



National Research University Higher School of Economics

Institute for Statistical Studies and Economics of Knowledge

Semantic analysis for innovation policy based on HSE intelligentFOResightAnalytics (iFORA) system

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OECD, CSTP – TIP Workshop

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Outline

- Semantic analysis at Higher School of Economics: goals, methodology and applications
- Analysis of OECD TIP documents:
 - Innovation policy topics landscape
 - Trends / structural changes in innovation policy over 25 years
- Conclusions

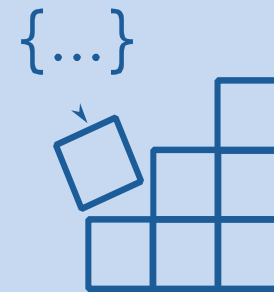
Semantic analysis allows to augment strategic expertise

Sources



- A variety of data formats
- Millions of documents
- Both open and subscription sources
- Full texts
- Constant replenishment
- Sources are filtered based on objective criteria of quality

Advantages



- Transparent, reproducible, and validated methods
- Human factors risks are minimized
- High processing throughput
- Option for fine tuning with leading stakeholders

Features

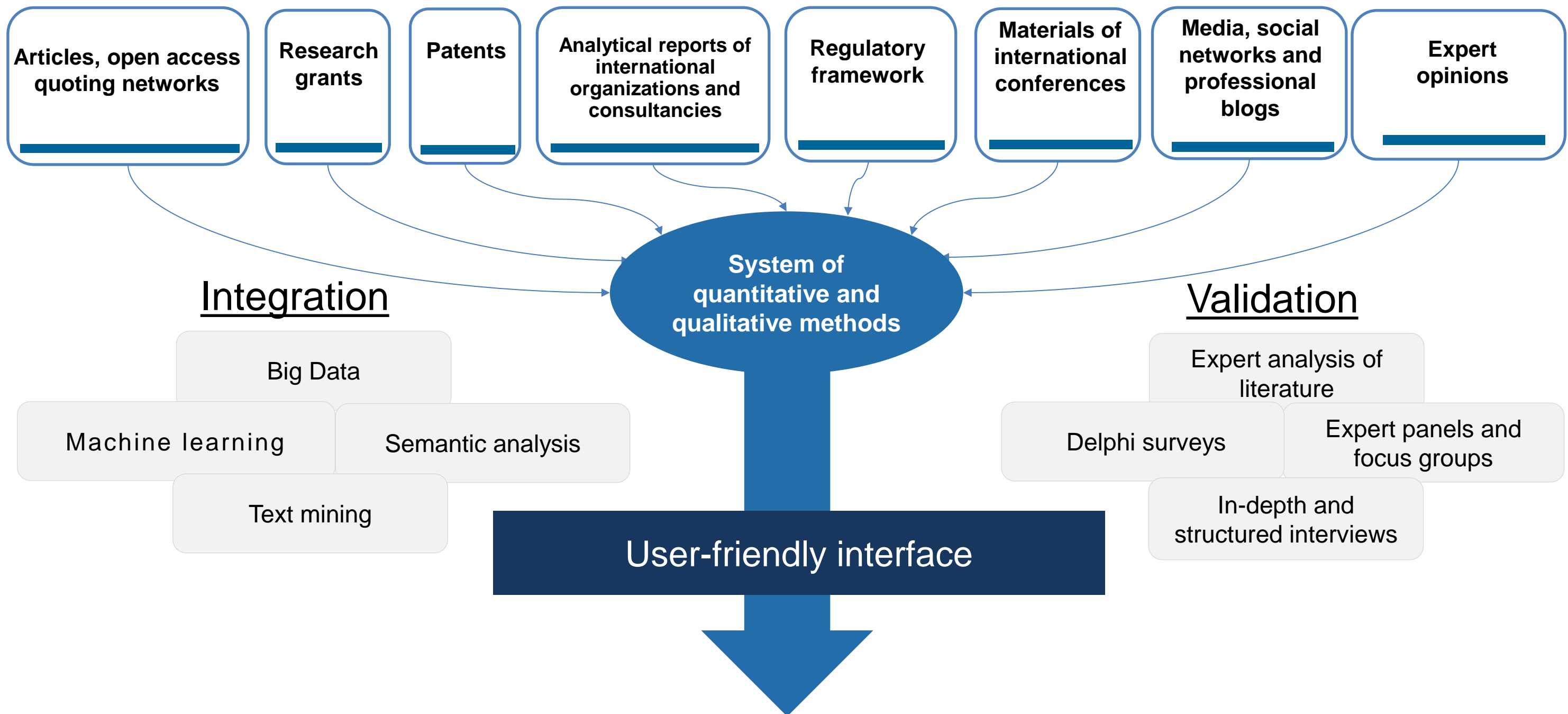


- Interactive interface
- Rapid creation of the new tools for user requests
- Results in table, graphic or geographic maps forms
- Interpretation of analysis result of Big Data
- Different groups of users

Application of semantic analysis allows to implement a state-of-the-art information management in an organisation



iHSE's infrastructure for big-data-enhanced information and analytical support of decision-making

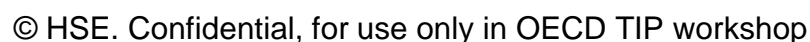


Documents of strategic planning and technology foresight (S&T foresight, S&T priorities, technology road maps, foresight of future skills, etc)



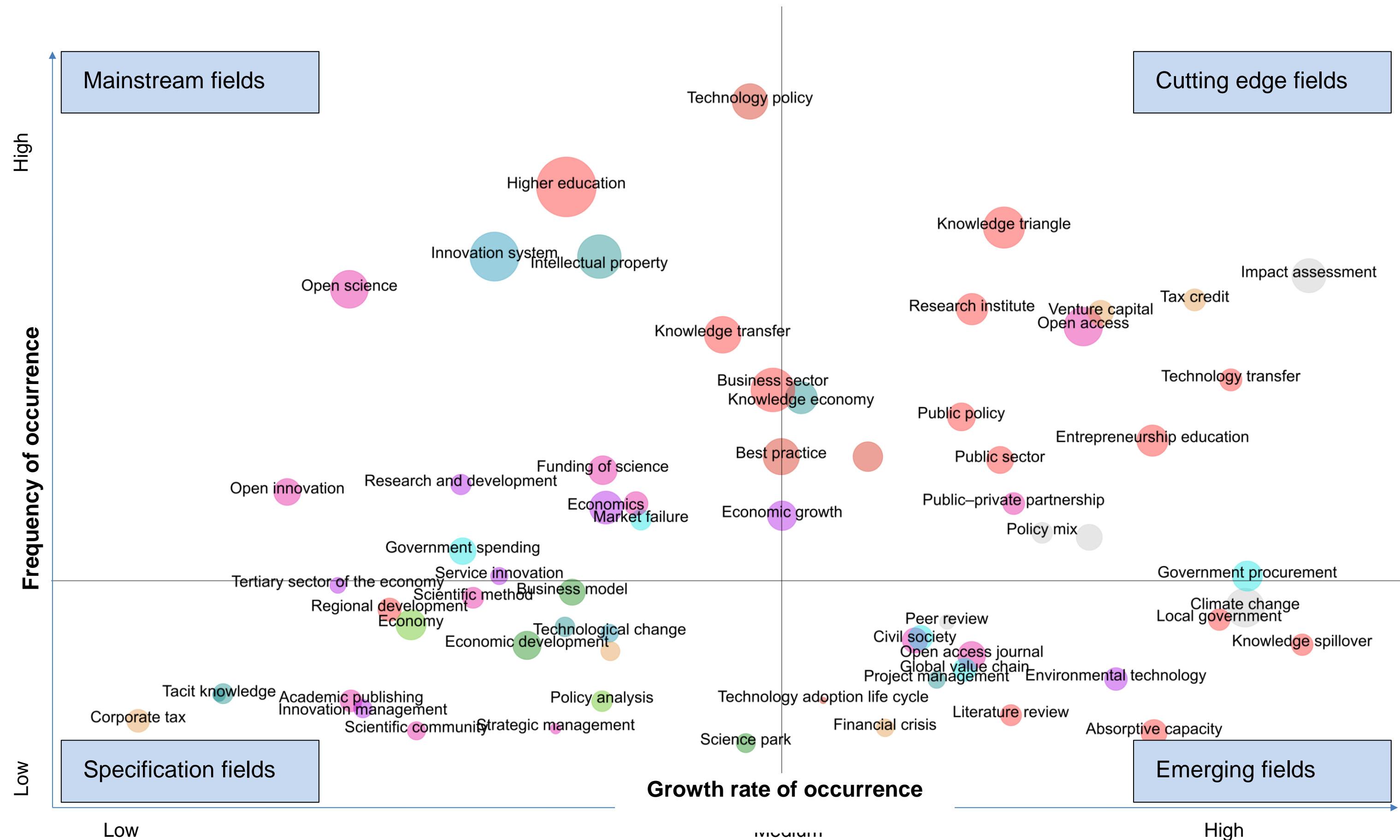
The wide of applications of semantic analysis

Services	Tasks	Applications
Trends in S&T development	Structure and dynamic analysis of science, technologies, industry	<ul style="list-style-type: none">▪ S&T forecasting▪ Sectoral and regional strategies, programs, roadmaps▪ STI policy▪ Strategic planning in scientific organisations, universities, companies▪ Evaluation of effectiveness of policies, programs, activity of organisations▪ Training and competency development programs▪ Strategic market research▪ Marketing strategies and programs▪ Expertise of projects, bids▪ Knowledge management, information structuring and workflow optimisation▪ Validation of studies, forecast and other documents, etc.
Markets estimates	Identification and analysis of trends, weak signals, “wild cards”, emerging technologies and new markets	
Forecasts	Identification and integration of quantitative forecasts	
Independent assessments	Analysis of cooperation networks, identification of competence centers, experts and interrelations between them	
Information management	Reputation analysis of organizations,, assessment of technologies, products, services	
Workflow optimisation	Comparative analysis of organisations, competitiveness of products, content of documents	





Trends in innovation policy for 1993-2017



Structural comparative analysis

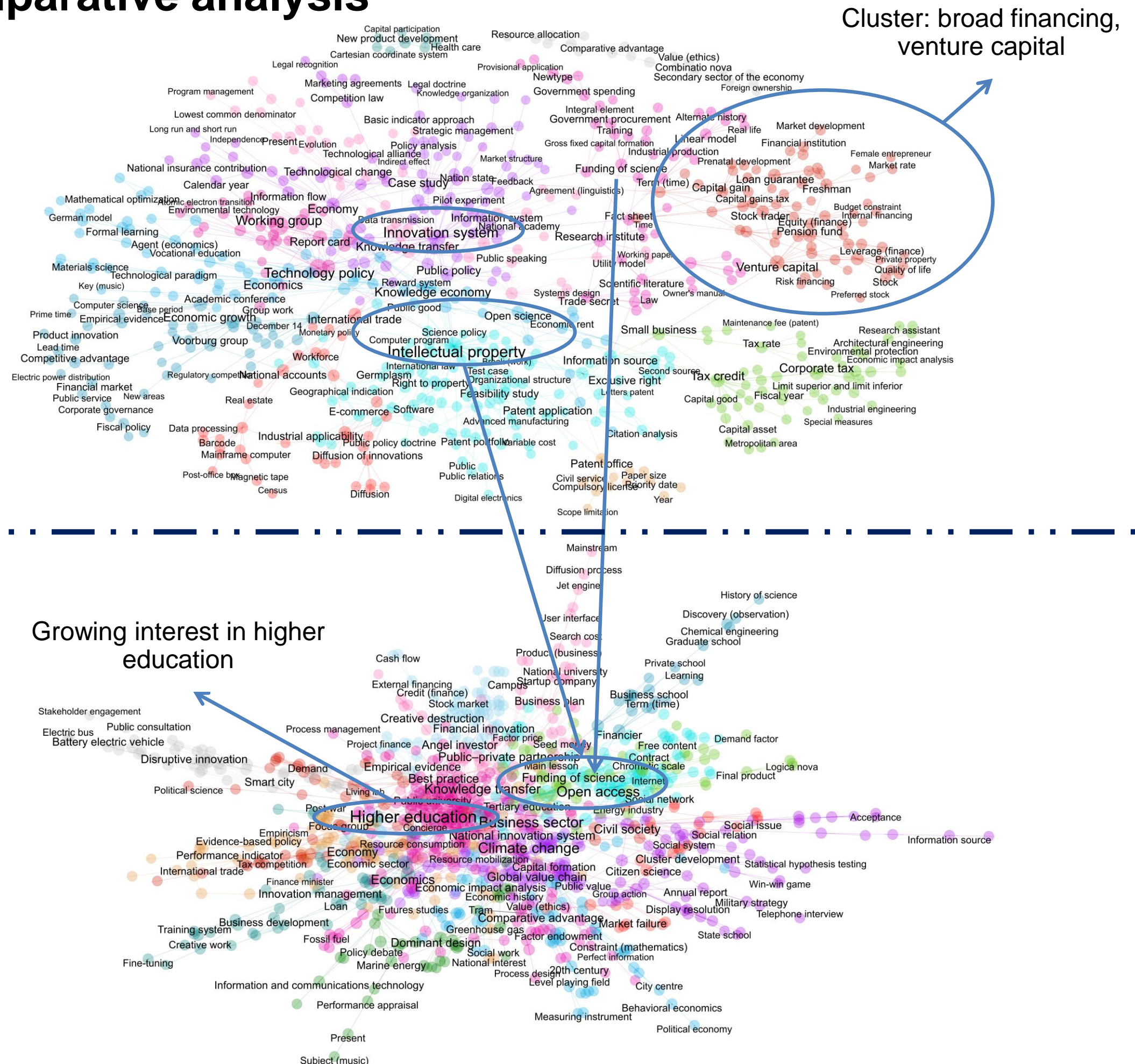
1993-2007 topics

- more fundamental
- concentrated around innovation system, intellectual property, financial issues
- focused on protection of intellectual property



2008-2017 topics

- growing specialization
- brand new significant topics in comparison to 1993-2007 period: higher education, climate change
- open access issues become more popular

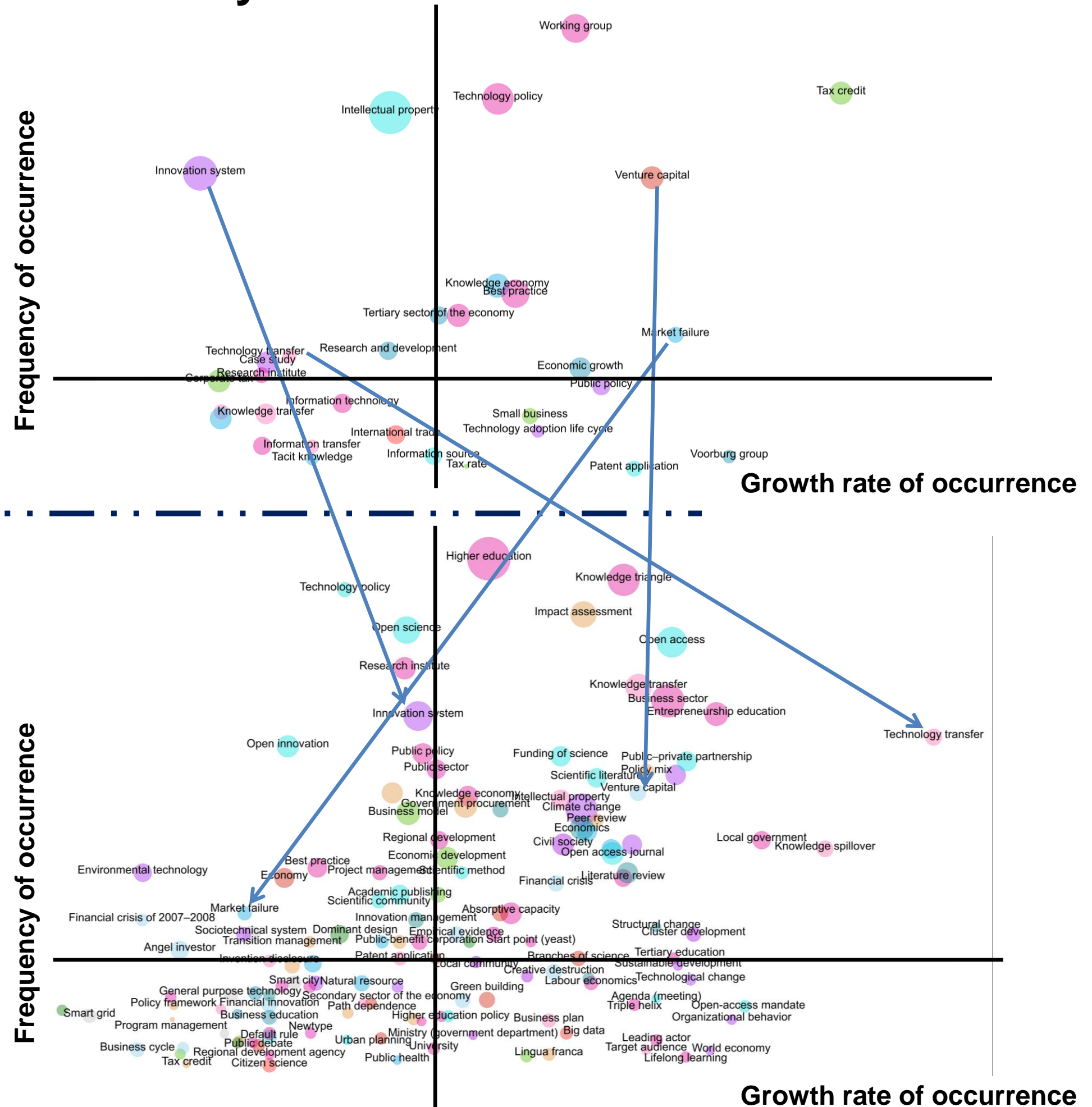




- more common
- intellectual property is a significant, but stable direction
- concentration on protection of intellectual property



- growing specialization of topics
- technology transfer becomes a trend
- innovation system is still a stable direction





Most frequent topics of TIP agenda (1)

TOPIC	FREQUENCY
national innovation systems	15
innovation and technology policy	8
technology, productivity and job creation	8
international technology co-operation	6
technology and innovation policy	6
intellectual property rights	4
public/private partnerships for innovation	4
fiscal measures to promote R&D and innovation	3
public and private financing of R&D	3
statistics and indicators for innovation and technology	3
technology diffusion	3



Most frequent topics of TIP agenda (2)

TOPIC	FREQUENCY
advanced technology	2
benchmarking industry science relations	2
biotechnology	2
development of innovation indicators	2
energy	2
globalisation of industrial R&D: policy implications	2
high tech spin-offs	2
human resources in science and technology	2
impact of technology on jobs in service enterprises	2
innovation and economic performance	2
innovation and growth	2
innovation and IPRS	2
intelligent manufacturing systems	2

TOPIC	FREQUENCY
international collaborative R&D and intellectual property rights	2
national developments in innovation policy	2
national systems for financing innovation	2
public/private partnerships	2
role of competition and co-operation in innovation and growth	2
S&T labour markets	2
science and technology labour markets	2
subsidies in R&D and industrial innovation	2
technology and innovation policies	2
technology and sustainable development	2
technology policy and SMES	2
venture capital	2



Main implications of the research

- Thematic areas overlap and interrelate with no clear indication of causality
- Cutting edge fields often represent old concepts: terms change but content remains the same (i.e. caused by policy makers' personal agenda)
- Broad range of topics contradicts consistent and coherent STI policy implementation due to missing focus
- Prioritization and ranking of policies must be done with consideration of network effects
- Spread responsibility between policy makers create challenges for STI governance



Thank you for your attention!

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