-innovation-index-2025-en.pdf>

- Institutions (FIN 5th)
- Human capital and research (FIN 5th)
- Infrastructure (FIN 3rd)
- Market sophistication (FIN 11th)
- Business sophistication (FIN 12th)
- Knowledge and technology outputs (FIN 8th)
- Creative outputs (FIN 16 th)

Finland

7

www.sotaraute.info

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP\$ (bn)	GDP per capita, PPP\$
10	5	High	EUR	5.6	361.3	64,657

	Score/Value	Rank		Score/Value	Rank
 Institutions	83.6	5	 Business sophistication	55.3	12
1.1 Institutional environment	84.6	11	5.1 Knowledge workers	59.6	12
1.1.1 Operational stability for businesses*	83.3	14	5.1.1 Knowledge-intensive employment, %	47.8	17
1.1.2 Government effectiveness*	85.8	6	5.1.2 Females employed w/advanced degrees, %	27.0	16
1.2 Regulatory environment	93.7	3	5.1.3 Youth demographic dividend, %	25.7	114
1.2.1 Regulatory quality*	87.5	7	5.1.4 GERD performed by business, % GDP	2.1	10
1.2.2 Rule of law*	100.0	1	5.1.5 GERD financed by business, %	58.1	16
1.3 Business environment	72.4	14	5.2 Innovation linkages	60.2	16
1.3.1 Policy stability for doing business ¹	78.5	9	5.2.1 Public research–industry co-publications, %	4.9	15
1.3.2 Entrepreneurship policies and culture ¹	66.4	17	5.2.2 University–industry R&D collaboration ¹	64.8	14
			5.2.3 University industry and international engagement, top 5*	66.5	28
			5.2.4 State of cluster development ¹	69.7	35
			5.2.5 Patent families/bn PPP\$ GDP	6.7	5
Human capital and research	60.9	5	5.3 Knowledge absorption	46.1	11
2.1 Education	70.0	8	5.3.1 Intellectual property payments, % total trade	0.9	45
2.1.1 Expenditure on education, % GDP	6.5	11	5.3.2 High-tech imports, % total trade	7.9	72
2.1.2 Government funding/pupil, secondary, % GDP/cap	24.8	21	5.3.3 ICT services imports, % total trade	5.3	4
2.1.3 School life expectancy, years	19.6	4	5.3.4 FDI net inflows, % GDP	4.2	37
2.1.4 PISA scales in reading, maths and science	495.1	11	5.3.5 Research talent, % in businesses	59.8	15
2.1.5 Pupil–teacher ratio, secondary	12.6	60			
2.2 Tertiary education	50.0	11	Knowledge and technology outputs	52.7	8
2.2.1 Tertiary enrolment, % gross	108.1	3	6.1 Knowledge creation	55.2	9
2.2.2 Graduates in science and engineering, %	29.4	25	6.1.1 Patents by origin/bn PPP\$ GDP	11.3	6
2.2.3 Tertiary inbound mobility, %	9.3	32	6.1.2 PCT patents by inventor origin/bn PPP\$ GDP	3.9	5
2.3 Research and development (R&D)	62.6	11	6.1.3 Utility models by origin/bn PPP\$ GDP	0.7	25
2.3.1 Researchers, FTE/mn pop.	8,354.3	5	6.1.4 Scientific and technical articles/bn PPP\$ GDP	38.4	6
2.3.2 Gross expenditure on R&D, % GDP	3.1	10	6.1.5 Citable documents H-index	42.3	20
2.3.3 Global corporate R&D investors, top 3, mn USD	71.0	13	6.2 Knowledge impact	51.2	9
2.3.4 QS university ranking, top 3*	50.5	24	6.2.1 Labor productivity growth, %	–0.8	117
			6.2.2 Unicorn valuation, % GDP	4.7	8
Infrastructure	67.6	3	6.2.3 Software spending, % GDP	0.6	14
3.1 Information and communication technology (ICT)	95.4	7	6.2.4 High-tech manufacturing, %	34.1	33
3.1.1 ICT access*	100.0	5	6.3 Knowledge diffusion	51.6	10
3.1.2 ICT use*	97.2	4	6.3.1 Intellectual property receipts, % total trade	2.7	9
3.1.3 Government online service*	89.1	19	6.3.2 Production and export complexity	78.8	18
3.2 General infrastructure	64.3	8	6.3.3 High-tech exports, % total trade	4.9	43
3.2.1 Electricity output, GWh/mn pop.	14,513.4	9	6.3.4 ICT services exports, % total trade	9.0	7
3.2.2 Logistics performance*	95.5	2	6.3.5 ISO 9001 quality/bn PPP\$ GDP	8.4	30
3.2.3 Gross capital formation, % GDP	24.0	64			
3.3 Ecological sustainability	43.0	11	Creative outputs	47.8	16
3.3.1 GDP/unit of energy use	7.8	96	7.1 Intangible assets	45.7	22
3.3.2 Low-carbon energy use, %	60.5	9	7.1.1 Intangible asset intensity, top 15, %	67.0	18
3.3.3 ISO 14001 environment/bn PPP\$ GDP	4.9	18	7.1.2 Trademarks by origin/bn PPP\$ GDP	26.7	76
			7.1.3 Global brand value, top 5,000, % GDP	10.3	14
Market sophistication	58.6	11	7.1.4 Industrial designs by origin/bn PPP\$ GDP	2.2	35
4.1 Credit	57.9	15	7.2 Creative goods and services	27.4	42
4.1.1 Finance for startups and scaleups ¹	100.0	1	7.2.1 Cultural and creative services exports, % total trade	0.6	50
4.1.2 Domestic credit to private sector, % GDP	93.1	24	7.2.2 National feature films/mn pop. 15–69	9.0	13
4.1.3 Loans from microfinance institutions, % GDP	3.6	10	7.2.3 Entertainment and media market/th pop. 15–69	48.4	14
4.2 Investment	37.4	13	7.2.4 Creative goods exports, % total trade	0.5	63
4.2.1 Market capitalization, % GDP	n/a	n/a	7.3 Online creativity	72.4	7
4.2.2 Venture capital (VC) received, deal count/bn PPP\$ GDP	0.8	7	7.3.1 Top-level domains (TLDs)/th pop. 15–69	39.7	22
4.2.3 Late-stage VC deal count, % global VC	0.2	22	7.3.2 GitHub commits/mn pop. 15–69	98.8	3
4.2.4 VC investors, deal count/bn PPP\$ GDP	0.9	14	7.3.3 Mobile app creation/bn PPP\$ GDP	78.8	9
4.2.5 VC investor co-participation/bn PPP\$ GDP	0.5	10			
4.3 Trade, diversification and market scale	80.6	26			
4.3.1 Applied tariff rate, weighted avg., %	1.3	24			
4.3.2 Domestic industry diversification	96.4	9			
4.3.3 Domestic market scale, bn PPP\$	361.3	59			

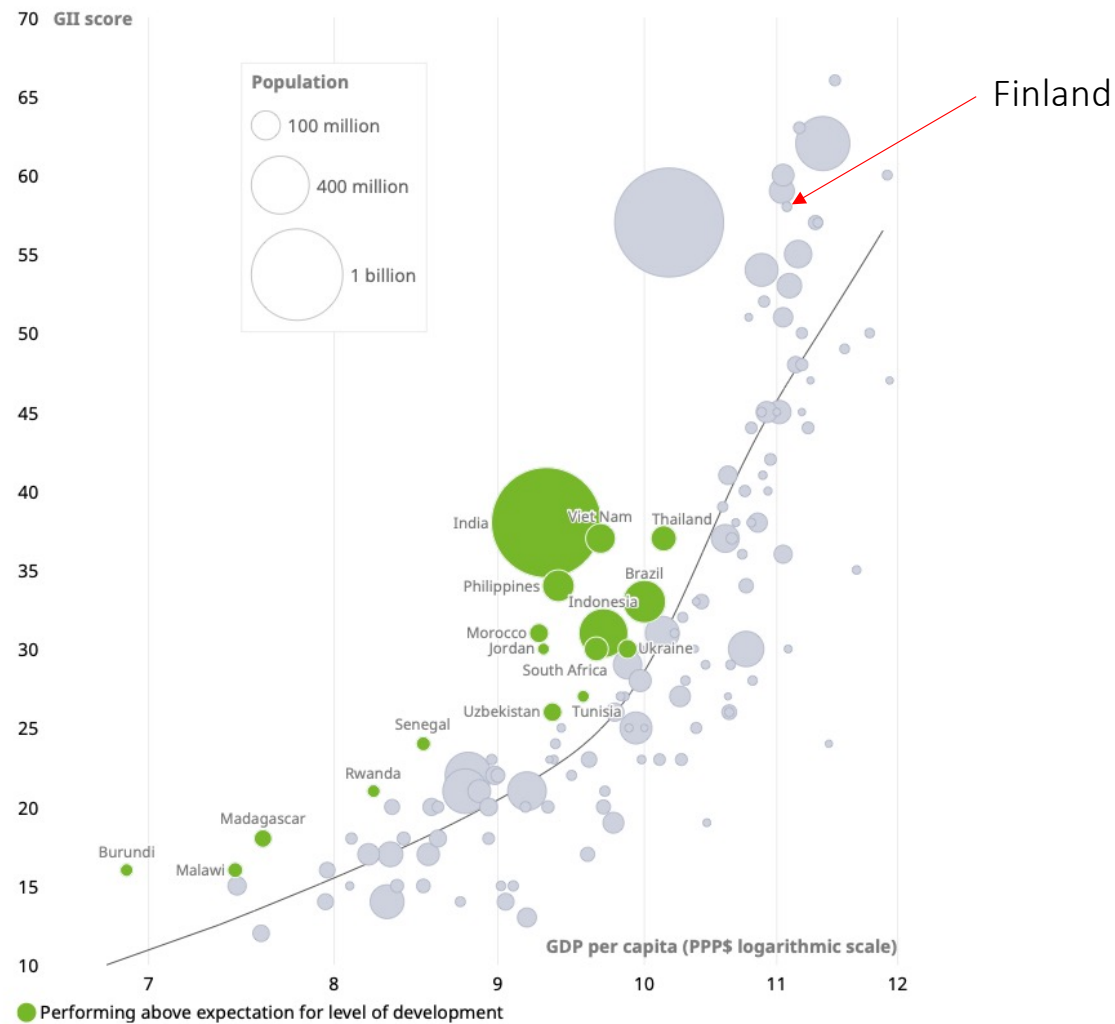


Figure 2 Top 10 innovation clusters by metric, share of global total, 2025



Source: WIPO Statistics Database, May 2025.

Note: Circles with numbers show cluster rankings.
Source: Global Innovation Index Database, WIPO, 2025.



Note: Bubbles are sized according to population. The cubic spline trendline shows the expected level of innovation performance at different levels of GDP per capita for all economies covered in the GII 2025.
Source: Global Innovation Index Database, WIPO, 2025.

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.



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.



An every-day example of DUI
Finnish Maternity Package





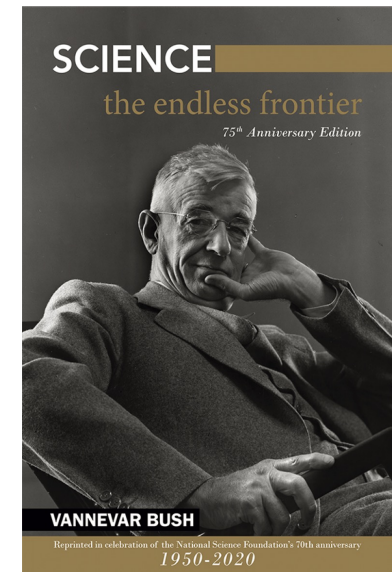
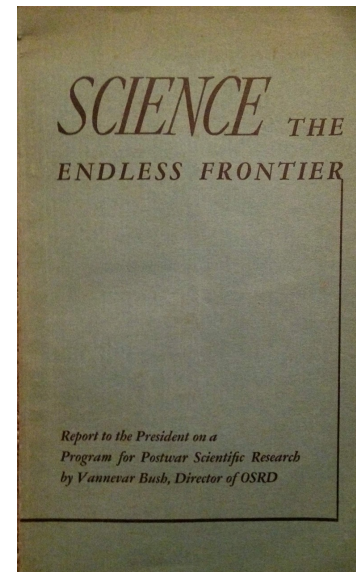
The changing rationales – three framings of innovation policy

(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.

1. Technology push policy (1950->)

- Research and development >>> innovation >>> economic growth
- Focus on scientific breakthroughs, technology development and commercialization of new technologies
- Rationale for innovation policy: correct market failures
- Key actors: Universities, research institutes, companies



2. Innovation systems approach

- Innovation as key for competitiveness
- High-road strategy of innovation vs. low-road strategy of cost competition
- From linear to interactive model
- Innovation comes in many shapes involving variegated types of actors and networks
- Open system – local & global – interdependencies
- A focusing device, new language in the 90's
- Rationale for innovation policy: correct system failures

National innovation system is a network of institutions in the public and private sectors whose activities and interactions initiate, import, modify, and diffuse new knowledge (technologies)

Freeman 1987

Also, regional and sectoral systems of innovation

3. Transformative innovation policy (mission-oriented)

- Places social and environmental problems at the core
- Layered upon (not fully replacing) earlier innovation policy paradigms
- Conceptual variety
- Policy rationale: Correct transformational failures

‘Mission-oriented innovation policy is a co-ordinated package of policy and regulatory measures tailored specifically to mobilise innovation in order to address well-defined objectives related to a societal challenge, in a defined timeframe’ (OECD)

Challenges – transformation failures

- Directionality
- Experimentation
- Demand articulation
- Policy learning and coordination

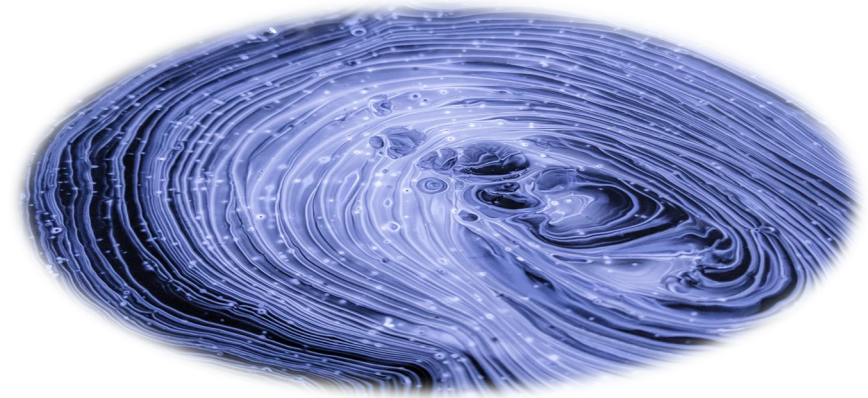


Table 1. Characteristics of old and new mission-oriented projects

Defense, nuclear, and aerospace	New: Environmental technologies and societal challenges
Diffusion of the results outside of the core of participants is of minor importance or actively discouraged	Diffusion of the results is a central goal and is actively encouraged
The mission is defined in terms of the number of technical achievements, with little regard to their economic feasibility	The mission is defined in terms of economically feasible technical solutions to particular societal problems
The goals and the direction of technological development are defined in advance by a small group of experts	The direction of technical change is influenced by a wide range of actors, including government, private firms, and consumer groups
Centralized control within a government administration	Decentralized control with a large number of agents involved
Participation is limited to a small group of firms due to the emphasis on a small number of radical technologies	Emphasis on the development of both radical and incremental innovations to permit a large number of firms to participate
Self-contained projects with little need for complementary policies and scant attention paid to coherence	Complementary policies vital for success and close attention paid to coherence with other goals

Source: Modified version of Table 5 in Soete and Arundel (1993: 51).

The World Economic Forum's Global Competitiveness Report highlights Finland, Denmark and Sweden, and declares these three countries as being 'among the best-prepared [...] for an economic transformation'

This assessment is based on the institutional, social and political capacity, not entrepreneurial capacity

Making Innovation a Mission?

Overview of the Implementation of
Mission-Oriented Innovation Policies
in Denmark, Finland and Sweden

Alberto Giacometti & Sigrid Jessen

<https://pub.nordregio.org/r-2024-17-making-innovation-mission/makinginnovationamission.pdf>

Denmark has selected four national missions focusing on the green transition

- Carbon capture and storage or utilisation
- Green fuels for transportation and industry (power-to-X, etc.)
- Climate- and environment-friendly agriculture and food production
- Recycling and reduction of plastic waste (later expanded to 'plastic and textiles')

Sweden and **Finland** have no nationally declared missions

- But - they do not lack transformative processes in their respective innovation systems
- Sweden and Finland have long traditions of (transformative) innovation policy
- In Finland, transformation is partly led by the private sector

Innovation ecosystems



It is a well-known fact that most breakthrough innovations and new businesses are not created in isolation but through collaborative arrangements that enable organizations to combine their individual offerings into coherent solutions

Innovation ecosystem

‘Network of interconnected organizations, **connected to a focal firm or a platform**, that incorporates both production and use side participants and created as appropriates new value through innovation.’

(Autio & Thomas 2014)

Rinkinen (2016): “**ecosystems are first and foremost global**. The role of a region is not visible in the literature concerning ecosystems. The national level perspective is the main way in which ecosystem discussion is connected to the geographical context. It is generally difficult to define the ecosystem boundaries, whether they are geographical or not.”

But... local and regional development scholars and policy makers have woken up



Photo by Pascal Debrunner on Unsplash

Innovation ecosystem

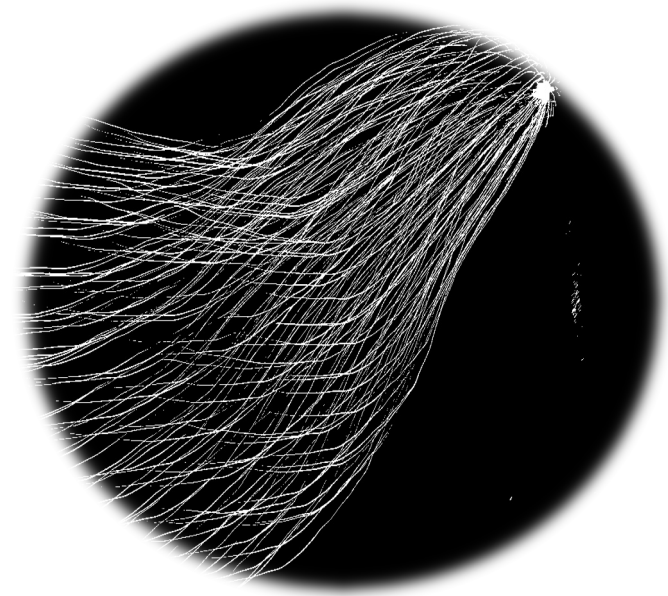
- Emphasizes more market mechanisms than institutionally oriented innovation system literature
- Embedded in business studies (but also regional and innovation studies)
 - Earlier almost explicitly in economics, regional studies, and economic geography
- Organic metaphors replace mechanical ones
- **Leading actor** enables ecosystem members to invest in a shared future and common goals
- Loose network relationships
- Ecosystem members share the fate of the entire system (Moore, 1993)
- Access to global innovation ecosystems highlighted

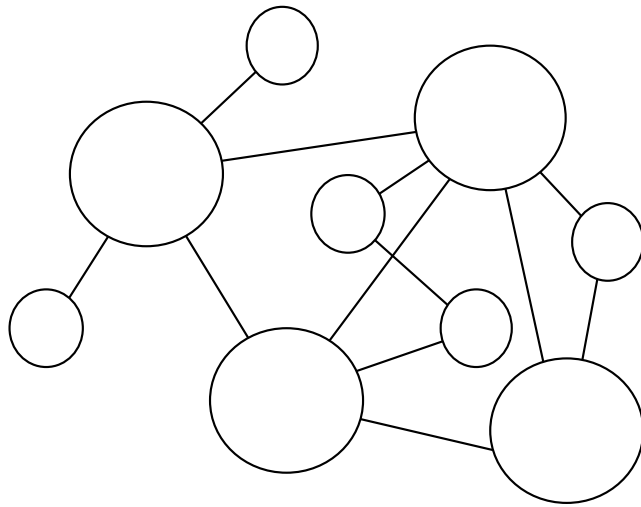


Photos: Pixabay

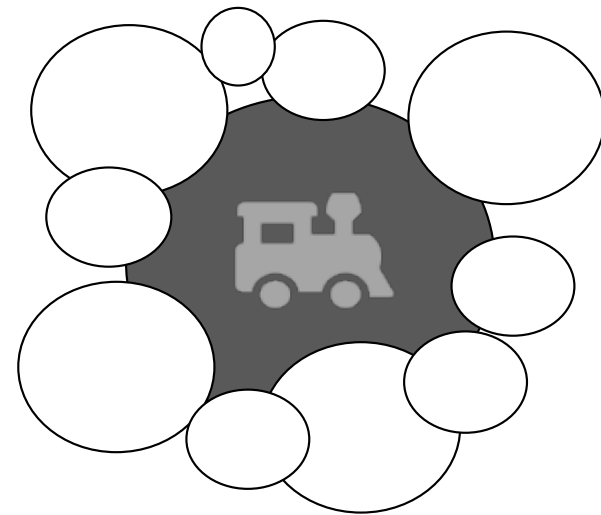
Change in thinking? Growth engines (2020s)

- The main objective is to generate billion-euro export businesses in Finland
 - Collaboration between companies of different sizes, research organizations and public actors to achieve a common concrete business goal.
 - Launching a new operator, a **platform company** to achieve a business goal
 - The construction of the platform company's business and through it generating extensive networking effects



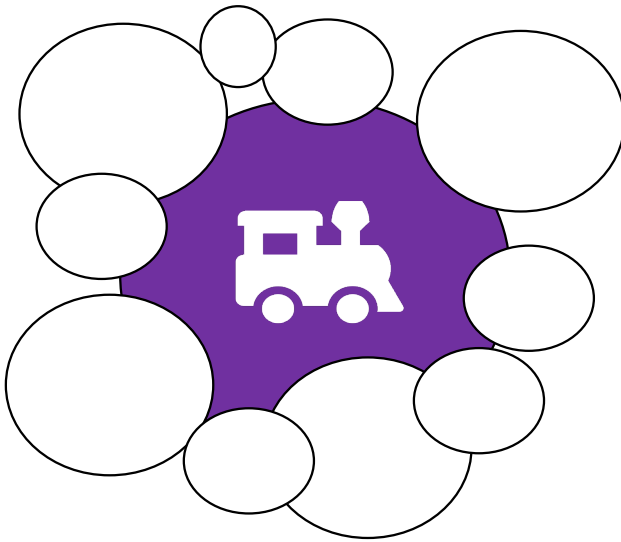


A cluster



An innovation ecosystem with an engine company

The Growth Engine programme



Leading companies

- **NESTE:** Sustainable and globally scalable solutions for the R&D of raw materials that reduce the use of crude oil.
https://www.businessfinland.fi/4a9cd1/globalassets/finnish-customers/01-funding/06-ecosystems/neste_veturi_tiekartta.pdf
- **ABB:** Platforms for the optimal generation and consumption of electricity in a carbon-neutral society.
<https://www.businessfinland.fi/492bb4/globalassets/finnish-customers/01-funding/06-ecosystems/abb-green-electrification-2035-veturi-roadmap.pdf>
- **FORTUM & METSÄ GROUP:** New fibre-based products for consumer markets to reduce the carbon footprint.
https://www.businessfinland.fi/49a764/globalassets/finnish-customers/01-funding/06-ecosystems/expandfibre_ecosystem-roadmap_may-2023.pdf
- **KONE:** Mobility solutions for urban environments in line with the principles of sustainable development.
<https://www.businessfinland.fi/49073c/globalassets/finnish-customers/01-funding/06-ecosystems/kone-the-flow-of-urban-life-veturi-roadmap.pdf>
- **NOKIA 5G:** Making Finland a pioneer in 5G networks and industrial 5G (ended).
<https://www.businessfinland.fi/suomalaisille-asiakkaille/palvelut/rahoitus/veturiyrittysten-ja-ekosysteemien-rahoitus>
- **SANDVIK:** Globally competitive electric and digital solutions for heavy machinery.
<https://www.businessfinland.fi/492bb4/globalassets/finnish-customers/01-funding/06-ecosystems/sandvik-veturi-roadmap.pdf>
- **TIETOEVRY:** Trust-based digital services.
https://www.businessfinland.fi/494766/globalassets/finnish-customers/01-funding/06-ecosystems/20220221_tietoevry_veturi_public_roadmap.pdf
- **KONECRANES:** Zero4 material flow.
<https://www.businessfinland.fi/499c0b/globalassets/finnish-customers/01-funding/06-ecosystems/konecranes-zero4.pdf>

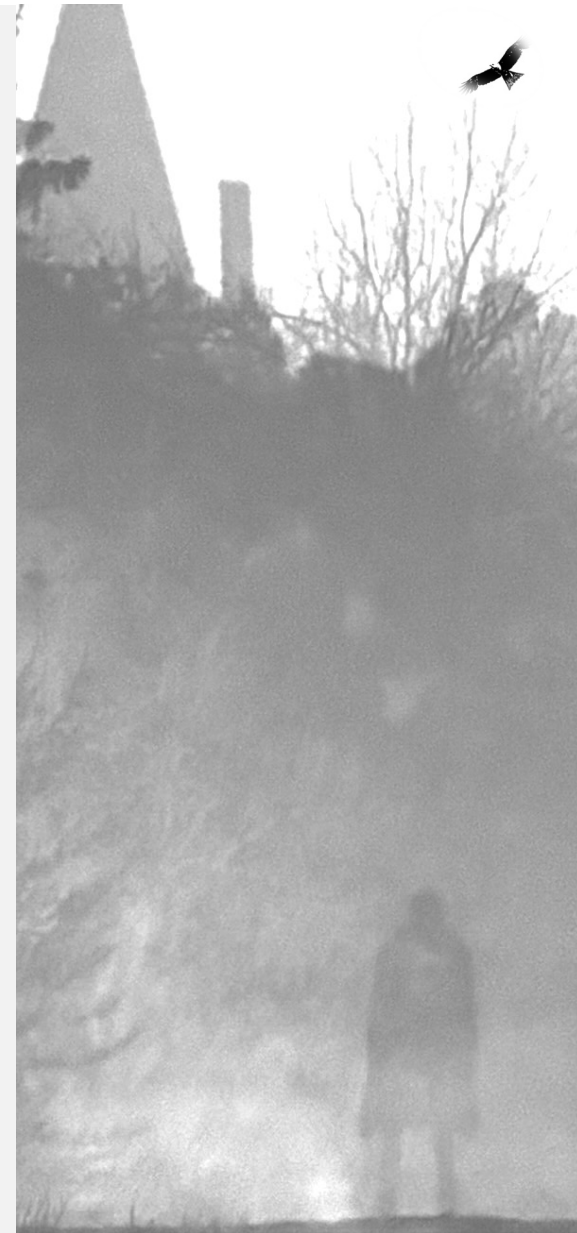


Challenger companies

- **BITTIUM:** Seamless and secure connectivity.
https://www.businessfinland.fi/4904f7/globalassets/finnish-customers/01-funding/06-ecosystems/bittium_seamless-and-secure-connectivity-2024.pdf
- **PONSSE & EPEC:** Unlocking sustainability in off-road and commercial vehicles.
https://www.businessfinland.fi/49bbe4/globalassets/finnish-customers/01-funding/06-ecosystems/ponsse_epec_forward27_roadmap.pdf
- **DANFOSS:** Fossil-free future.
https://www.businessfinland.fi/49c1e1/globalassets/finnish-customers/01-funding/06-ecosystems/danfoss_fossil-free-future_roadmap_2023.pdf
- **MIRKA:** Shaping the green transition.
https://www.businessfinland.fi/494803/globalassets/finnish-customers/01-funding/06-ecosystems/mirka_shape-02-2024.pdf
- **KEMPOWER:** Heavy electric traffic ecosystem.
<https://kempower.com/news/heavy-electric-traffic-ecosystem-program-boosted-by-10-million-euros/>
- **VALIO:** Food 2.0
<https://www.businessfinland.fi/491a86/globalassets/finnish-customers/01-funding/06-ecosystems/food-2.0-roadmap.pdf>

Connected to EU RRF

- **BOREALIS POLYMERS:** Sustainable plastic industry.
<https://www.businessfinland.fi/49542b/globalassets/finnish-customers/01-funding/06-ecosystems/borealis-spirit-veturi-roadmap-20220318.pdf>
- **MEYER TURKU:** Climate-neutral cruise ship and shipyard.
<https://www.businessfinland.fi/494cb5/globalassets/finnish-customers/01-funding/06-ecosystems/meyer-turku-2022-03-18-necoleap-veturi-roadmap.pdf>
- **VALMET:** Circular economy technology.
<https://www.businessfinland.fi/4a5208/globalassets/finnish-customers/01-funding/06-ecosystems/beyond-circularity-roadmap-valmet-september-2023.pdf>
- **NOKIA EDGE:** Energy-efficient edge-computing.
https://www.businessfinland.fi/494a77/globalassets/finnish-customers/01-funding/06-ecosystems/nokia-veturi_competitive-edge_roadmap_2601_2022.pdf
- **WÄRTSILÄ:** Zero-emission marine.
<https://www.businessfinland.fi/494cf9/globalassets/finnish-customers/01-funding/06-ecosystems/wartsila-zem-leading-company-ecosystem-roadmap.pdf>



At best innovation policy creates interpretive spaces

- Sheltered spaces for collective search, experimentation and interpretation
 - where fears of the risk of private appropriation of information do not disrupt the open-ended futures-oriented conversations (Lester & Piore 2004)
 - where collective sense-making is possible (learning new vocabulary, thinking, partners, etc.)
 - where one is not only learning to innovate or detecting system failures but is enabled to seek futures with relevant partners (and to find relevant partners)

Platform policy approach

(Asheim, Boschma & Cooke, 2011; Ailisto et al 2016)

- Focuses on making connections between different but related activities
 - Represents a strategy based on related variety for **diversification**
 - Related variety is defined on the basis of shared and complementary knowledge bases and competences
- Meeting points for different needs
 - Network effects
 - Multi-way interaction

Ecosystems bringing talent together

The ecosystems unite experts from multiple fields, facilitate making use of opportunities and help with innovation.

The ecosystems already in place:

- Camera technology – Tampere Imaging Ecosystem
- Artificial intelligence – Tampere AI ecosystem
- Mobility – ITS Factory
- Startup Tampere
- The Tampere Automotive Cluster
- Tampere Region Safety and Security Ecosystem
- Connectivity ecosystem
- Tampere Region Circular Economy Ecosystem
- Film Tampere
- Education and learning
- Intelligent Machines and Automation
- Health technology and life science

12
ecosystems -
for open and
smart
collaboration.



Bioeconomy in Central Finland

“An economy that relies on renewable natural resources to produce food, energy, products and services ... new economic growth and jobs in line with the principles of sustainable development ... bioeconomy output up to EUR 100 billion by 2025 and to create 100,000 new jobs

(Suomen biotalousstrategia, 2014)



News 21.4.2015 15:45 | updated 21.4.2015 15:45

Metsä Group to build next-gen bioproduct mill – to make pulp, products, power

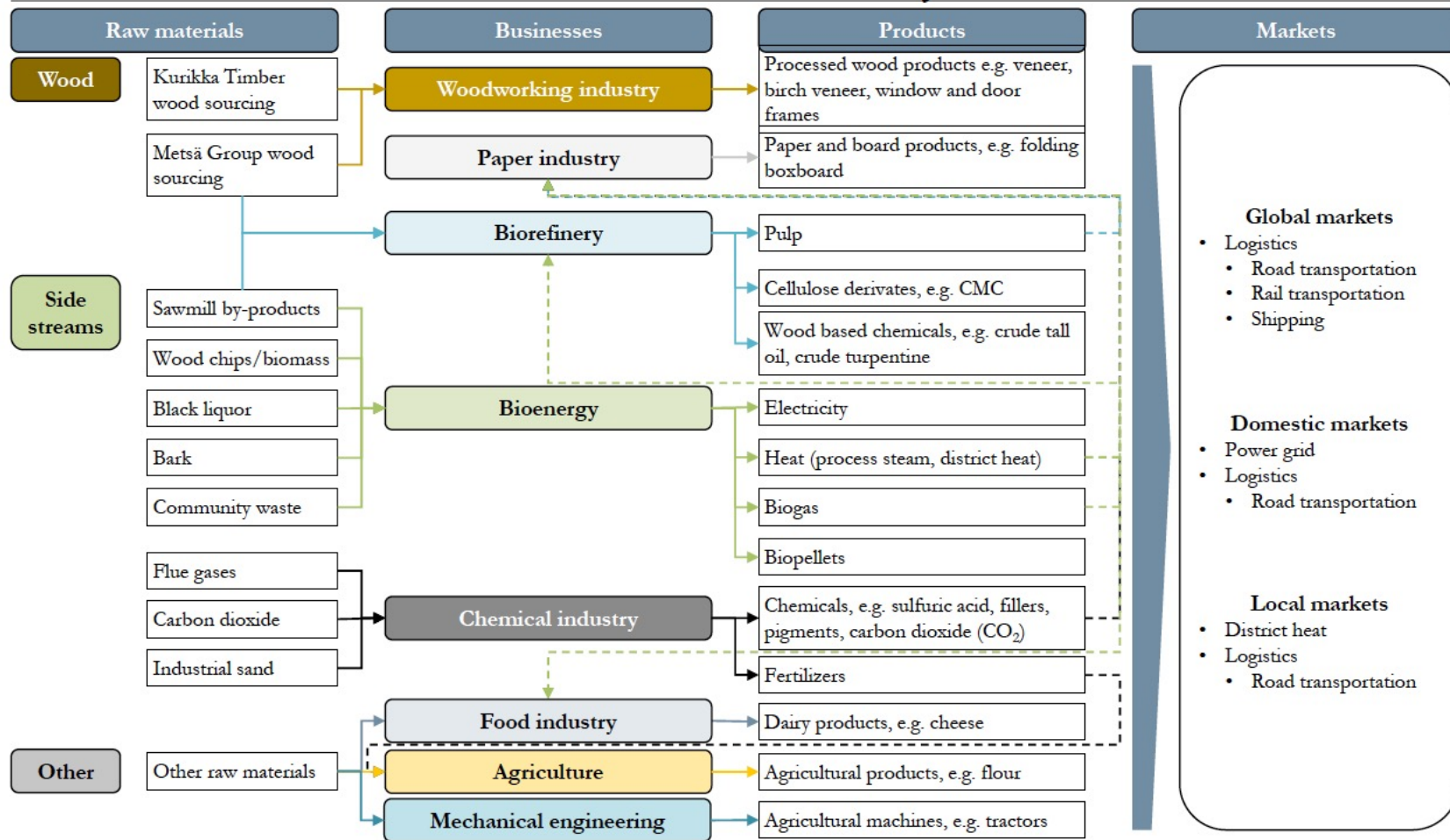
Metsä Group has announced it will build a next-generation bioproduct mill in Äänekoski. Building the new bio-friendly mill, which will produce pulp – and twice the energy it requires – will cost Metsä about 1.2 billion euros. The investment is said to be the largest-ever by the forest industry in Finland – and the world's largest softwood pulp mill.



How Metsä Fibre pulp mill looks these days, before the planned next-generation mill which is projected to be complete towards the end of 2017. Image: Metsä Group



Äänekoski – Industrial Business Ecosystem



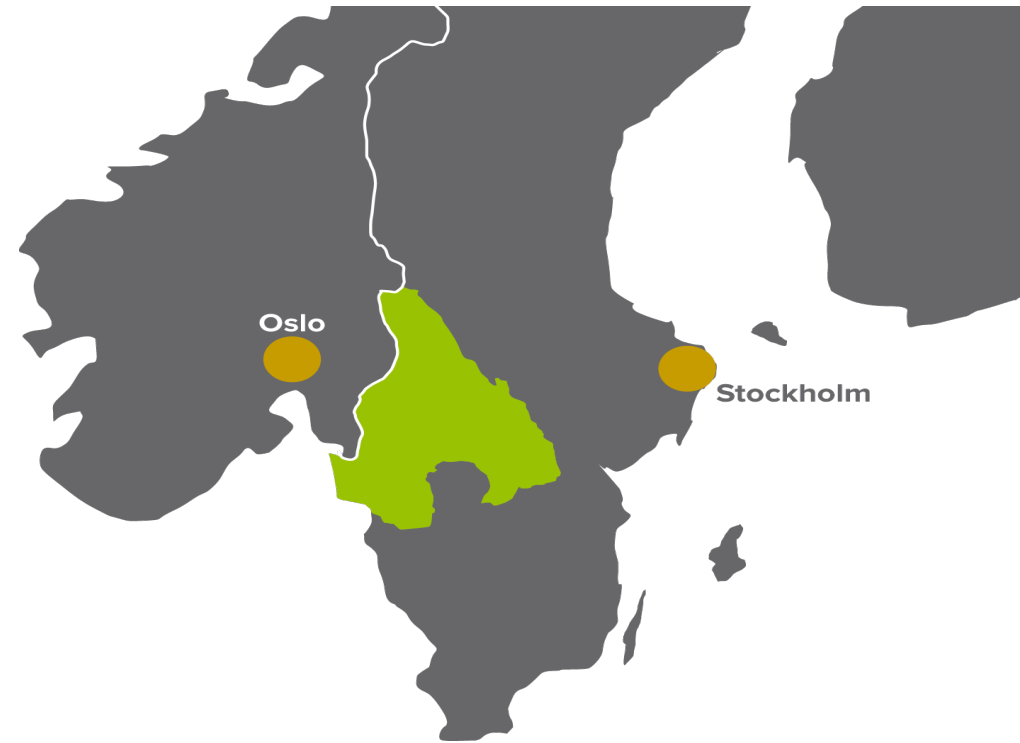
Paper province,
an example of a cluster policy
Värmland, Sweden



- Packaging materials
- Packaging solutions
- Specialty paper
- Board
- Pulp- and paper machines
- Tissue paper machines
- Components
- Coating machines
- Barriers
- Engineering services
- Bio-energy solutions
- R&D

WE SHALL BE THE
LEADING
COMPETENCE NODE
FOR FOREST BASED
BIOECONOMY

- All the main players mobilized
 - PP2.0 is a successful dating agency
- Strong support from the region
- Shared enthusiasm
- Collective self-confidence
- Region branding
 - “Paper province” reflects history and the strong identity of the region but may be misinterpreted by outsiders
- Strong industrial base and impressive set of competences



The geography of knowledge dynamics





Customised innovation policy

- No 'one size fit for all' formula for promoting innovativeness - not even among the Nordic countries (Asheim et al 2011)
- Innovation policies and practices do not vary only between countries but also within them (Tödling & Trippel 2005)
- Unique advantages have to be actively constructed and innovation policies customised

Localized / regionalized innovation policy

Localized and/or regionalized innovation policies may have some advantages in solving specific issues.

- National innovation policies have a regional impact - intended or not
- Regional differences...
 - in the quantity and quality of innovation activity
 - in the performance of the entire regional innovation system
 - in the institutions/practices framing the action and choices made in the region

Differentiated strategies and instruments are needed both to serve the specific regions and to achieve national-level goals more effectively.

Localized / regionalized innovation policy in Finland

- Regions are usually poorly, if at all, defined in the Finnish **national** innovation policies.
- Regional innovation policy is, more or less, seen as an extension of national policies (Suorsa 2007)
- Due to strong local government national and local policies have coevolved for some time (Sotarauta & Kautonen 2007)

Differing regions / differing local systems

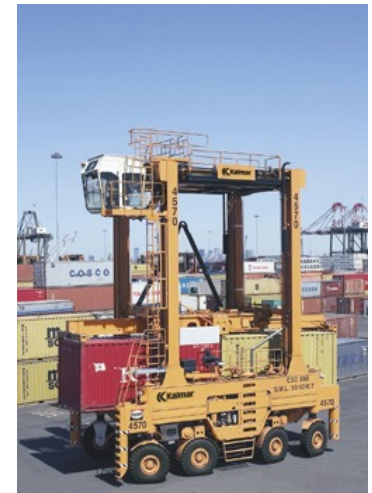
- Peripheral regions (organizational thinness)
South Ostrobothnia
- Old industrial areas (potential lock-in)
Tampere region
- Metropolitan regions (fragmentation)
Helsinki MA



Solid engineering is the name of the innovation game

Mobile heavy machinery in Tampere

- Adding 'intelligence' to traditional machines
- Customized production for individual customers
 - Products are a mixture of solutions and industrial services
- New knowledge from on-the-site, face-to-face and hands on interactive processes with customers
- Solid and long-term innovation work
- The majority of the firms have a separate R&D unit

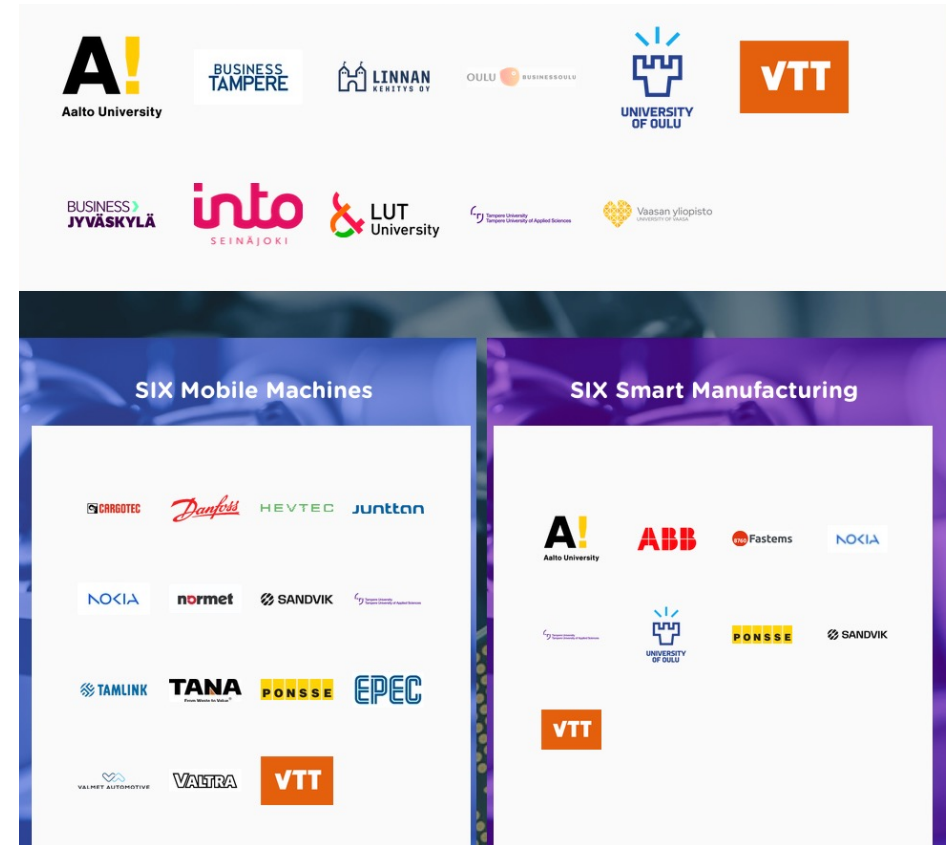


The main source of knowledge is
customers
Also universities

An example

SUSTAINABLE INDUSTRY X

A national initiative supercharging Finnish industry performance and sustainable growth through innovation and knowledge





and in very wide range of ICT and digitalisation technologies



The core of the local innovation policy
Customized and collaborative

Mobile heavy machinery in Tampere

- Proactive collaborative strategy
- Maintaining and increasing R&D intensity (generic technology focus)
 - Main focus on 'applied basic research'
 - Conscious efforts to tap into international knowledge hubs
 - University highly involved





Solid engineering is the name of the innovation game

Agrotechnology in South Ostrobothnia

- Adding 'intelligence' to traditional machines
- Customized production for individual customers
- New knowledge from on-the-site, face-to-face and hands on interactive processes with customers
- Solid and long-term innovation work
- The minority of the firms have a separate R&D unit



The main source of knowledge is **customers**



Customized proactive and collaborative strategy

AgroTech – catching up learning for innovation

Proactive collaborative strategy

- Increasing innovation capacity and culture – learning to innovate
- Tapping into national knowledge hubs
- Simultaneously very customized to serve the cluster and generic to serve regional development more broadly
- Usability and customer-orientation important
- Distributed activity, experimentation (Agro Living Lab)





Restless dynamism is the name of the innovation game

DigiBusiness in HMA

- Digi businesses are evolving rapidly and accumulating in many ways
- Constant search of new business ideas as well as new customer groups and novel forms of digital media
- Customized production for individual customers
- The minority of the digibusiness firms have a separate R&D unit
- A wide set of professional and user communities involved





Restless dynamism is the name of the innovation game

DigiBusiness in HMA

- Identified business opportunities are tested rapidly and incorporated into the existing service portfolio of a firm
- Branding the service or product and hosting visible references from various...
 - Design, brands, trademarks, social media references etc.
- Extensive use of the Internet and other digital channels to stay in touch with a rapidly developing field



The main source of knowledge is **customers** and **competitors**



Customized gardening strategy

DigiBusiness in Helsinki - making sense of rapidly evolving field

- “360 degree strategy”
- Simultaneously customized and generic
- Creation of awareness of rapidly emerging industry, reduction of fragmentation
- Real-life experimentation (living labs)
- Universities loosely connected
- Reactive gardening policy

‘360 degree strategy’

- Loose focus
- Don’t know what to focus on, experiment with everything interesting to find a new path
- Loosely defined policies, space for experimentation and rapid reaction – collective learning
- Focus on growth-oriented SMEs and boosting interaction between SMEs and large firms





Customized gardening strategy

”Just as nature conducts many evolutionary experiments in order to have a successful species, so companies should fund many innovation projects and see which ones win out”

(Välikangas & Hamel 2003)

