Kaminzimmer, 11:30-12:45

Regional Development

Yasunori Kikuchi (Chair)

Markus Lemmens

Marina Ranga

Regional Development

Yasunori Kikuchi (Chair)

Presidential Endowed Chair for
"Platinum Society", Japan

AESIS
NETWORK FOR
ADVANCING & EVALUATING THE SOCIETAL IMPACT OF SCIENCE

東京大学
THE UNIVERSITY OF TOKYO

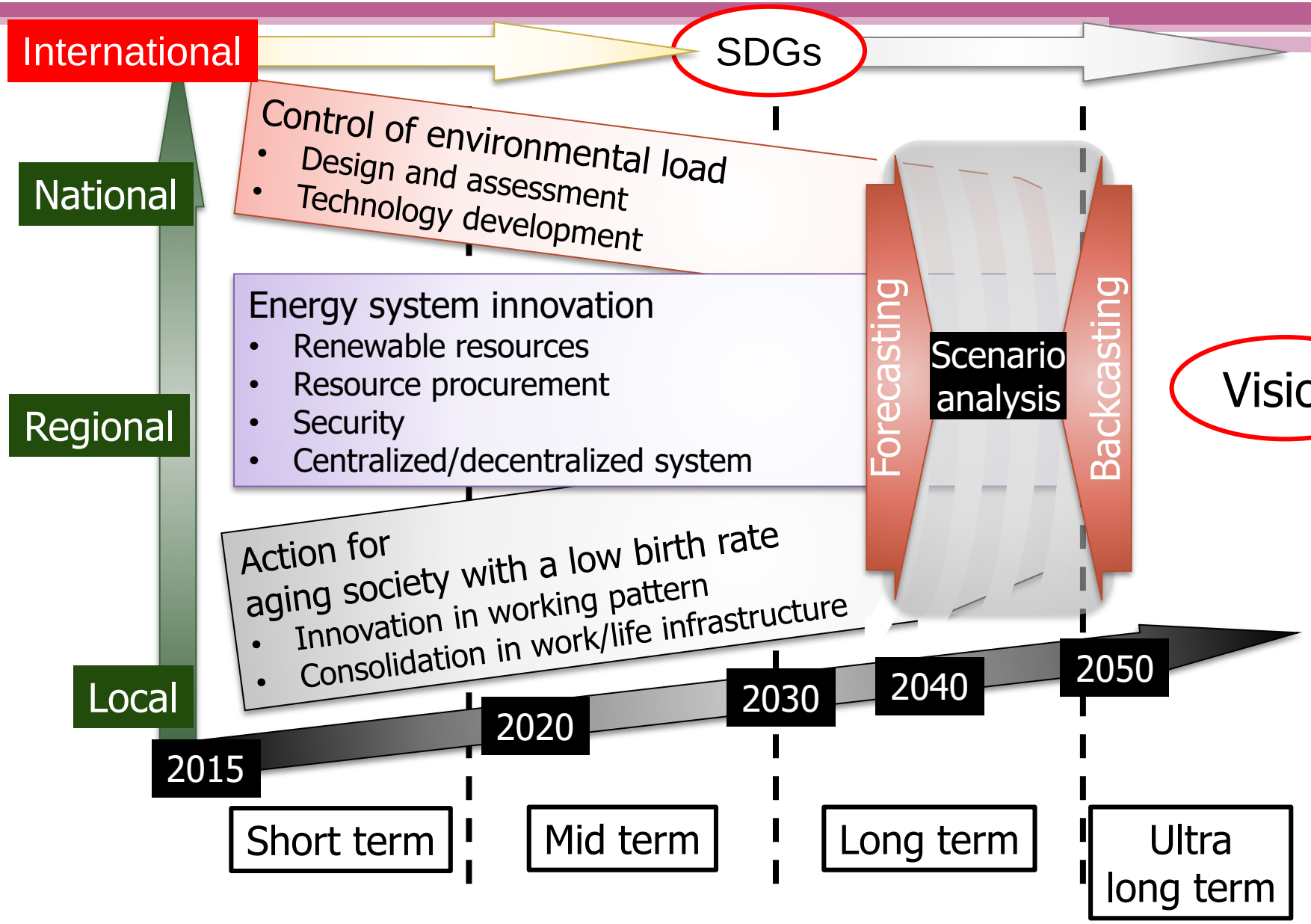
Session: Regional development
Creating societal impact of science through alliances with your region

Presidential Endowed Chair for "Platinum Society", the University of Tokyo
Yasunori KIKUCHI

Institute for Future Initiatives
Department of Chemical System Engineering
at The University of Tokyo

東京大学未来ビジョン研究センター
Institute for Future Initiatives
The University of Tokyo

Scenario analysis of future society



Vision

- Sustainable
- Recycle-based
- **Platinum society**

- Forecasting scenario
  - Solving current issues
- Backcasting scenario
  - Chasing the visions

Platinum society: A inclusive vision of future society

Necessary Conditions for a Platinum Society

Ecology
- Overcoming pollution
- Biodiversity
- Global environment

Sufficient resources
- Energy efficiency and renewable energies
- Primary industries
- Recycle-based society

Everyone can participate
- Interaction
- Lifelong learning
- Aging healthily and securely

Freedom of choice
- Culture, arts, sports
- A variety of options
- Time, space, field

Job opportunities
- Innovation
- GDP
- Interface with society

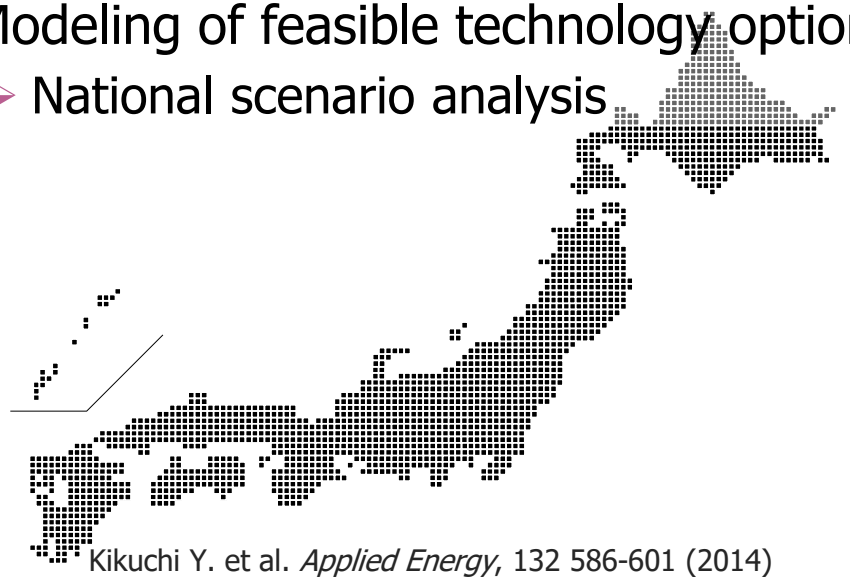
These are the seeds for new businesses

New Vision 2050, Hiroshi Komiyama & Koichi Yamada, Nikkei BP

Hiroshi Komiyama, PhD
The 28th President of the University of Tokyo.
Knowledge award in 2017

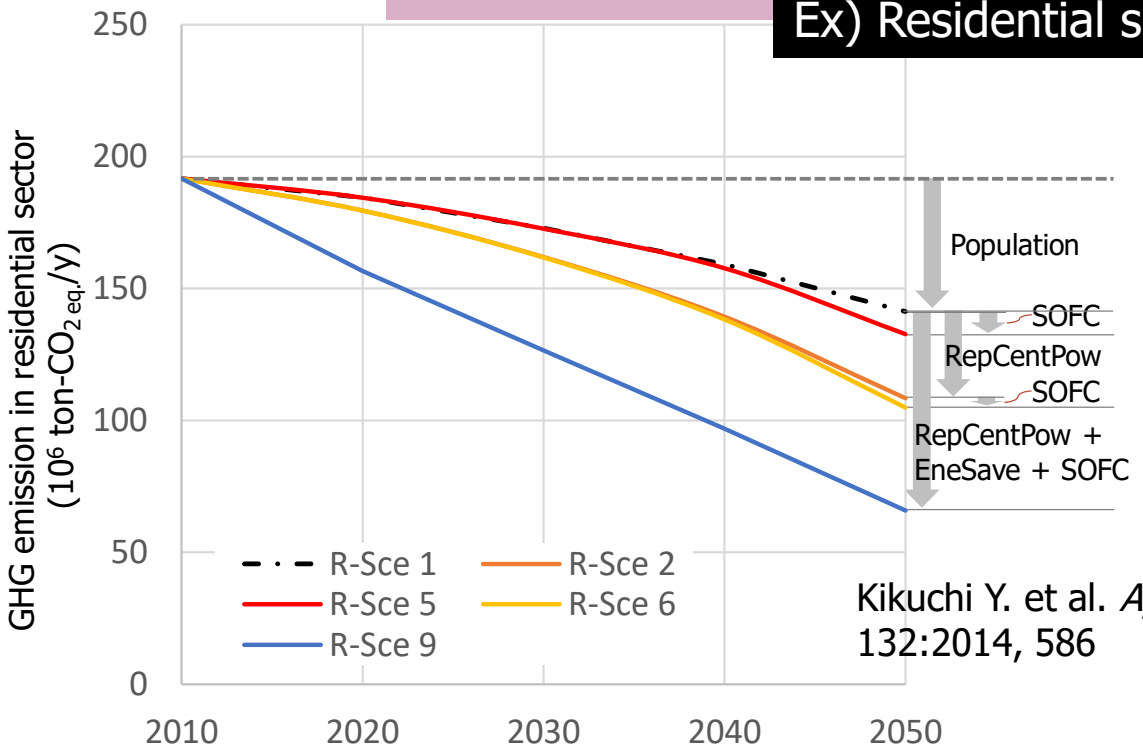
From nation-wide analysis to region-wide design

- Modeling of feasible technology options
  - National scenario analysis



Kikuchi Y. et al. *Applied Energy*, 132 586-601 (2014)
Taufiq BN, Kikuchi Y. et al. *Applied Energy*, 147 486-499 (2015)
Kikuchi Y. et al. *J Ind Ecol*, DOI: 10.1111/jiec.12374
UNEP IRP Environmental Assessment WG

Ex) Residential sector



Kikuchi Y. et al. *Applied Energy*, 132:2014, 586

- Who will realize the proposed scenario?

→ Needs of **designing micro systems** based on **macro analysis**

Open platform

Supporting **Regional Transformation** utilizing locally available resources

- Assessment of energy technology options for regional systems
- Co-design through communication of assessment results

Network of networks:
Industry, academia, and public organization

Circular funds
→ Players in current economy

Platinum Society
Research Association
(Mitsubishi Research Institute, Inc.)

Circular knowledge and wisdom
→ Development and education of knowledge and wisdom

Presidential Endowed Chair for
"Platinum Society",
the University of Tokyo

Circular public capital
→ Actors for public interests

Platinum Society School
for civil servants and
junior high school students

An alliance for networking networks

Platinum Society Network

- Network of networks
  to share knowledge, wisdom, and good practice
  - Local governor: 162
  - Industry: 104

- Place making for generating opportunity
  - Platinum vision awards
  - Symposiums
  - Discussion meetings
  - Workshops
  - Human education for industries, local government, and junior high school students

New Vision 2050, Hiroshi Komiyama & Koichi Yamada, Nikkei BP

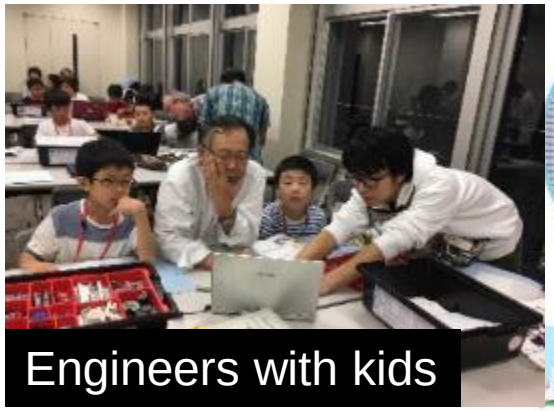
Sharing good practices

Better society with freedom and diversity

Robot suit HAL (lower-limb type, for care) Produced by CYBERDYNE (Japan)

It is possible to live independently as long as the brain is alive

Communication robot "Giraffe" Produced by Robotdalen (Sweden)



Engineers with kids

（Platinum Future School)

Seniors with students

（Platinum Future Human Resources Development School）

Telework at Miyazaki (900 km from Tokyo)

（Source: Aratana）

Experts with young

（Source: Mayekawa）

Social implementation trial in Tanegashima

System innovation
Behavioral systems analysis for medical check-up

Leading by technology
Demonstration of novel biodiesel process

Leading by technology
Demonstration of inverse production of sugar and ethanol

Alarming heatstroke

Biomass-derived chemical production

AI in agriculture

Welfare

Satoyama; Satoumi

Biodiesel production

Social problems

Education

Distributed energy system

Utilization of unused energy

Reforestation

Sugarcane

Systematic tourism

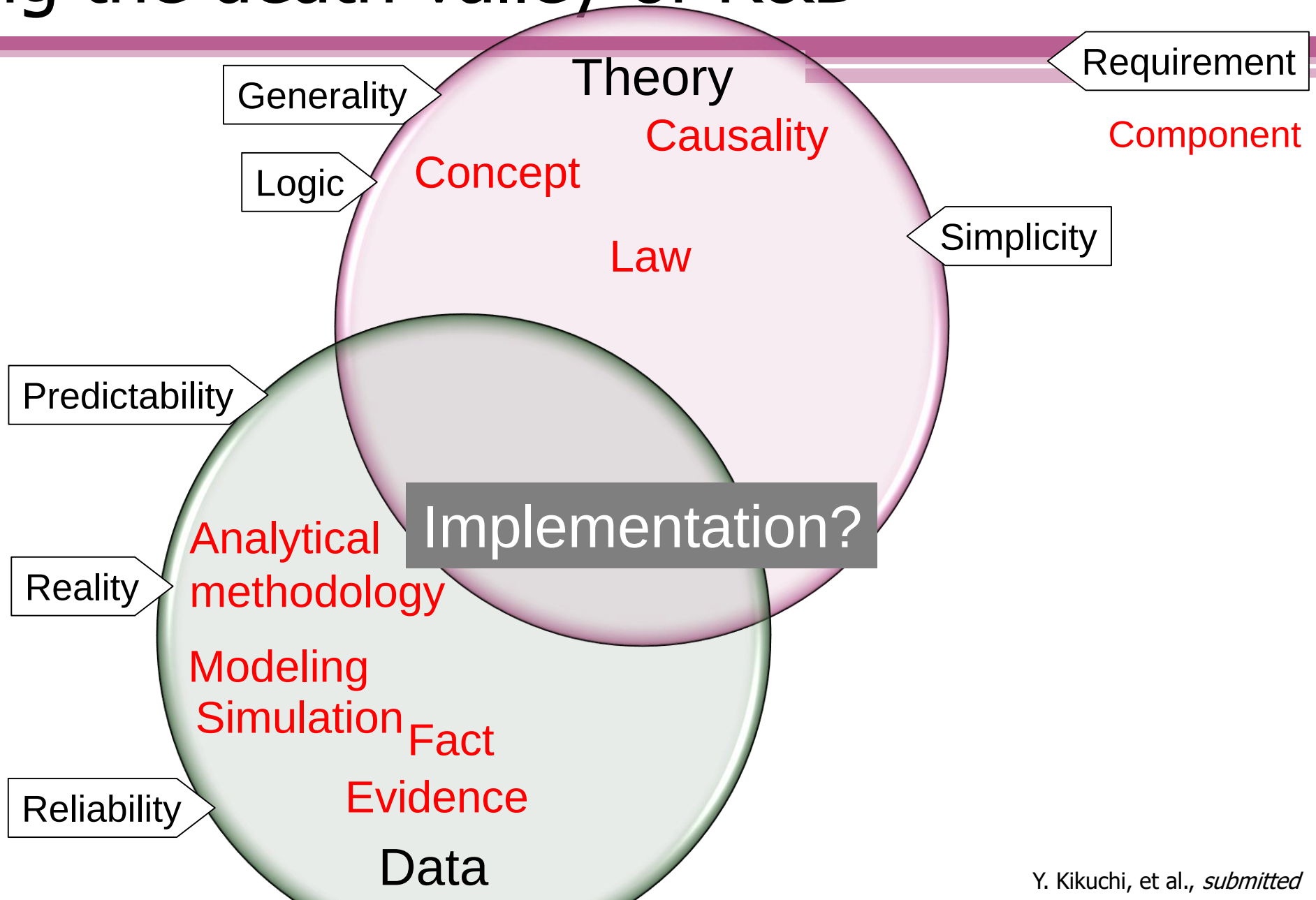
Implementation of natural energy

Communication and education
- Lecture at high school
- Management of symposiums

System innovation
- Energy system centering cane sugarmill
- Agri-Eng system optimization

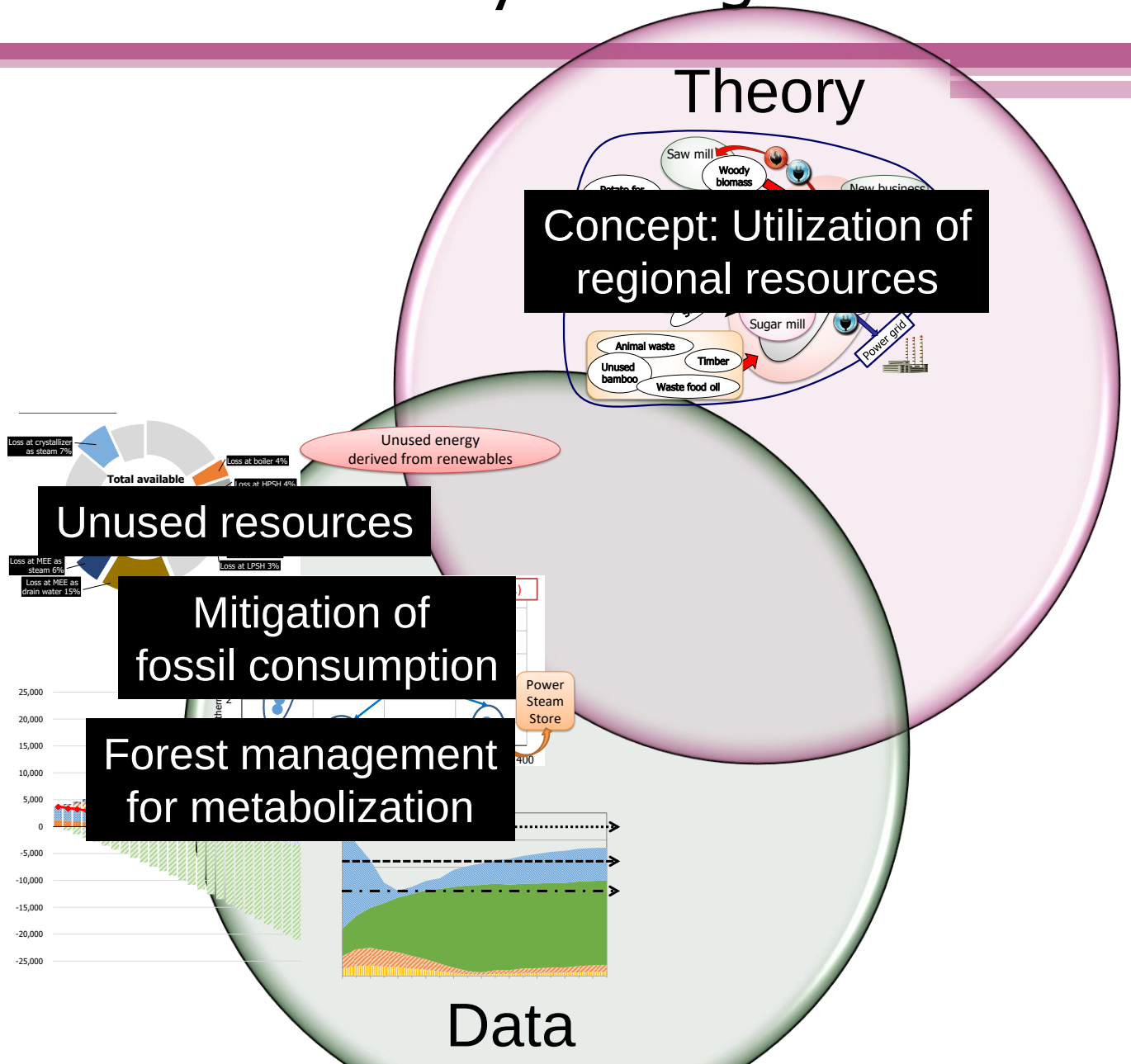
Discovery through tourism
- New tourism
- Tourism monitor

Bridging the death valley of R&D



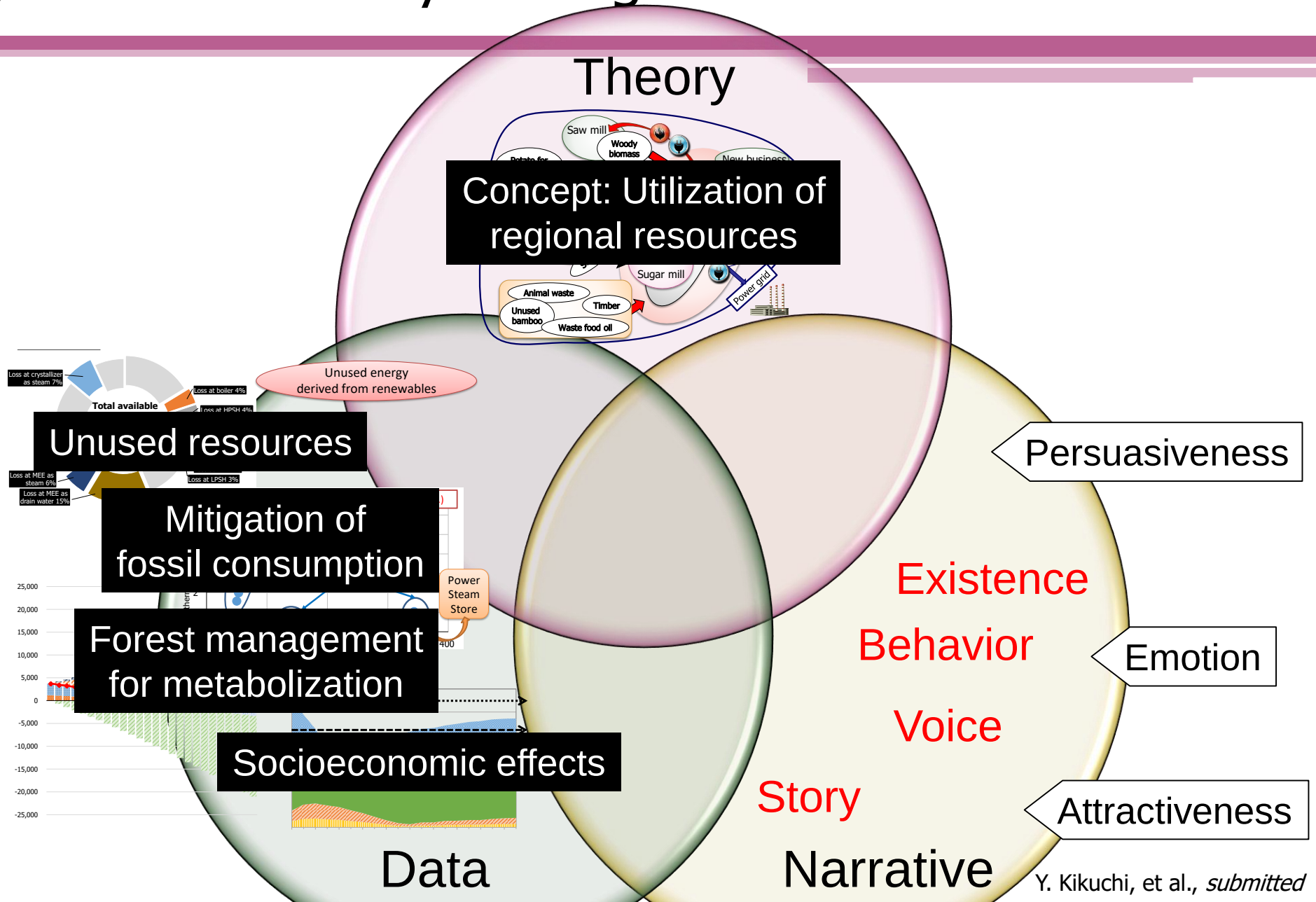
Y. Kikuchi, et al., *submitted*

Bridging the death valley: Tanegashima case



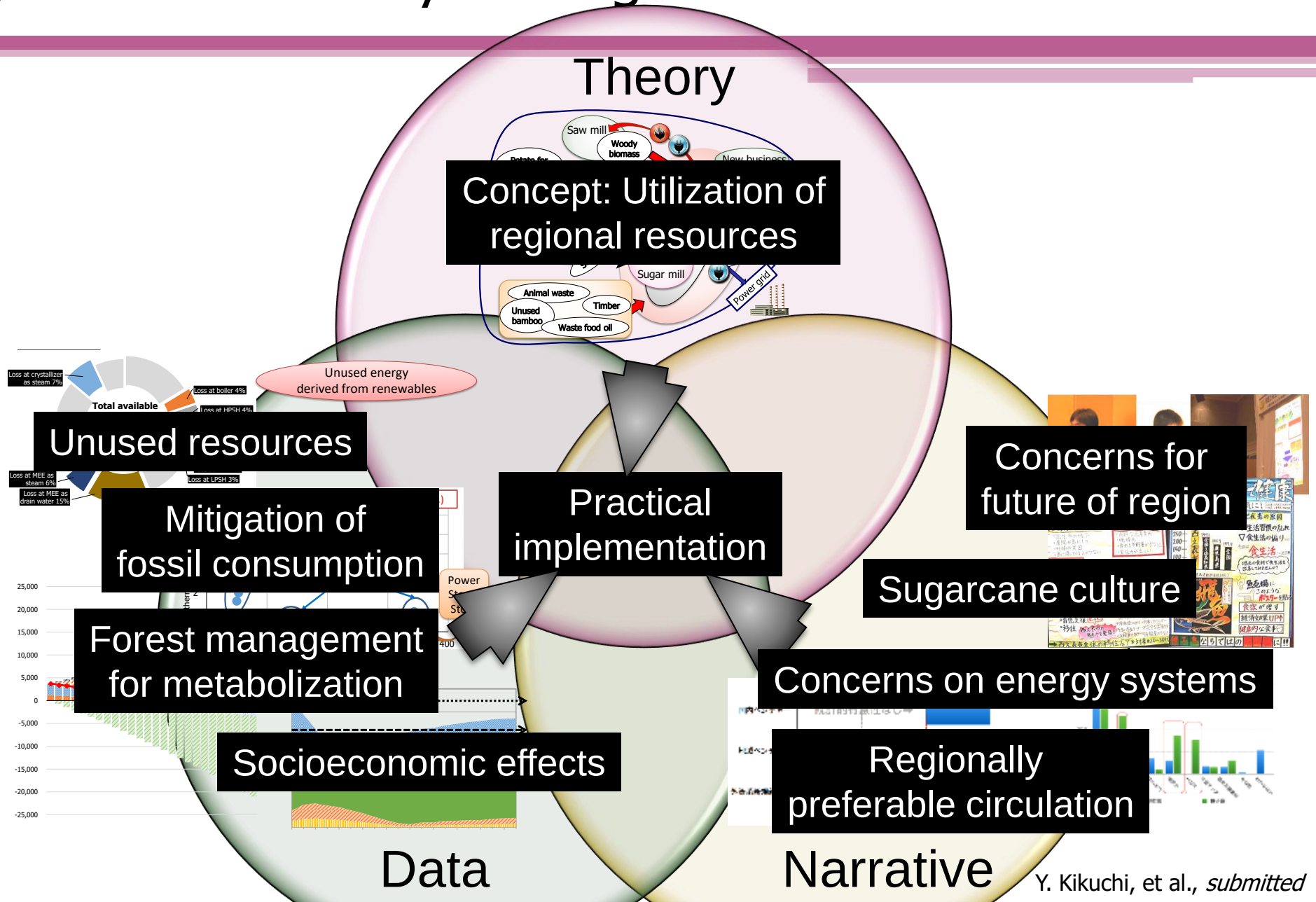
Y. Kikuchi, et al., *submitted*

Bridging the death valley: Tanegashima case



Y. Kikuchi, et al., *submitted*

Bridging the death valley: Tanegashima case

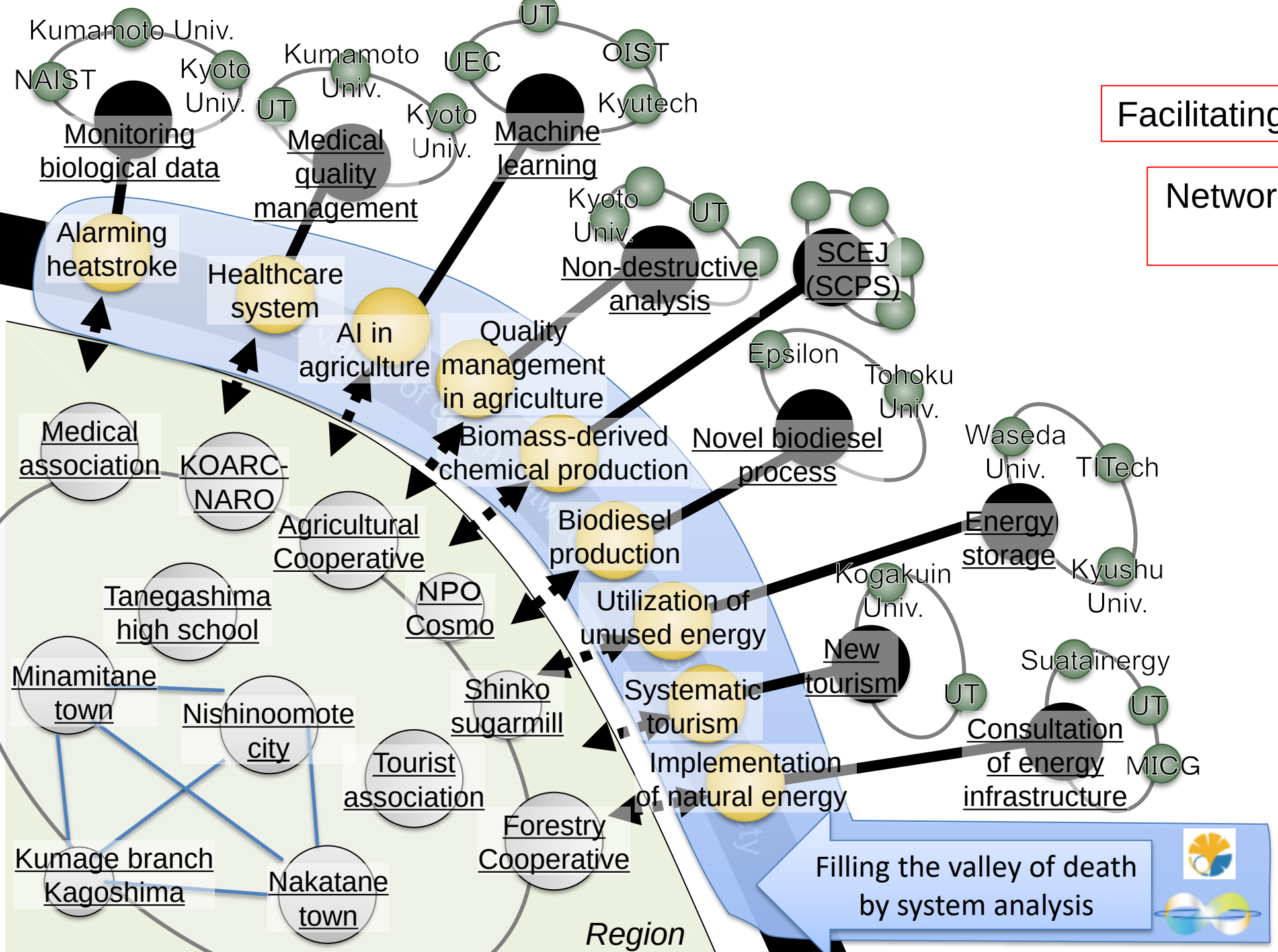


Y. Kikuchi, et al., *submitted*

For networking networks

Facilitating colearning community

Networking inside and outside of region



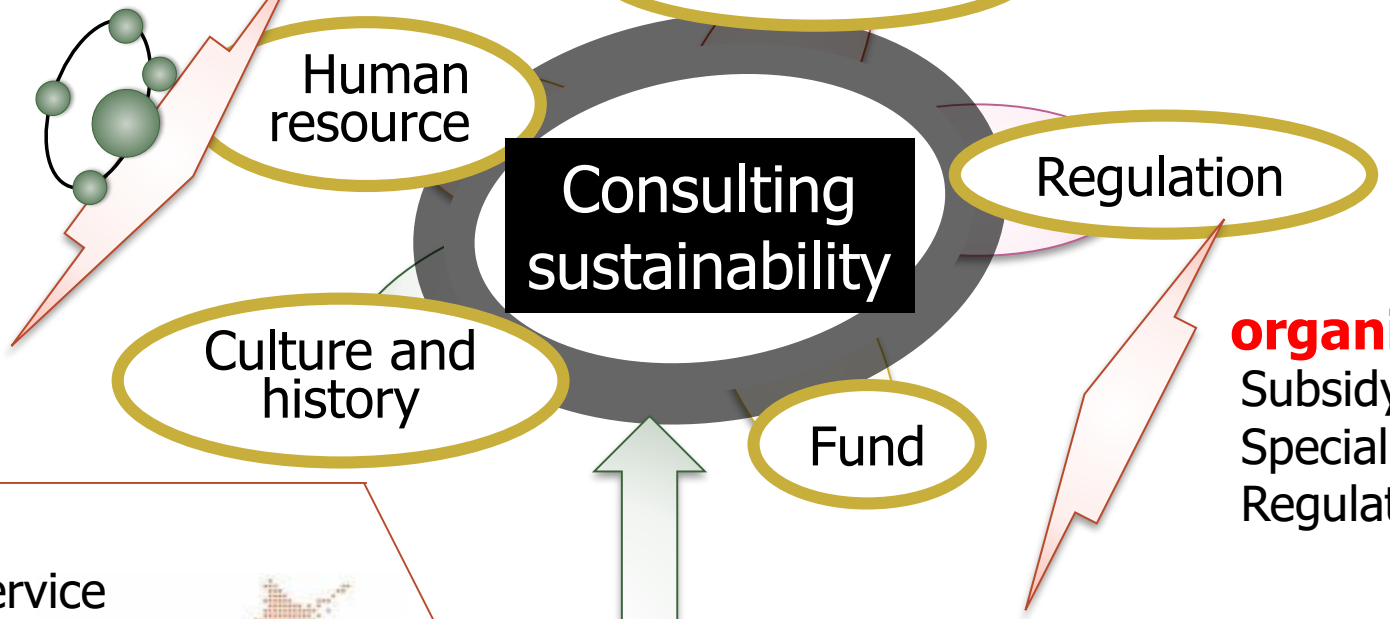
Technology assessment/Social implementation

Partners of Value chain、Supply chain

Senior, Intellectual property（dead patents etc.）, Funding

University

Network of Networks.
Research activities for public systems
(medical, waste, etc.)



Public organization

Subsidy,
Special economic zone,
Regulation, Regional network

Implementation

- Regional industry service
  - Lease of industrial machine
  - Staffing for agriculture and forestry
  - Process engineering
- Energy management

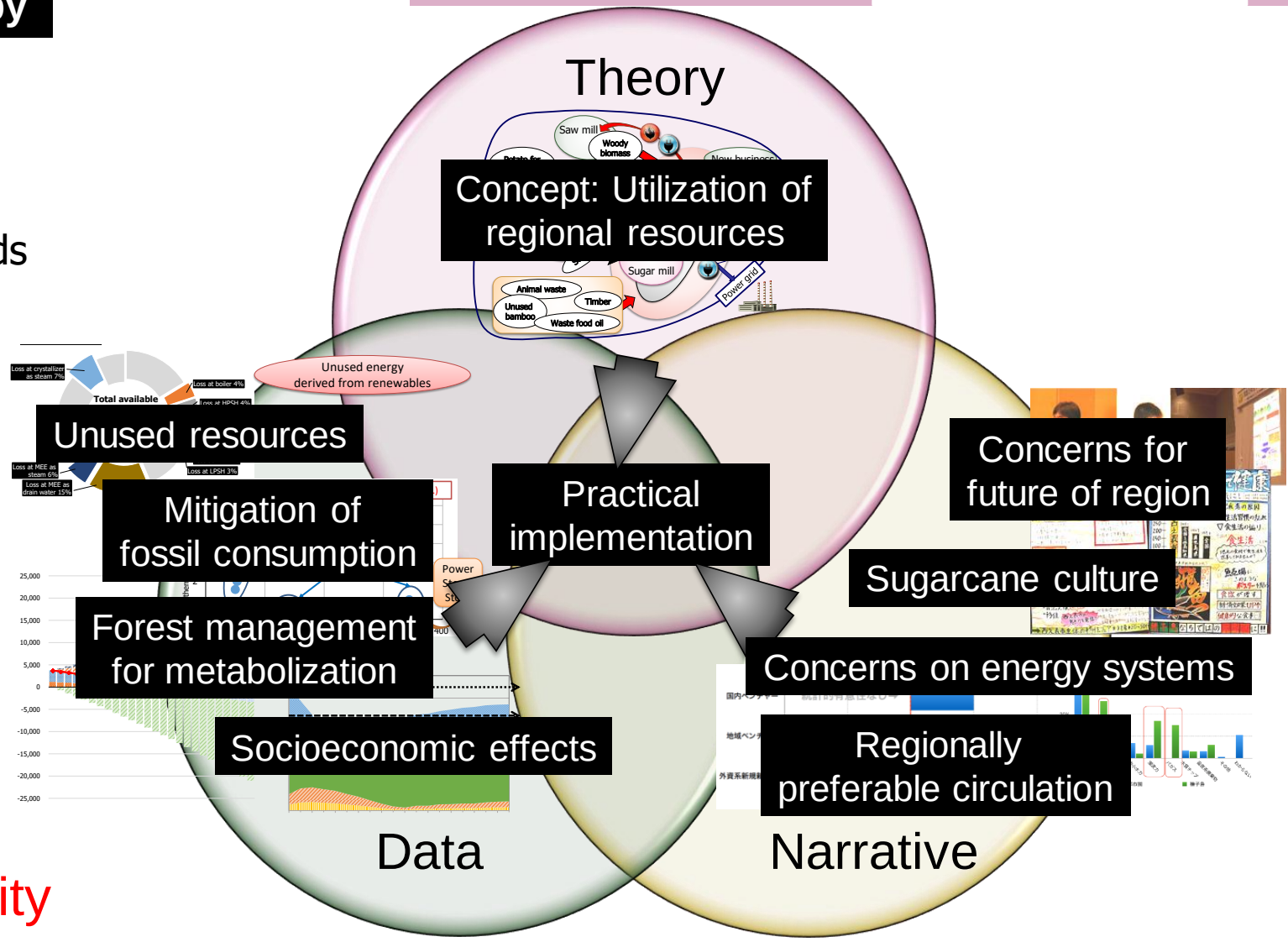
- Licenser
- Research & Development
- Business (consulting, maintenance)
- Assist (capacity building)

Summary: Regional transformation by technology implementation

Regional transformation can be supported by

- Multiscale simulation
  - Analysis on relationships among technology options and local systems
  - Specification of research and action needs
- Visualization of "circulation"
  - Roles of LCA, IO analysis, and MFA
- Colearning based on Theory, Data, and Narrative among multiple stakeholders to become players

Network of networks becomes a driving force towards sustainability



Y. Kikuchi, et al., *submitted to Sustainability Science*

Regional Development

Markus Lemmens

CEO & Co-owner of Lemmens GmbH,
Education, Science and Technology, Germany

LEMMENS
Bildung, Forschung, Technologie

Creating societal impact of science

through alliances with your region

Might the Hidden Champions idea work?

- *Conceptional approach*
- *Data analytics and method*
- *Advanced communication*

Markus Lemmens

Lead Question

Might the concept of „Hidden Champions“ (primarily designed for regional companies working on global markets) – supported by an elaborative use of data analytics – can advance the science communication and hence visualize the impact of universities and non university organizations in regions and beyond?

Our contribution to the debate :

„Hidden Champions“ in Science and Humanities – how to advance communication and research marketing 2025?

Published by Lemmens Media – Education, Science, Technology, Bonn-Berlin (expected 2020)

"Hidden champions are relatively small but highly successful companies that are concealed behind a curtain of inconspicuousness, invisibility, and sometimes secrecy."

This is a common explanation.

"`Hidden champions´ are mainly medium-sized companies which hold a leading international market position and are not well known to the general public despite their success. But they should be – because executives of all companies can learn a lot from the successful concepts of hidden champions. At the same time, the hidden champions themselves have to face and cope with special challenges."

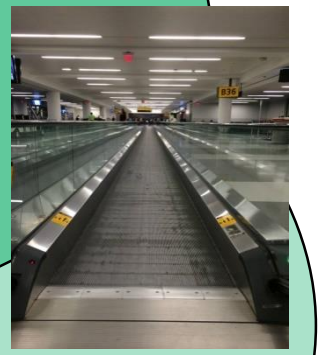
This is the opener on the ESMT website (European School of Management and Technology, Berlin) with the "Hidden Champions Institute" (HCI), the first worldwide. https://execed.esmt.berlin/hci

History: The HCI idea was co-invented by Prof. Dr. Hermann Simon, a professor for economics and business administration and founder of the base concept of Hidden Champions in 1996 in cooperation with the management consulting firm Simon, Kucher & Partner.

How can we use the HC concept for scientific institutions?

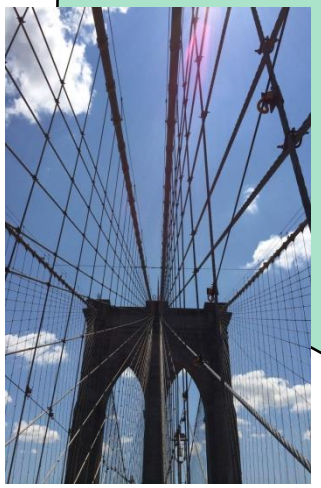
(3) Effect

= feature the fabric of a knowledge society; answer, how to translate scientific results either as insights or as contributions for solutions/grand challenges; getting more stories supported by data/information to the surface



(2) A need for advanced Methodes/Formats in Science and Research Communication

= empirical analysis/data analytics, added by qualitative evidence (journalistic research and interviews); use of benchmarks; public awareness founded by relevance



(1) Hidden Champions in Science, Research & Humanities

= strong & successful track record; clear targets and audience related; intended selected appearance in public; „family"/scientifically driven (of course supported by a good governance/management system); challenged by political/public demand to show their societal relevance; game changer might come along with the digitalisation (E Science/E Education)

How do we work? What will be the difference of the planned publication?

I.: Comparison of 4-6 (various topics, different locations/regions) Clusters of Excellence (CoE) *with* funding by the German Excellence Strategy (ExStrategy) (timeline 2008 plus…) and II.: 4-6 CoE *without* but supported by various other sources (regional, European, by industry or foundations). The project relys on the hypothesis that data analytics & methods of journalistic research and self-appraisal can bring the relevance of science much better to light than traditional communication formats.

Questions – what are the ingredients of reputation and footprint? How might a broader impact study lead to a better regional visibility and beyond?

Data and structures – patents, publications etc., knowledge and technology transfer system, public affairs practice, briefing of stakeholders, public research marketing

Governance & Management – people, instruments, experience, peer learning

Communication

Method: data analytics, benchmark, analysis, journalistic interviews, self-appraisal by the researchers and/or cluster directors, communication formats

Our Data: We work with Scopus data and SciVal analytics, analysis provided by Elsevier.

Summary for CEPLAS

Example one: funded by the ExStrategy

Overall research performance

Entity: CEPLAS_new · Year range: 2013 to 2019 · Data source: Scopus, up to 10 May 2019 ·

Scholarly Output	Researchers	Field-Weighted Citation Impact
1,917 ▼	56 ▼	2.01

Citation Count	Citations per Publication
38,192	19.9

CEPLAS - the Cluster of Excellence on Plant Sciences aims to assemble a blueprint of the genetic mechanisms that control complex plant traits with sufficient detail to enable predictions of trait performance in different environments. This knowledge is crucial for the design of new crop varieties using predictive trait engineering and will be important for sustainable food security for a growing population faced with climate change. CEPLAS integrates the resources of the **Universities of Cologne and Düsseldorf, the Max Planck Institute for Plant Breeding Research, and the Forschungszentrum Jülich** into an internationally leading plant science center that attracts world-class faculty and junior researchers (since 2013). https://www.ceplas.eu/en/about-us/vision/

Overview of Functional Biodiversity Research (Uni Göttingen)

Example two: not funded by the ExStrategy

Overall research performance

Entity: Functional Biodiversity Research (Uni Göttingen)

Year range: 2013 to 2019 Data source: Scopus, up to 19 Apr 2019

Scholarly Output	Researchers	Field-Weighted Citation Impact
1,036 ▼	14 ▼	1.95

Citation Count	Citations per Publication
15,481	14.9

The Cluster of Excellence **"Functional Biodiversity Research"** at the University of Göttingen was established as a research cluster by January 1, 2008, through funds of the State of Lower Saxony (Ministry of Science and Culture). Man has dramatically increased plant and animal extinction rates on earth. Since processes such as productivity, water purification, pollination and natural pest control are influenced by biodiversity, genetic erosion may threaten ecosystem functioning and can impair ecosystem services used by man. A group of scientists from functional, taxonomic and applied biodiversity research from **three faculties of the University of Göttingen** with expertise in plant and animal ecology, agroecology, biogeochemistry, and environmental economy has formed an interdisciplinary platform to conduct collaborative research on functional biodiversity research in Central Europe and in the Tropics, and to attract and promote excellent junior scientists in the field. The scientific concept includes new innovative diversity manipulation experiments in grasslands and in the soil, and investigates the functional role of intraspecific genetic diversity in populations of woody plants. https://www.uni-goettingen.de/de/76642.html

Outputs in Top Citation Percentiles summary

Entity: CEPLAS_new · Year range: 2013 to 2019 · Data source: Scopus, up to 10 May 2019 ·

Publications in top 10% most cited worldwide

CEPLAS_new
38.9%

Publications in Top Journal Percentiles summary

Entity: CEPLAS_new · Year range: 2013 to 2019 · Data source: Scopus, up to 10 May 2019 ·

Publications in top 10% journals by CiteScore Percentile

CEPLAS_new
67.9%

Outputs in Top Citation Percentiles summary

Entity:
Functional Biodiversity Research (Uni Göttingen)
Year range: 2013 to 2019
Data source: Scopus, up to 19 Apr 2019

Publications in top 10% most cited worldwide

Functional Biodiversity Research (Uni Göttingen)
30.5%

Publications in Top Journal Percentiles summary

Entity:
Functional Biodiversity Research (Uni Göttingen)
Year range: 2013 to 2019
Data source: Scopus, up to 19 Apr 2019

Publications in top 10% journals by CiteScore Percentile

Functional Biodiversity Research (Uni Göttingen)
53.6%

International Collaboration summary

Entity: CEPLAS_new · Year range: 2013 to 2019 · Data source: Scopus, up to 10 May 2019 ·

Publications co-authored with researchers in other countries

CEPLAS_new
58.6%

Academic-Corporate Collaboration summary

Entity: CEPLAS_new · Year range: 2013 to 2019 · Data source: Scopus, up to 10 May 2019 ·

Publications with both academic and corporate affiliations

CEPLAS_new
5.4%

International Collaboration summary

Entity:
Functional Biodiversity Research (Uni Göttingen)
Year range: 2013 to 2019
Data source: Scopus, up to 19 Apr 2019

Publications co-authored with researchers in other countries

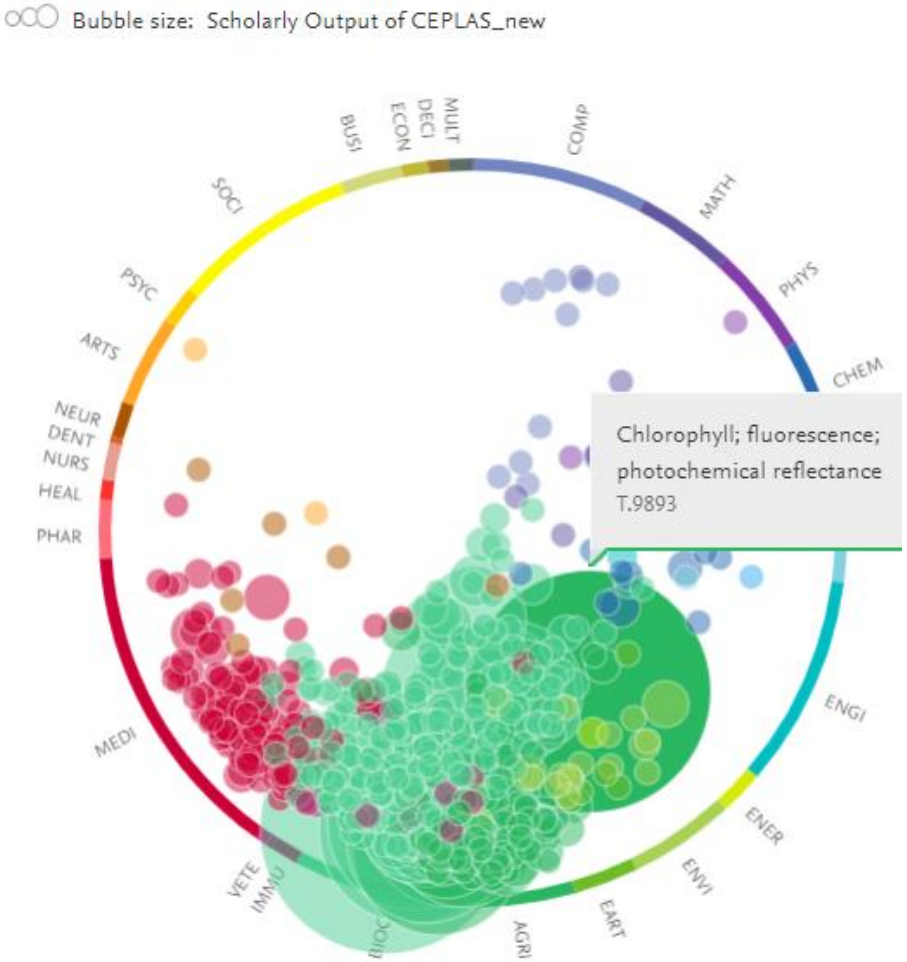
Functional Biodiversity Research (Uni Göttingen)
51.2%

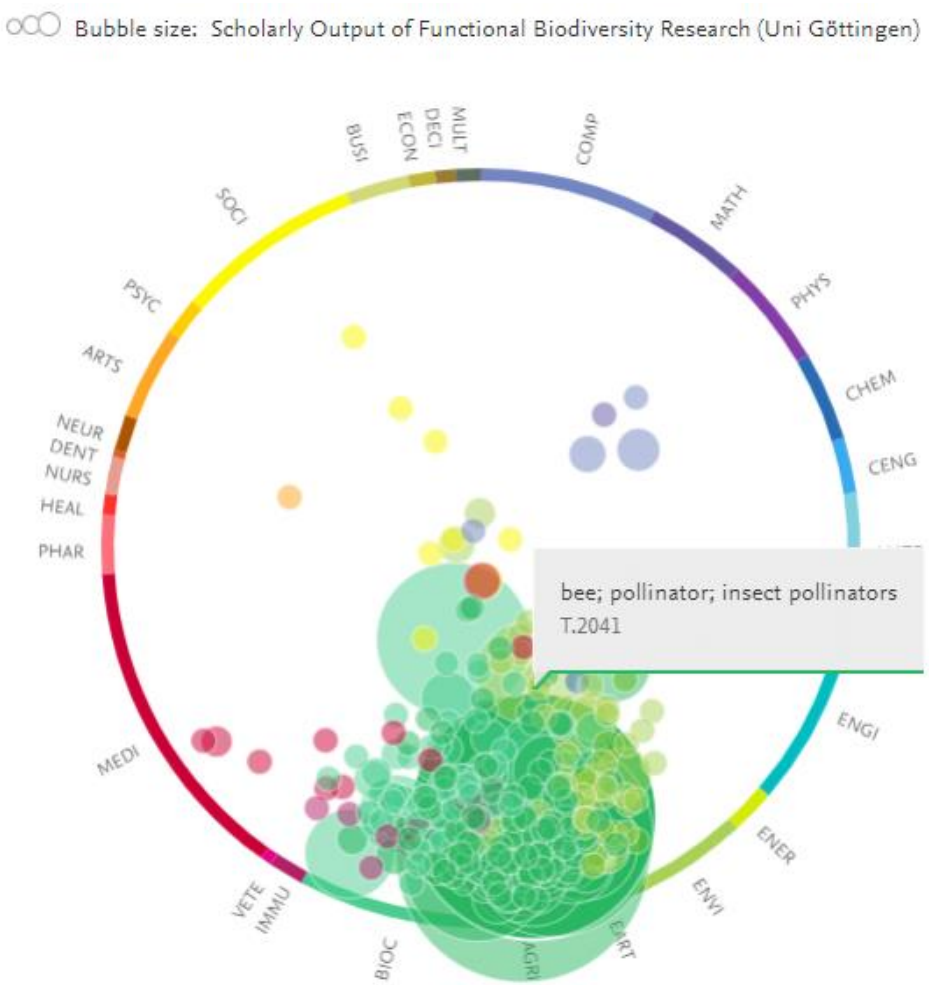
Academic-Corporate Collaboration summary

Entity:
Functional Biodiversity Research (Uni Göttingen)
Year range: 2013 to 2019
Data source: Scopus, up to 19 Apr 2019

Publications with both academic and corporate affiliations

Functional Biodiversity Research (Uni Göttingen)
3.5%


Bubble size: Scholarly Output of CEPLAS_new
BUSI
ECON
DECI
MULT
COMP
MATH
PHYS
CHEM
SOCI
PSYC
ARTS
NEUR
DENT
NURS
HEAL
PHAR
MEDI
VETE
IMMU
BIOC
AGRI
EART
ENVI
ENER
ENGI
Chlorophyll; fluorescence; photochemical reflectance
T.9893


Bubble size: Scholarly Output of Functional Biodiversity Research (Uni Göttingen)
BUSI
ECON
DECI
MULT
COMP
MATH
PHYS
CHEM
CENG
SOCI
PSYC
ARTS
NEUR
DENT
NURS
HEAL
PHAR
MEDI
VETE
IMMU
BIOC
AGRI
EART
ENVI
ENER
ENGI
bee; pollinator; insect pollinators
T.2041

Different impact study – adequate set of communication formats

SCIENTIFIC IMPACT

Field-Weighted Citation Impact (FWCI)

ECONOMIC IMPACT

patents and patent citations, university-industry collaboration

SOCIETAL IMPACT

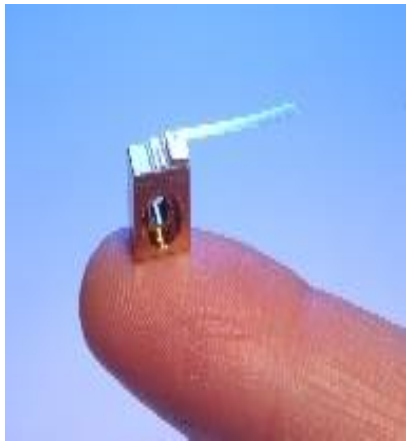
traditional and social media analyzed through Newsflo, Plum Metrics (altmetrics)

POLICY IMPACT

citations in government papers, trade press and clinical regulations

Finally – linking science and society (regions) might work better:

1) Science and research communication will rely on data analytics and analysis…



2) …use qualitative methods (interviews, self-appraisal etc.)…

3)…is understood as a concept based on the idea of Hidden Champions who have more to tell that they usually do and they always link their regions with the global world.

Thank you!

Regional Development

Marina Ranga

European Commission Joint Research Centre
Seville, Spain

The European Commission's science and knowledge service

Joint Research Centre

Creating societal impact of science through regional alliances: the impact of Smart Specialisation

Dr. Marina Ranga

7 June 2019
Berlin

Outline

1. What is Smart Specialisation, what's new, why is it important?

2. The Smart Specialisation operational framework promoted by the JRC
   - The project "Targeted Support to RIS3 in Lagging Regions"
   - JRC's S3 Platform and the three Thematic Platforms
   - Support to Key Enabling Technologies (KETs) and their impact on regional development

3. Major societal effects of Smart Specialisation

What is Smart Specialisation?

Core of EC Cohesion Policy for place-based regional innovation (DG REGIO)

- National or regional **research and innovation** strategies better connected to **business and local development needs**

- **Bottom-up "Entrepreneurial Discovery Process to** identify new technology and market opportunities that create country/region **competitive advantage**

- **Targeted investments** to address **emerging market opportunities, niches**

- *Ex-ante* conditionality ERDF, better use Structural Funds

EU Regulation 1301/2013 of the European Parliament and Council of 17/12/2013

National /regional RIS3 strategies

- Over 120 RIS3 strategies prepared by EU Member States and regions identifying national and regional priorities for R&I investments in 2014-2020
- Over EUR 40 billion from ERDF funds (+ over EUR 65 billion of national co-financing) allocated to regions to fund these priorities in this period
- EUR 1.8 billion from the European Social Fund for human capital in RTDI
- Estimated impact of support to R&I and entrepreneurship:
  - help 5,000 enterprises to introduce new products to market
  - support 140,000 start-ups
  - create 350,000 new jobs by 2020

Based on plans in the national or regional operational programmes for 2014-2020:
https://cohesiondata.ec.europa.eu/themes

RIS3 and modernisation of EU industry

- Targeted investments in R&I to modernise EU industry through:
  - adoption of new technologies (e.g. digital technologies)
  - competing for new or emerging domains
  - emergence of new domains from existing industrial ones;
  - diversification based on synergies between old and new activities
  - foundation of entirely new innovation-driven business activities
  - adoption or co-development of specific technologies

- Building technology and innovation competences, skilled labour

- **Correlation of R&I policies and financing with industrial policies**

Smart specialisation: what's new?

Policy

- Identification of regional strengths/priorities in R&I through bottom-up approach (EDP) complementing top-down priority-setting
- Increased weight of regional level of R&I in multilevel governance
- Stronger articulation between governance levels (regional-national-EU)
- Regional strengths/priorities better captured in the RIS3 strategies
- **RIS3 at the convergence of R&I, industrial, and regional development policies**

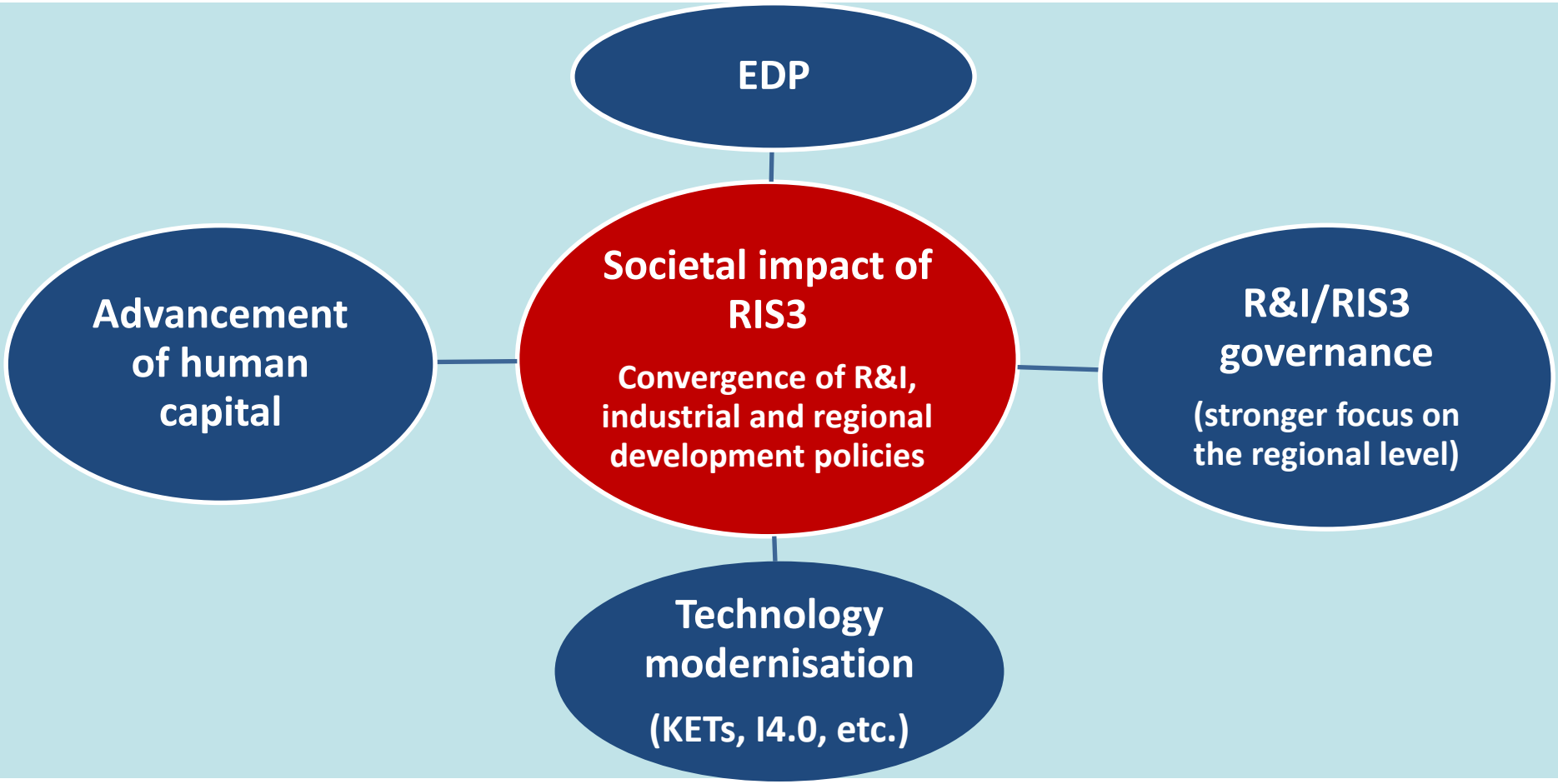
Process

- Systematic involvement of R&I stakeholders (Quadruple Helix)
- RIS3 monitoring and evaluation systems

Technology modernisation

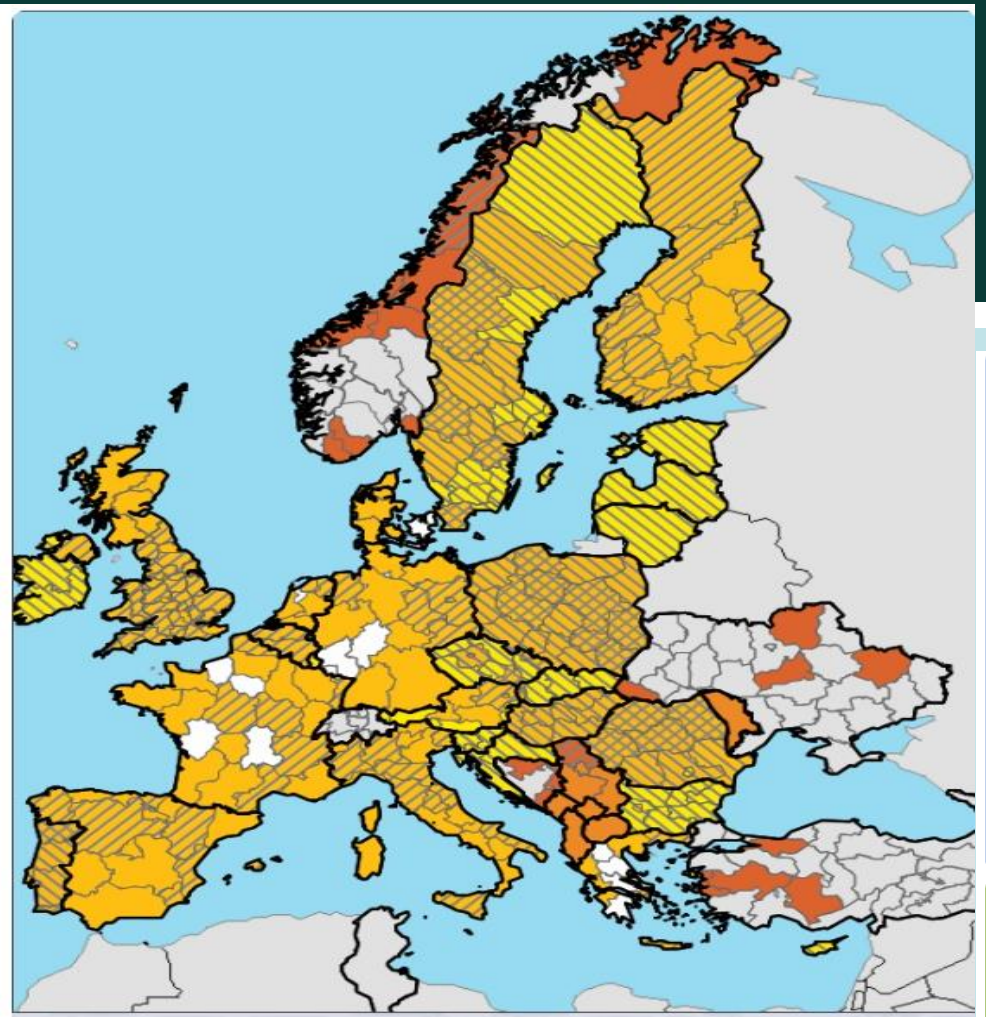
- Technology development, renewal, diversification, more access to global value chains
- New technology management competences, technology transfer competences
- Non research-driven innovation: organisational, market, soft skills

Societal impact of RIS3



S3P – JRC Seville

http://s3platform.jrc.ec.europa.eu/



- **EU Countries registered in S3P: 19**
- **EU Regions registered in S3P: 180**
- Non-EU Countries registered in S3P: 7
- Non-EU Regions registered in S3P: 18
- S3P Peer-reviewed Countries: 16
- S3P Peer-reviewed Regions: 75

JRC project "Targeted support to RIS3 implementation"

Five closely complementary JRC activities

STRIVE - Support to Transitions in Regional Innovation Eco-systems

Targeted RIS3 Support to Lagging Regions	Targeted RIS3 Support to Romania	Higher Education +VET in Smart Specialisation	Coal and industrial transition regions	Stairway to Excellence
European Parliament DG REGIO	European Parliament DG REGIO	DG EAC DG EMPL	DG ENER DG REGIO	European Parliament DG REGIO
2016 - 2020	**2016 - 2019**	**2016 - 2018-20**	**2018+**	**S2E-4 2018-20**

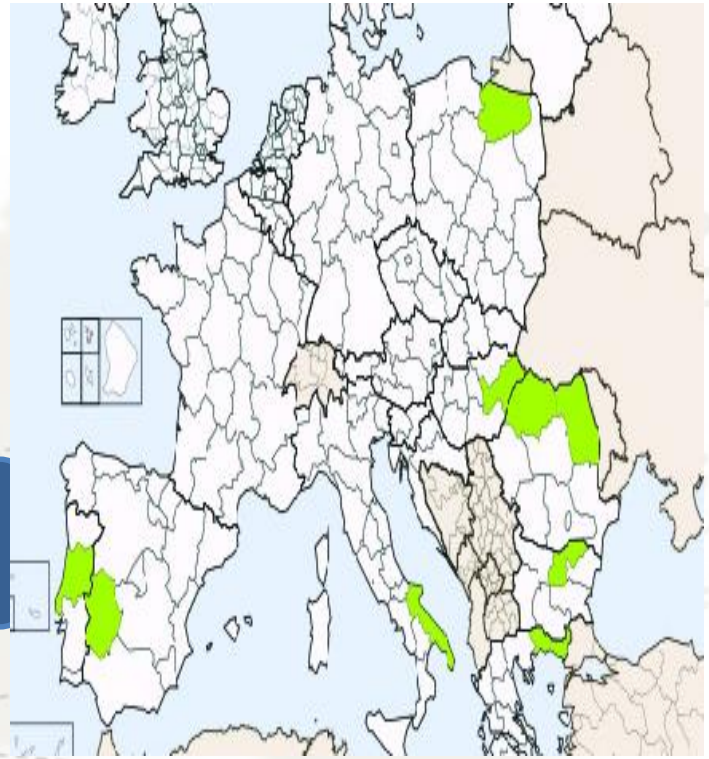
Regional coverage of the "Lagging Regions" project

1. Low-growth regions - GDP/capita below EU average

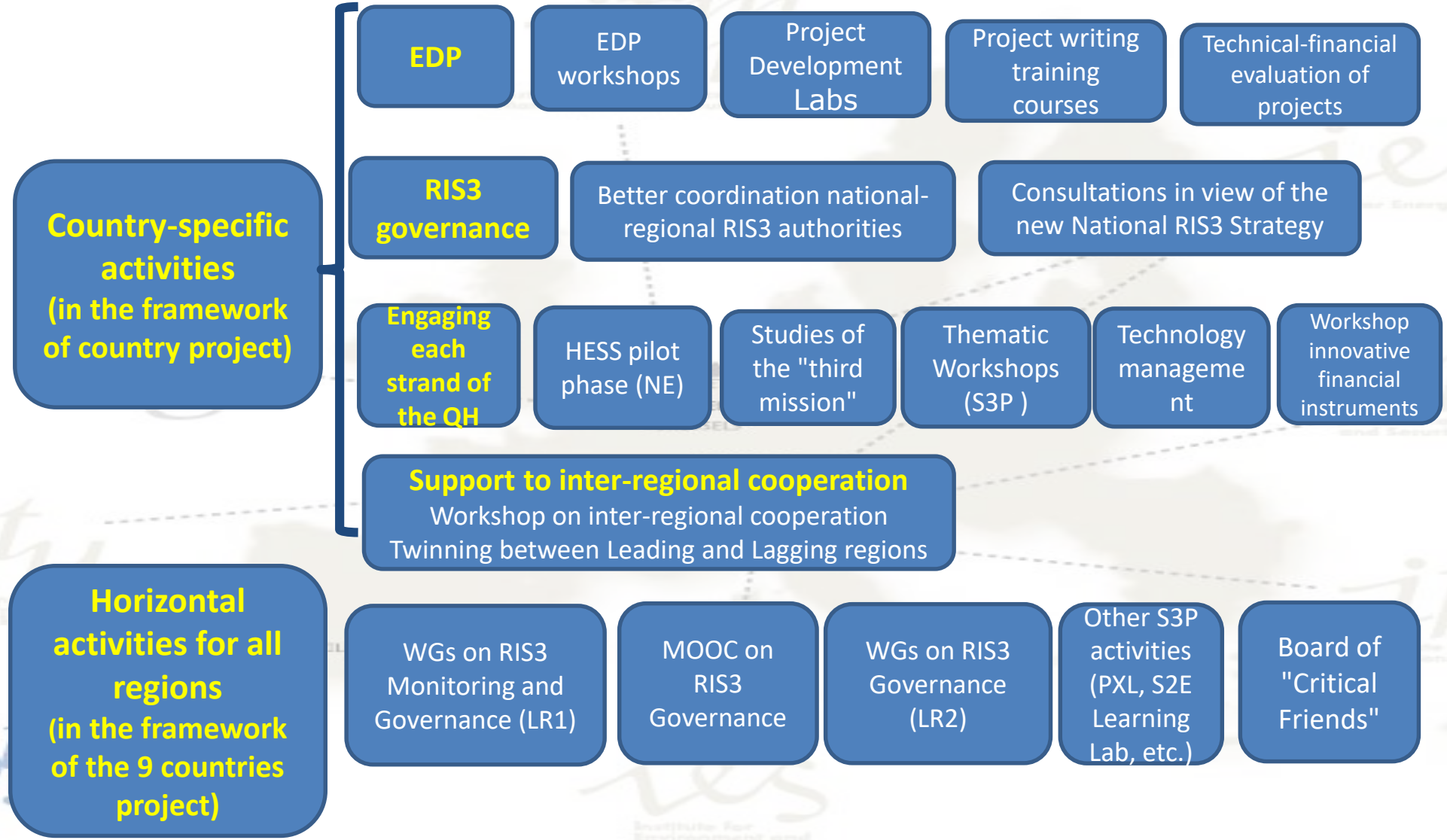
- Greece: Eastern Macedonia and Thrace
- Italy: Puglia
- Portugal: Centro
- Spain: Extremadura

2. Less developed regions - GDP/capita <50% of EU average

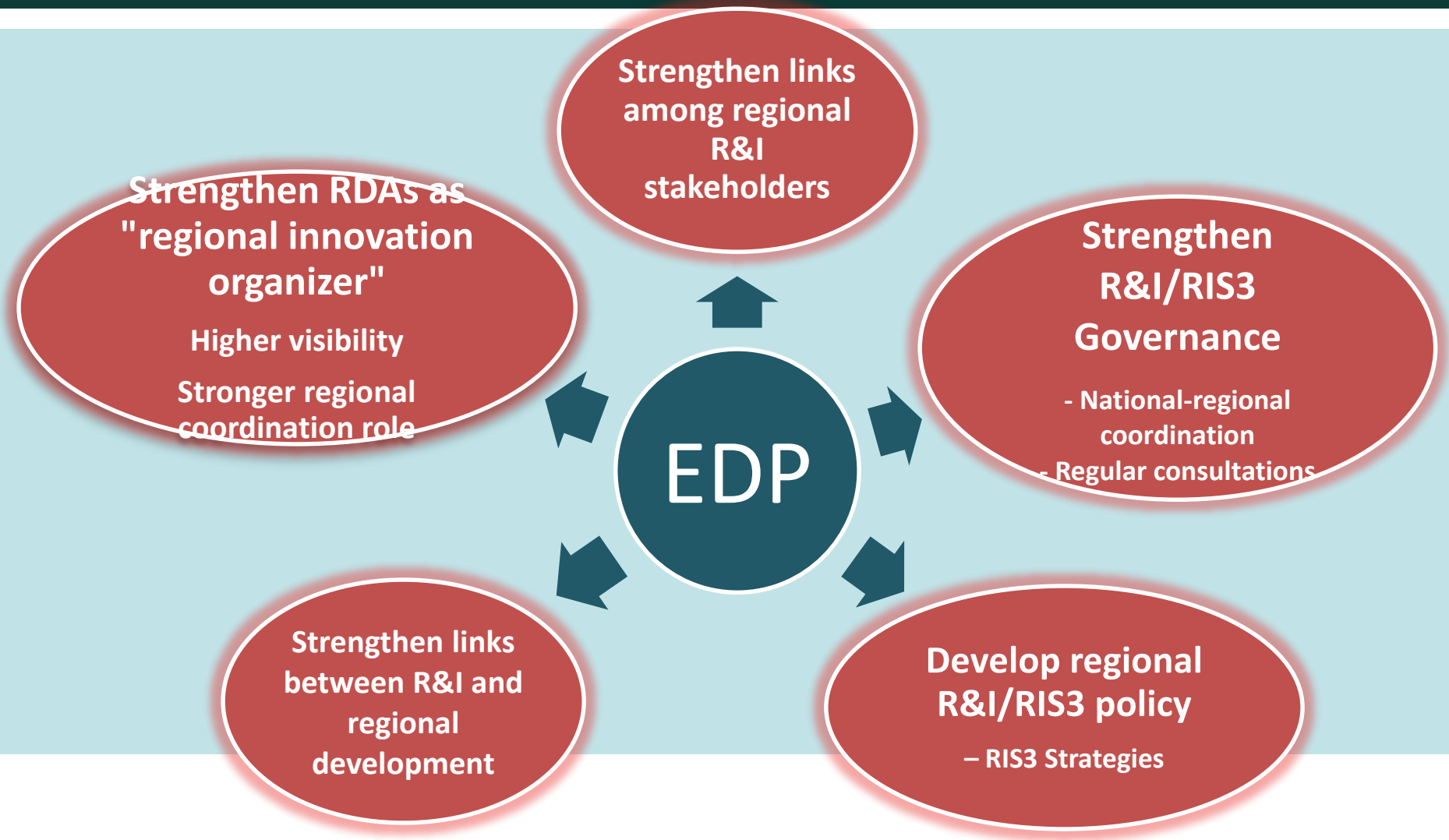
- Bulgaria: Severen Tsentralen, national level
- Hungary: Észak-Alföld (Stage 1), national level (Stage 2)
- Poland: Warminsko Masurskie (Stage 1), 3 new regions (Stage 2)
- Romania: Nord-Est and Nord-Vest (Stage 1), all 8 regions (Stage 2)
- Croatia (new in Stage 2)



RIS3 in Romania: Project toolbox



RIS3 in Romania: Multiple impact of EDP at regional level



S3P Thematic Platforms

Energy
(2015)

Industrial Modernisation
(2016)
Key Enabling Technologies (KETs)

Agri-Food
(2016)

- Over 100 regions proposed interregional partnerships on RIS3 topics to foster innovation, inter-regional value chains and develop joint investments, with EC support
- Interregional partnerships based on RIS3 priorities to create a pipeline of mature projects in new growth areas across the EU
- Partner regions develop or share infrastructure (testing facilities, pilot plants, data centres, etc.)
- Combine different EU investment instruments, e.g. ESIF, COSME, H2020 and EFSI

S3P Industrial Modernisation Platform

21 Thematic partnerships

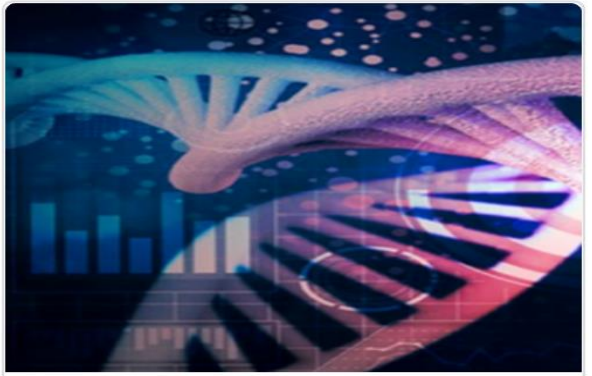
Advanced manufacturing

Non-food Biomass

Efficient and Sustainable Manufacturing

Textile Innovation

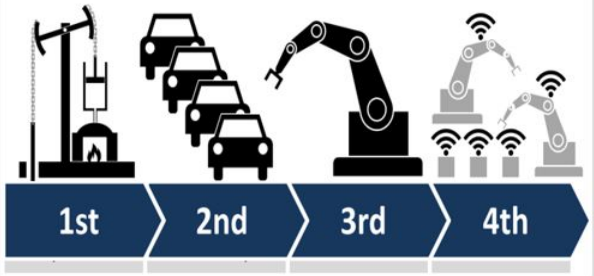
Medical technology



Photonics

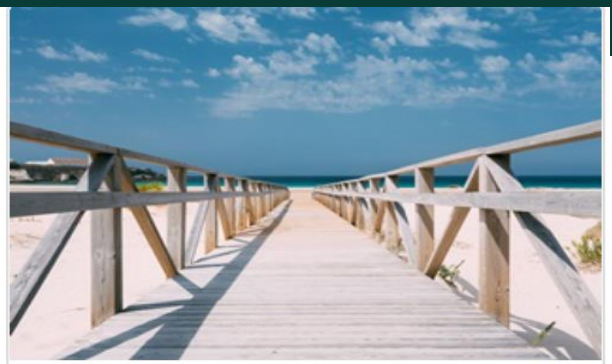
S3P Industrial Modernisation Platform

21 Thematic partnerships



SMEs to the Industry 4.0

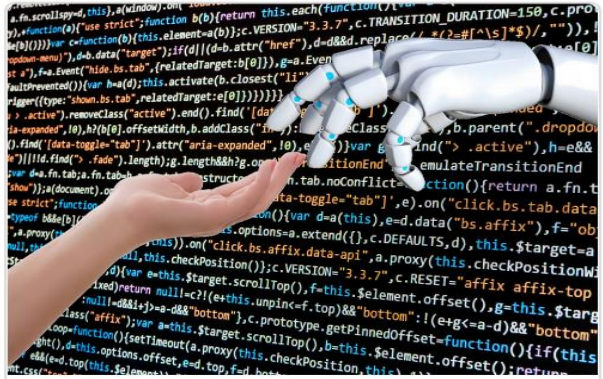
Sport



Digitalisation and Safety for Tourism

European Cyber Valleys

Social Economy

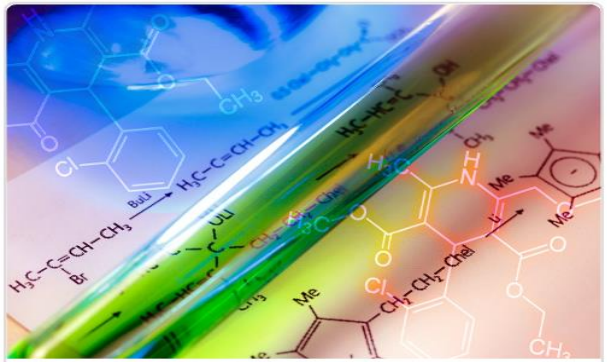


Artificial Intelligence & Human Machine

S3P Industrial Modernisation Platform

21 Thematic partnerships

Personalised medicine



Chemicals

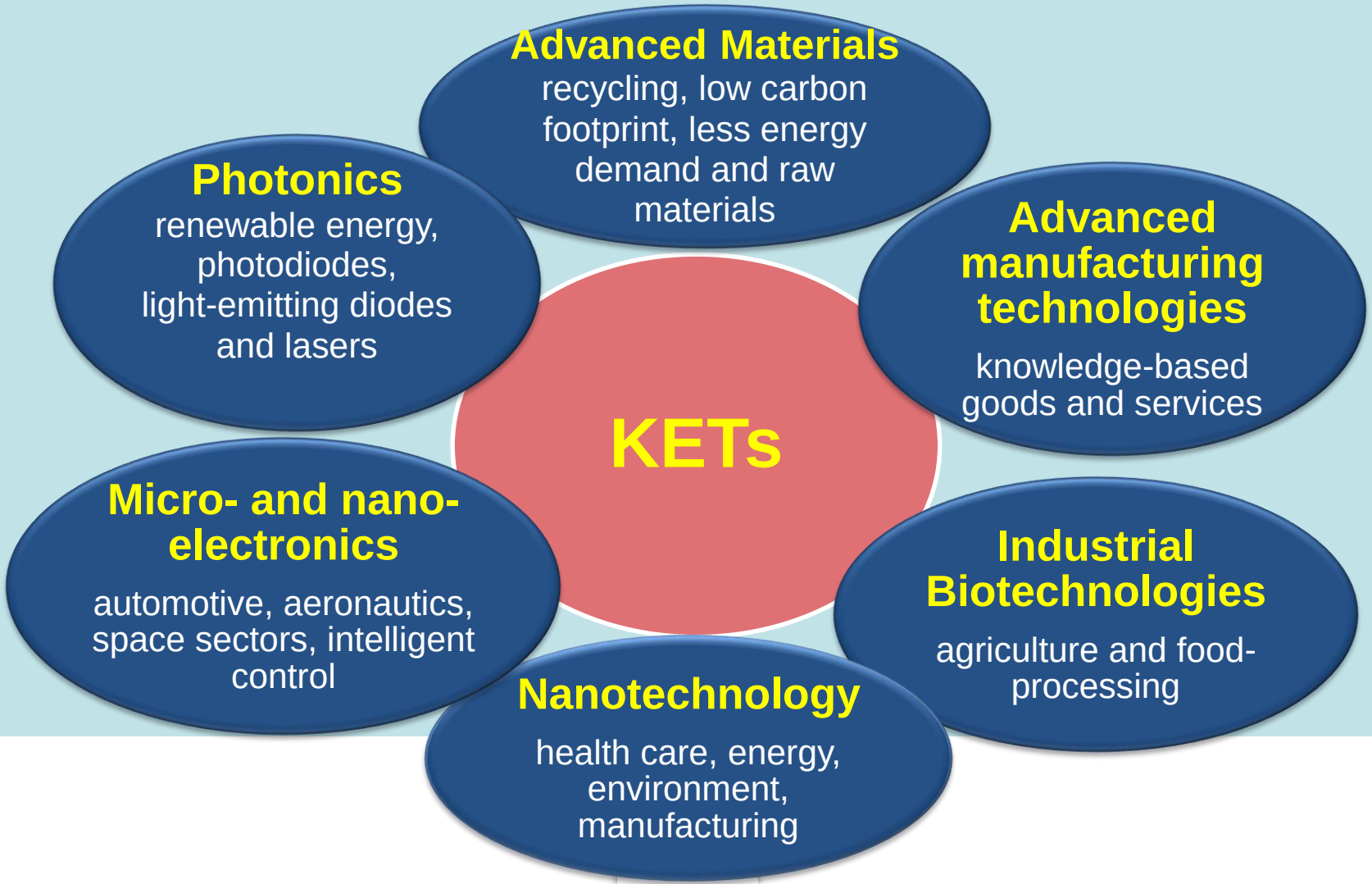
Safe and sustainable mobility

Advanced materials for batteries

Mining industry

Water Smart Territories

Key Enabling Technologies (KETs)



Why are KETs important?

- Innovation enablers: applications in multiple industries, both new and traditional, high economic and employment potential → economic crisis response
- Help solving societal challenges
- ‘Regional branching’ and diversification → create new regional technological advantages, advance regional economies
- Key element of an integrated European industrial policy

KETs economic impact

- Global market > EUR 1 trillion
- KET production volume EUR 953 bn (19% of total EU production)
- Growth potentials of 10 – 20% per year in coming years, depending on the KET
- Exports from EU countries account for 23% of world exports in KETs-based products
- 3.3 million European jobs
- Boost EU regions' growth, particularly lagging regions

Source: https://ec.europa.eu/growth/industry/policy/key-enabling-technologies/description_fr

Key RIS3 priorities and KETs

Over 1,300 RIS3 priorities encoded in the EYE@RIS3 database (Jan. 2017)

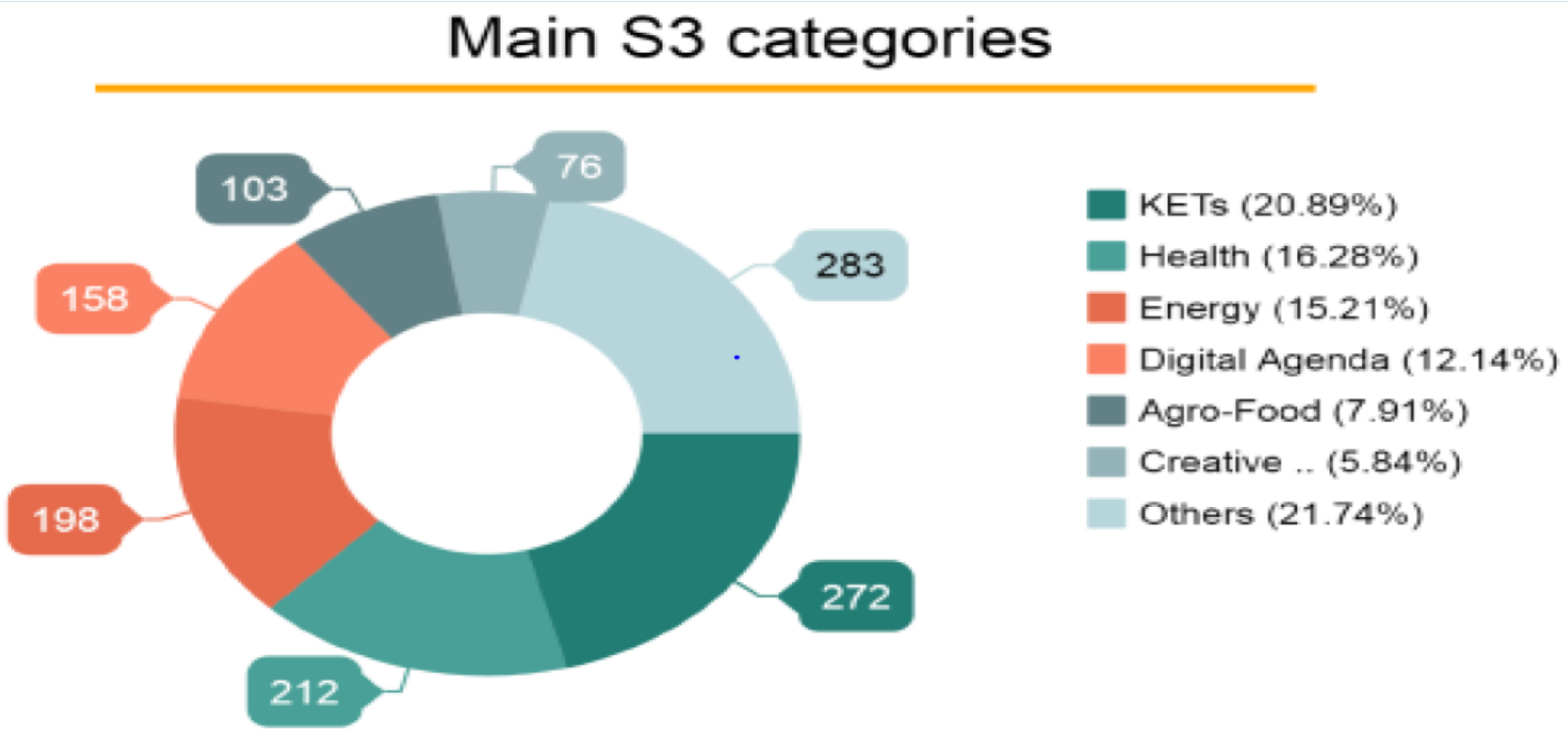


Figure 1: Main categories of EYE@RIS3 database
(Source: EYE@RIS3 database, 2017)

Hegyi and Rakhmatullin (2017)

Key RIS3 priorities and KETs

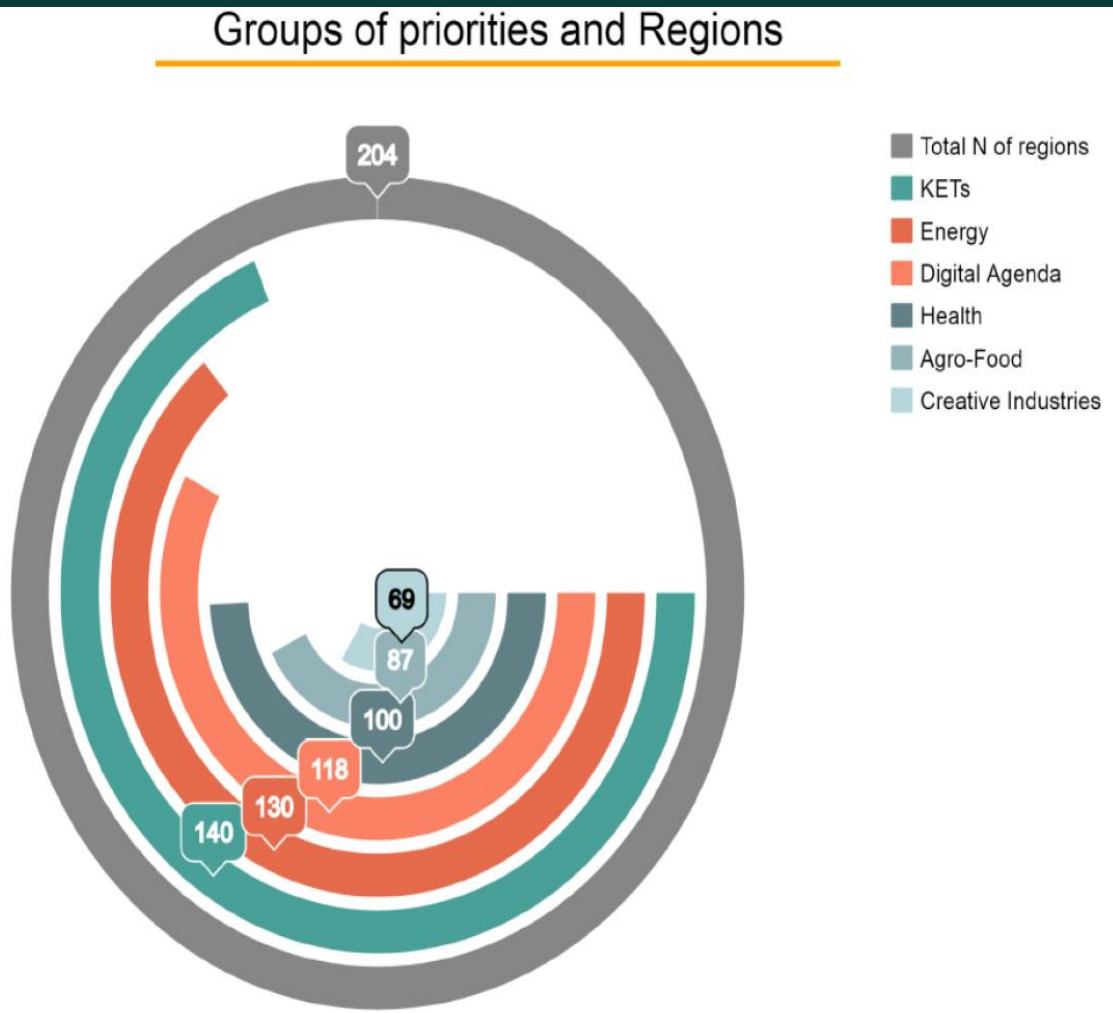
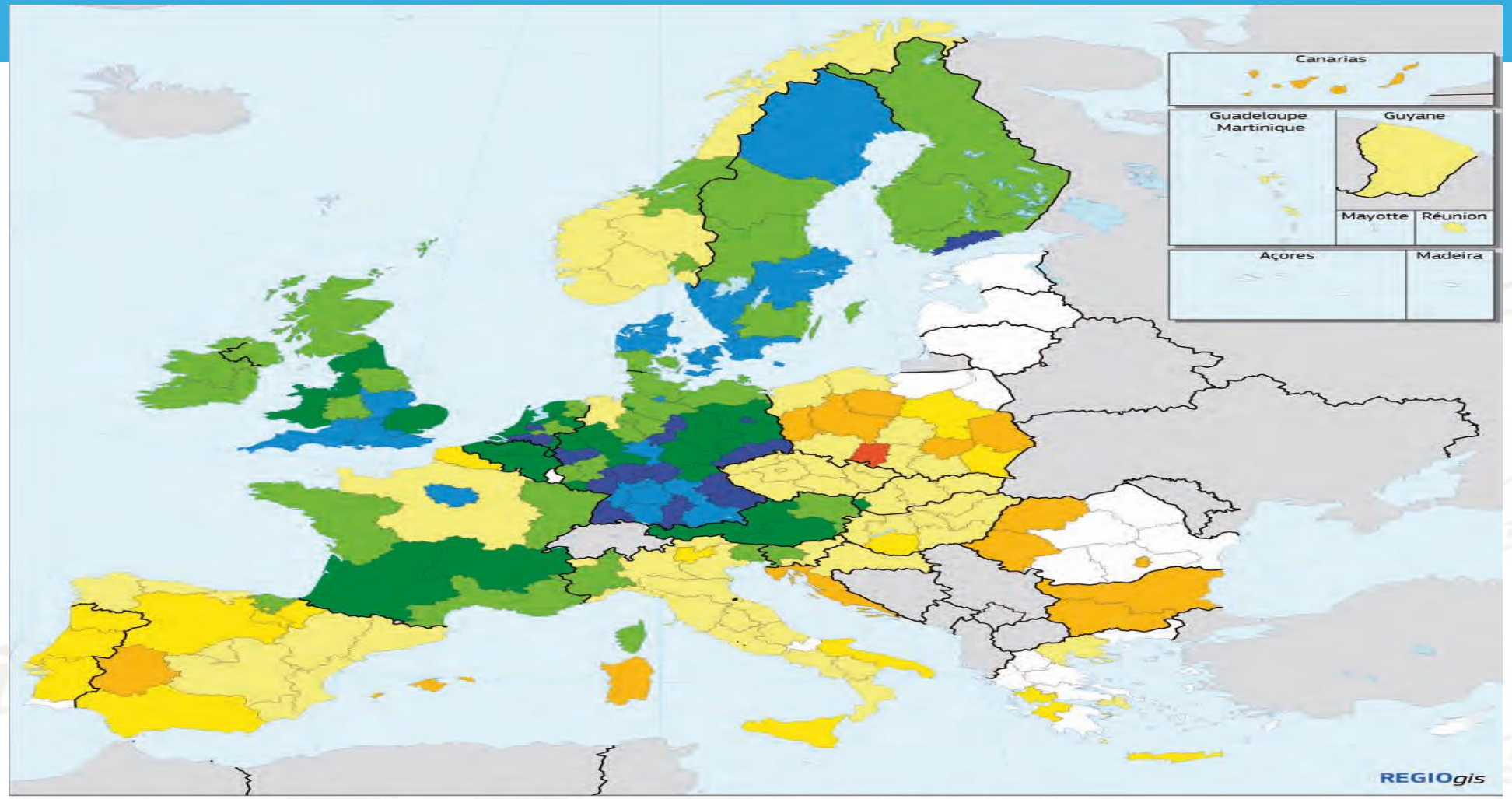


Figure 2: Smart Specialisation Priorities encoded by regions (*Source*: EYE@RIS3 database)

- 68% of all regions and MS have at least one RIS3 priority related to KETs
- 58% of regions have at least one RIS3 priority linked to the Digital Agenda.

Hegyi and Rakhmatullin (2017)

KETs specialisation and innovation performance



KETs specialisation and innovation performance, a map of Europe

- NO DATA FOR RTA
- MODEST INNOVATOR, RTA < 1
- MODEST INNOVATOR, RTA > 1
- MODERATE INNOVATOR, RTA < 1
- MODERATE INNOVATOR, RTA > 1
- STRONG INNOVATOR, RTA < 1
- STRONG INNOVATOR, RTA > 1
- INNOVATION LEADER, RTA < 1
- INNOVATION LEADER, RTA > 1

0 500 Km

KETs and regional development

Do KETs impact differently technologically advanced and laggard regions?

- **Advanced regions**: higher knowledge and R&D intensity, rapid innovation cycles, high capital expenditure, highly skilled employment, cumulative innovation → **KETs increase regional technological strength, expand European technology frontier at the cost of further widening technological and economic gaps in the EU**.

- **Less advanced regions** can use KETs broadly in traditional industries, shift existing activities to new ones and extend applications of engineering and manufacturing capabilities to technologically related domains, boost regional productivity and activate catching-up processes.

KETs specialization benefits are greater for technology laggard regions than for more innovative regions

(Evangelista et al. 2017)

Support to KETs through RIS3 strategies

- RIS3 strategies strengthen the regional knowledge base for KETs.
- Raise awareness of SMEs for KETs
- Bring KETs closer to the regional production and innovation systems
- Include more research results into KETs regional value chains, clusters
- Technological upgrade of existing industries in a region, involving KETs
- Exploit KETs as drivers for cross-sectoral and cross-cluster innovation
- Provide KETs financing through combination of various financial instruments
- Skilled workforce and entrepreneurs to handle the multi-disciplinary KETs.
- Setting up a monitoring mechanism on KETs to modernise a region

RIS3 as a catalyst for the development of early-stage regional innovation systems

Facilitating the emergence of some defining elements of RIS that were lacking before, or accelerating the development of others:

- Modernise regional R&I/knowledge base, dynamic learning process
- New institutional structures for R&I governance
- Network integration mechanisms among key innovation actors
- New regional industrial specialisations
- Collective identities built around RIS3 projects
- New forms of social capital (e.g. new UBC links and networks)
- Better positions on national and international markets and value chains
- Better capacity to attract skilled workforce, capital and ideas
- Build brand names in niche markets, revive traditional industries
- Better capacity to attract investors
- Address social, environmental, climate and energy challenges.

Thank you!

marina.ranga@ec.europa.eu