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Innovation, Growth and Responsability: Responsible Research and Innovation in Europe and the MARIE Project

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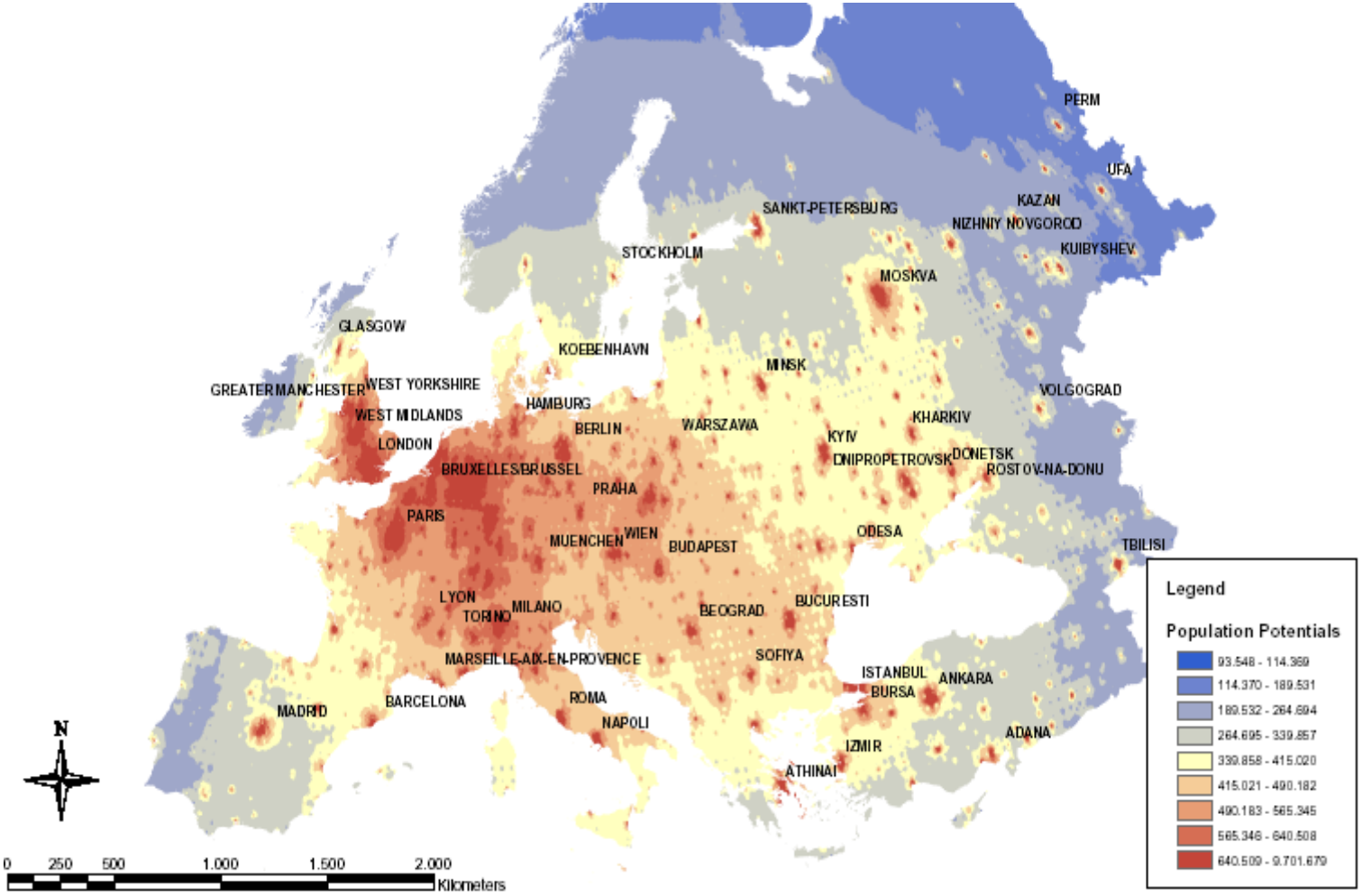
Innovation Growth and Responsabily. Responsible Research and Innovation in Europe. Lessons from the MARIE Project

- The trap of inefficient innovation ecosystems
- Innovation Archetypes: USA vs. Europe
- RRI: Main Definitions
- RRI in Action: The MARIE Project.
- RRI Maturity Assesments.
- Current Insights in RRI: Broadening Scope of Impacts

The Trap of Inefficient Innovation Ecosystems

Centre/Periphery structure inEurope



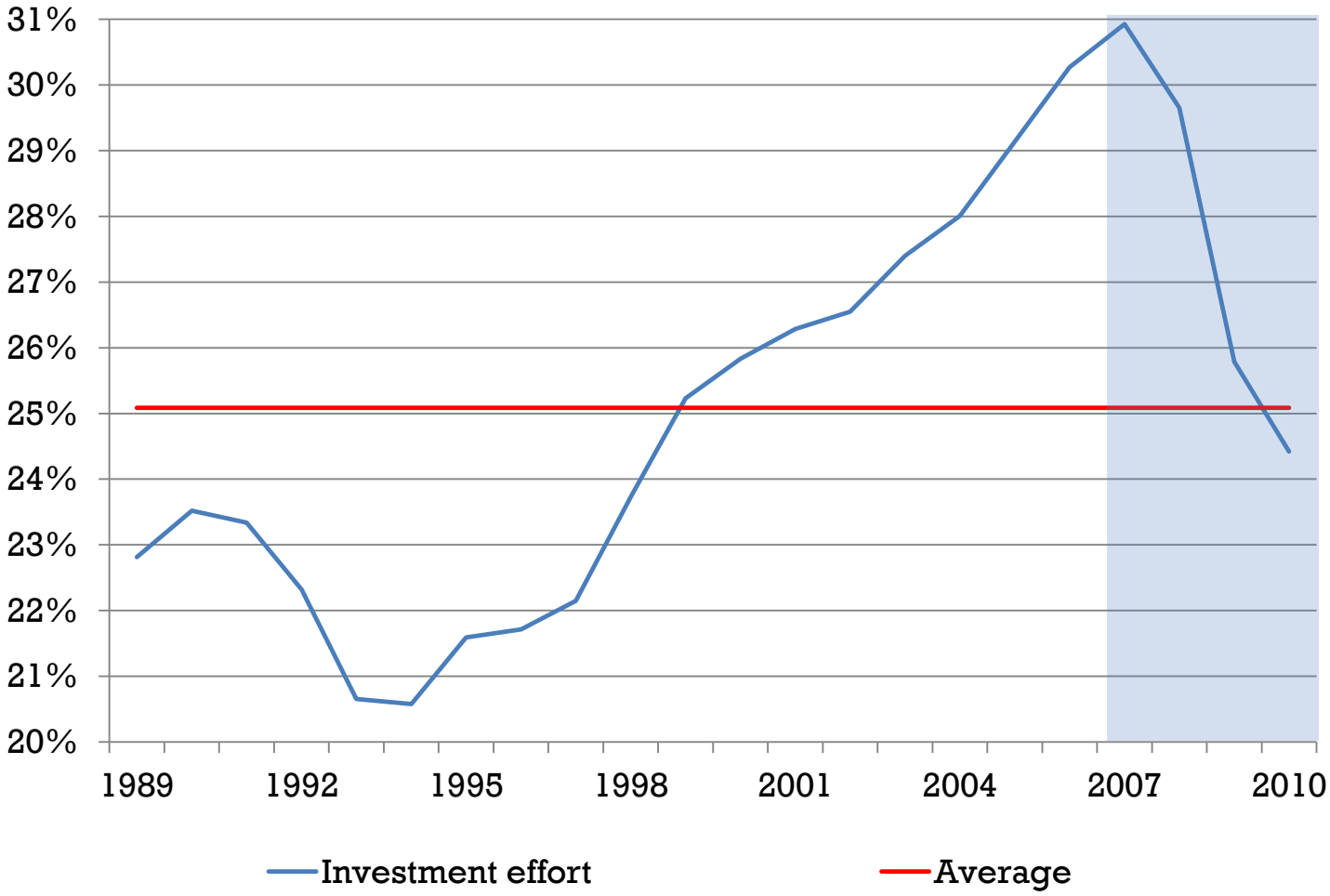
Fuente: Faíña, A. y J. López-Rodriguez (2006c)

Growth and Labor Productivy Spain vs EU15 1989 – 2010

Convergence EU15	**1989**	**1999**	**2007**	**2010**
Spain/EU15 - GDP/Per Capita %	62,0%	67,0%	69,7%	68,5%
Spain/EU15 - PIB/Per Employee %	82,2%	79,2%	70,3%	75,2%
Average Growth rate		**89-99**	**99-07**	**07-10**
GDPpc Spain		2,14%	1,86%	-1,43%
GDPpc EU15		1,44%	1,43%	-1,01%
GDP/Employee Spain		1,03%	-0,46%	1,65%
GDP/Employee EU15		1,38%	0,85%	-0,04%

Growth fueled by capital accumulation

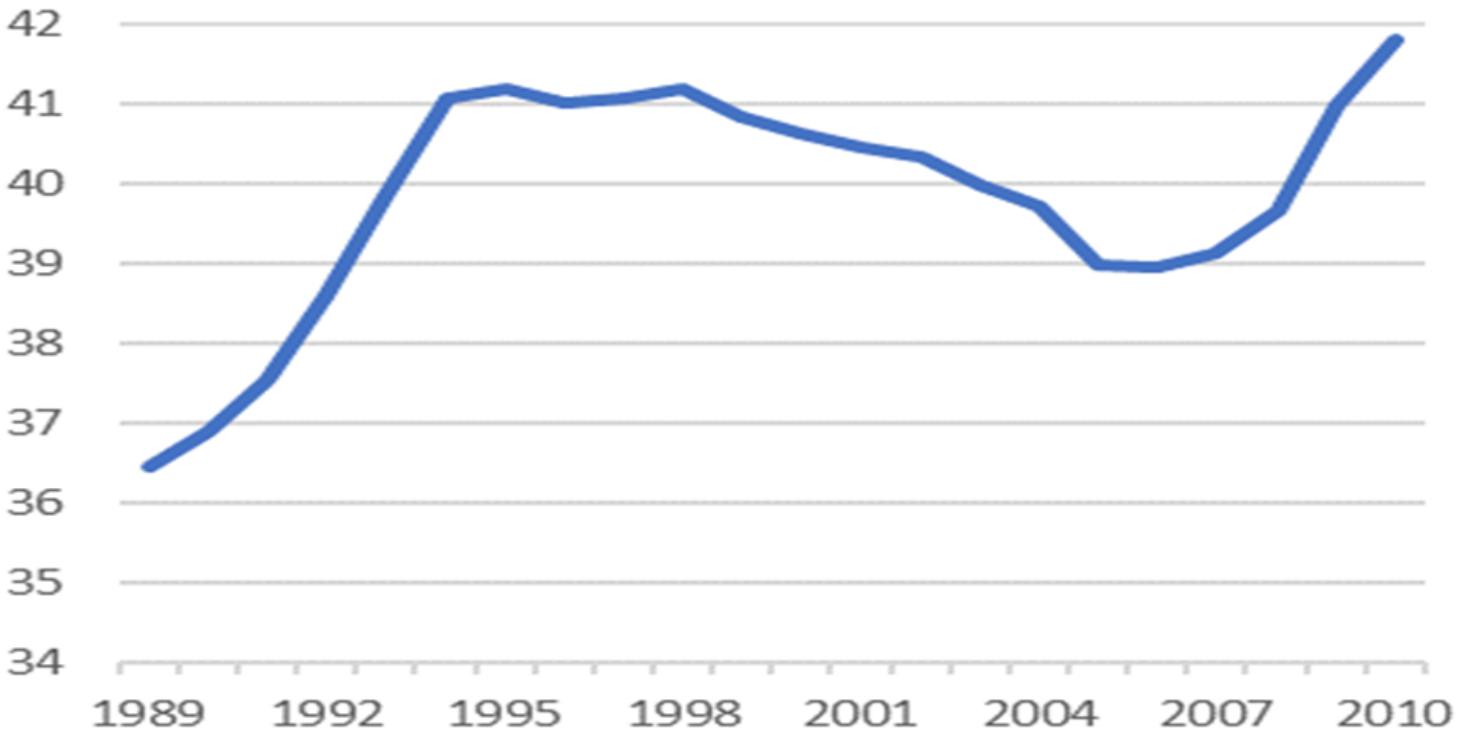
Investment effort % GDP
(Million EURO at constant prices year 2000



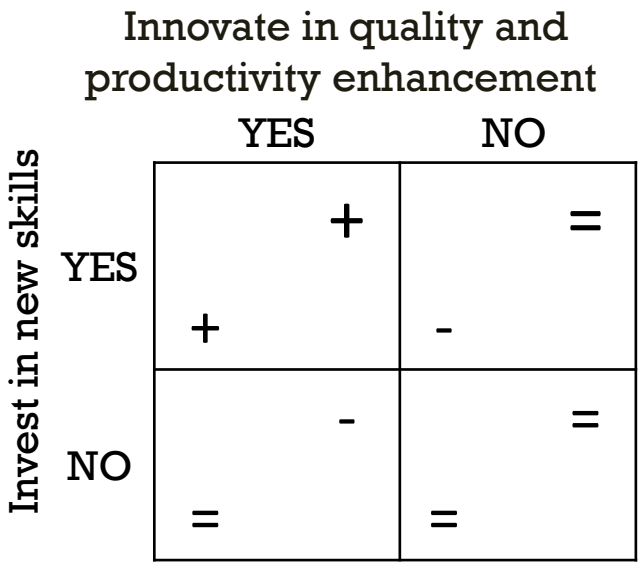
“Capital widening” Growth Type

Productivity per employee

Million EURO at constant prices year 2000



Growing like Spain: The trap of low-skills /low-quality equilibrium



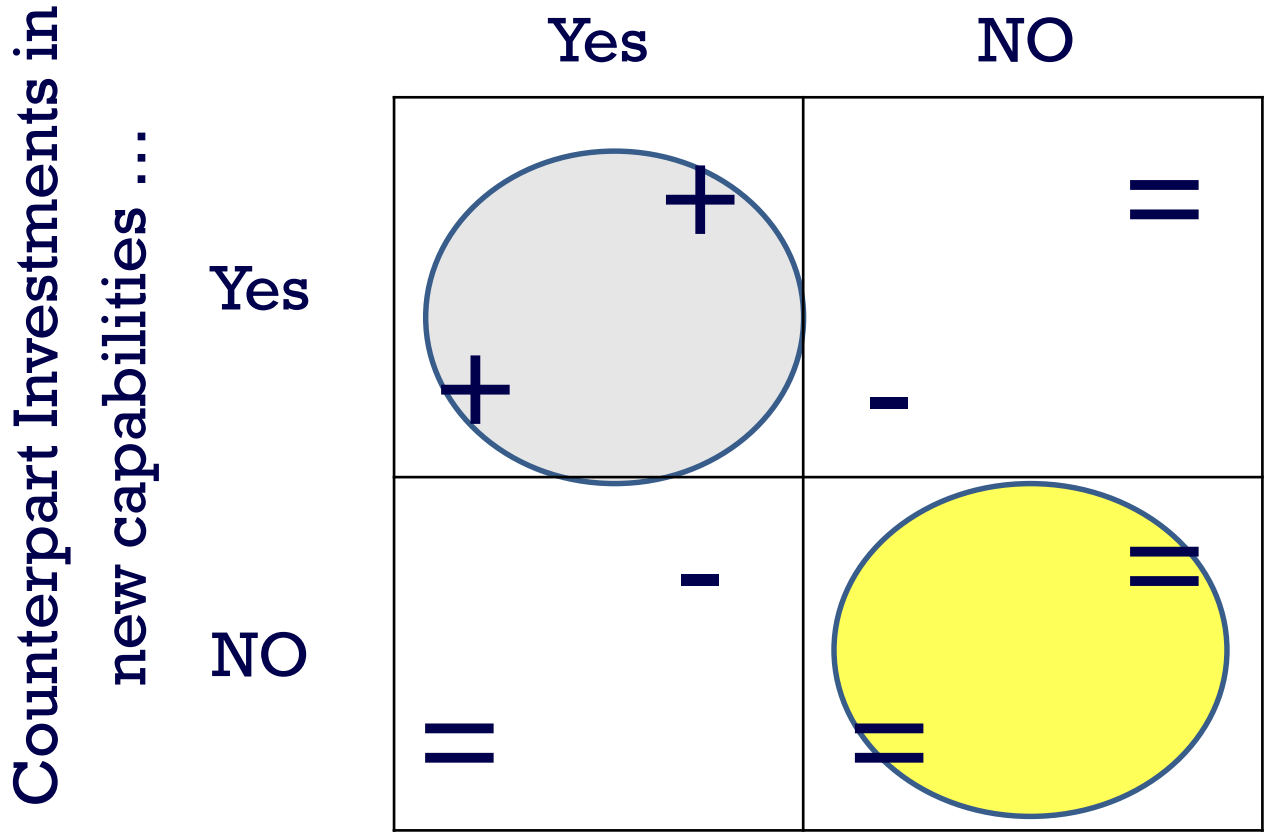
Getting out of the productivity trap is a difficult task which implies to solve a complicated incentives problem: the potential losses of the first movers

- ✓ Multiple growth equilibria can arise from the self-reinforcing dynamics of human capital and firms' RD investments (synergies), as well as from the incentives interplay between investments in developing skills and in quality-augmenting RI.
- ✓ The economy of a region can be trapped in a disadvantageous equilibrium of low-skills/low-quality falling into low-competitiveness dynamics, depending entirely upon agents' expectations, and a sound policy to drive out of the growth trap.

The Canvas of Innovation Ecosystems:

Innovation: Invention + Marketing

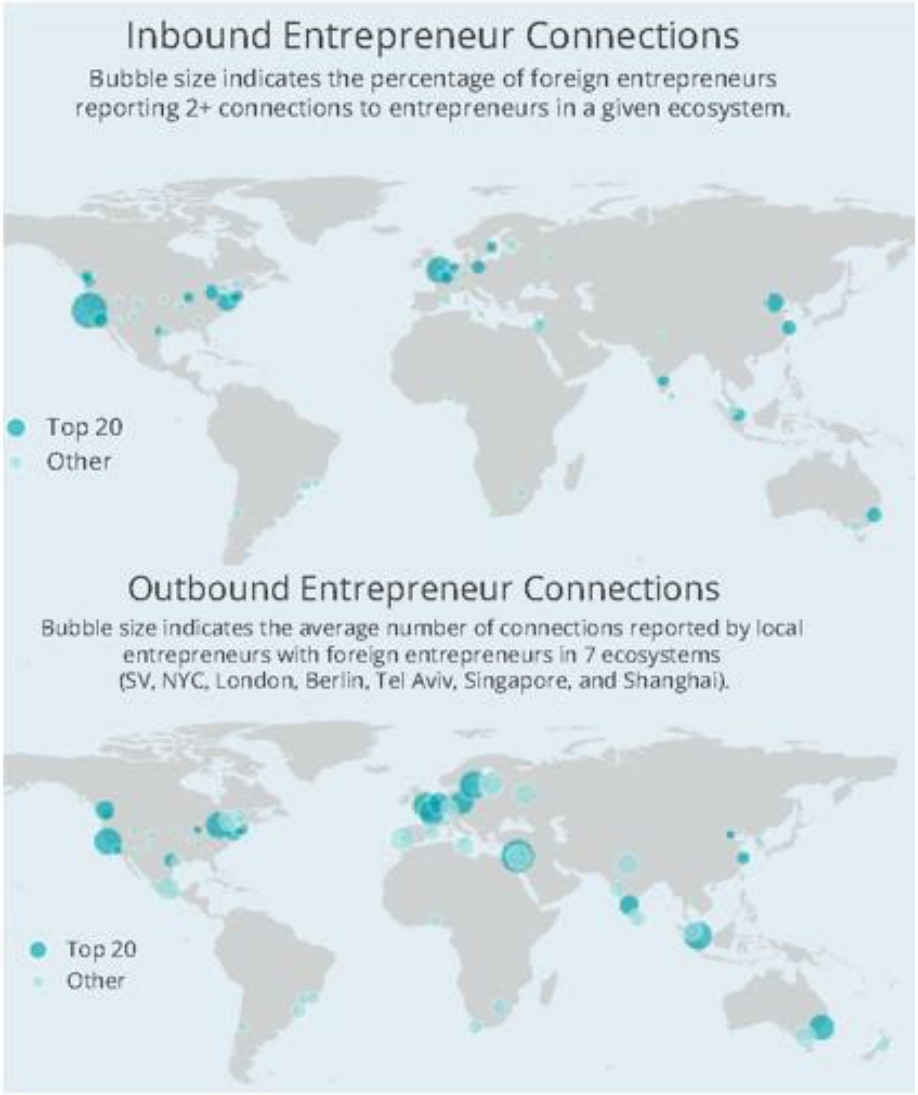
The trap of non innovation -based growth:



RRI as the right way

- ✓ A credible policy to boost the innovation ecosystem and Business Discovery processes at the heart of the RIS3
- ✓ Improve the "matching" between knowledge, science and technology, as well as between innovative ideas, commercial development and business models.
- ✓ Human Capacity Development, UNDP (1997), as "The development of individuals, groups and organizations to set and achieve objectives, perform functions and solve problems, as well as to develop the means and conditions required"

Innovation Archetypes: USA vs. Europe

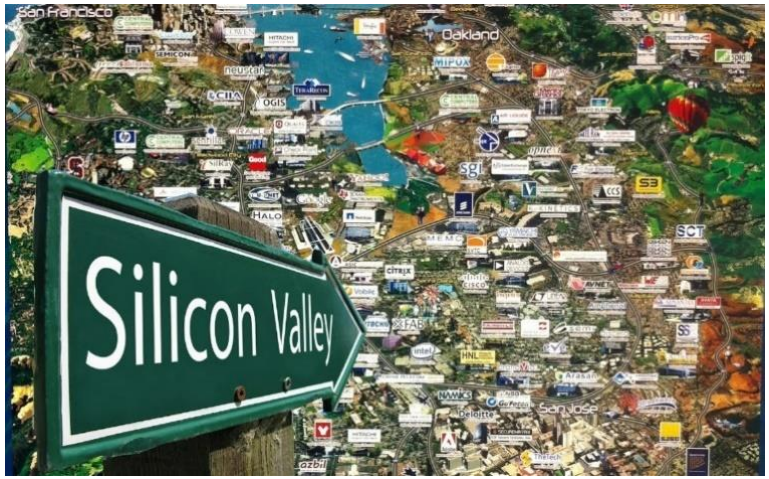


Global Startup Ecosystem Report 2017

Hatching of innovations in an interconnected world on the edge of the Information Revolution

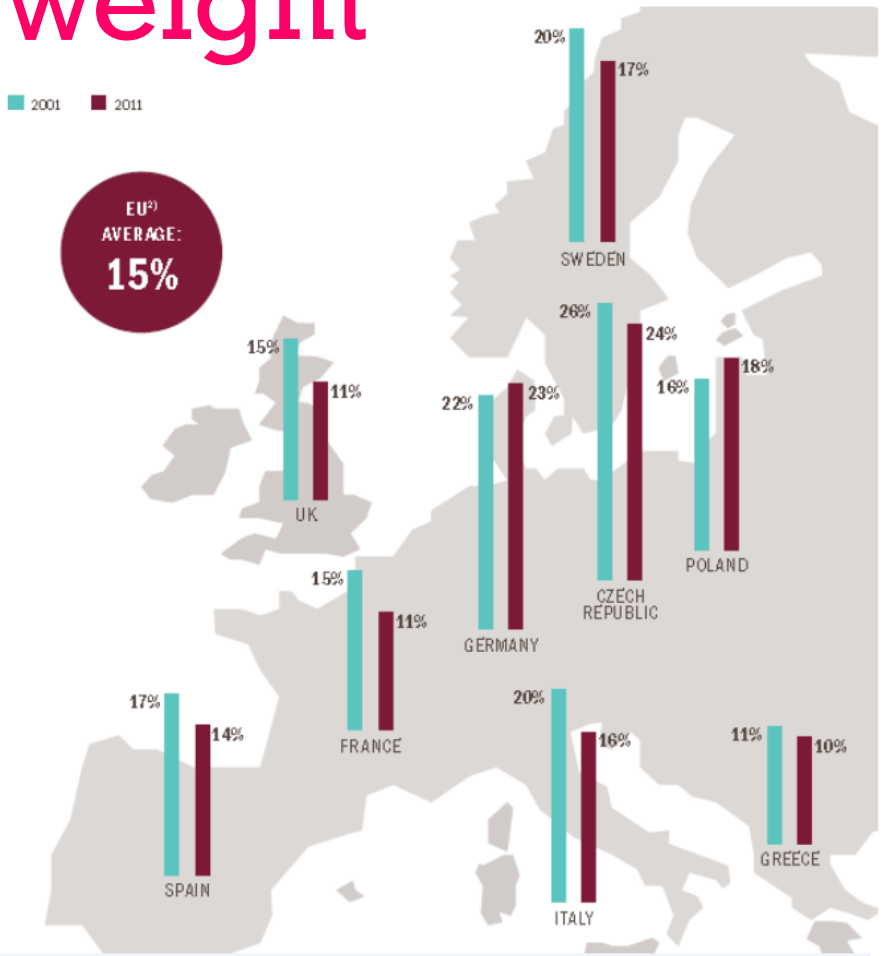
- New businesses with huge growth potential
- Google, Apple, Facebook, Amazon/Alibaba
- And many more that are about to be created … they will soon reach the markets

Innovation Archetypes: USA vs. Europe



- Innovation at the knowledge cutting-edge, breaking through innovations (startups)
- Innovation by transferring: dissemination of new technologies in production processes in manufacturing and other industries

Recovering industrial weight



Roland Berger (2014), Informe Industria 4.0, con datos de la UNCTAD

- Technologies of wide use *: ICTs, Robotics, New Materials, Algorithms.
- The German Industrie 4.0.
- New Industrial Revolution?
- The American Advanced Manufacturing Initiative

* General Purpose Technologies, GPTs)

Innovation Archetype: The reason behind European RRI approaches?

- Innovation by transferring, through dissemination of knowledge and GPTs across different industries, somehow implies Collaborative Innovation practices asking for the involvement of many different players and stakeholders.
- European (German) innovation Archetypes are rather prone –and fit well- with RRI elements [like public engagement, science education and open access] and support actions [Quadruple Helix, Open Innovation, Information and ICT Tools]

RRI: Main Definitions and Dimensions

RRI: Main Definitions

- ✓ von Schomberg (2011) emphatised the transparency and mutual interaction features:

"a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)".

- ✓ Stahl (2013) pointed out that RRI involves different players, activities, principles and values. Consequently, RRI implies:

"a higher level responsibility or meta-responsibility that aims to shape, maintain, develop, coordinate and align existing and novel research and innovation-related processes, actors and responsibilities with a view to ensuring desirable and acceptable research outcomes."

- ✓ Stilgoe et al. (2013) focused on the RRI significance:

"taking care of the future through collective stewardship of science and innovation in the present."

And its dimensions: anticipation/foresight, reflexivity, inclusion, and responsiveness.

RRI: Main European Policy Documents

- ✓ EC (2013), Options for Strengthening RRI, pointed out
  - the elements of cooperation and alignment with social needs as inputs to the R&I process
  - the assessment of the impacts of the R&I process in terms of societal needs and moral/ethical dimensions
- ✓ EC (2017), "RRI", Horizon 2020 – The EU FP for R&I highlighted the cooperation of societal actors throughout the entire R&I process to improve alignment with social values and expectations.

"a comprehensive approach of proceeding in research and innovation in ways that allow all stakeholders that are involved in the processes of research and innovation at an early stage to obtain relevant knowledge on the consequences of the outcomes of their actions and on the range of options open to them, to effectively evaluate both outcomes and options in terms of societal needs and moral values and to use these considerations as functional requirements for design and development of new research, products and services".

RRI Defs. in European Funded Research

- ✓ The project ResAGorA (2014) (proposes to develop a governance framework for RRI in response to calls for a normative and comprehensive governance framework for RRI by the EC and states.
- ✓ The project RRI Tools (2017) defines RRI as "a dynamic, iterative process by which all stakeholders involved in the R&I practice become mutually responsible … for both the outcomes and processes involved".
- ✓ The H2020 project "Nucleus" (2017) bases its working definition of RRI on that of the EU: RRI is "an approach where societal actors (researchers, citizens, policy makers, business, third sector organisations, etc.) work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of society".

RRI in Action: The MARIE Project.

2014 - 2020 Interreg Europe

MARIE Project

MAinstreaming Responsible Innovation in European S3

https://www.interregeurope.eu/marie/

MARIE Partnership

Introduction

- Programme: **Interreg Europe**
- Duration: **5 years (1st January 2017-31st December 2021)**
- 10 Partners from 8 EU regions

Objective: Improve regional public policy that supports delivery of RRI in design, production and distribution of innovations in S3 sectors.

Introduction

MARIE promotes responsible research and innovation in key sectors. By supporting quadruplehelix governance, open innovation and corporate commitment to responsibility, the project helps to create smart, sustainable and inclusive regions.

Introduction

MARIE achieves this through the following mechanisms:

Exchange of experiences and **benchmarking** between regions

Interregional **Learning** Events

Stakeholders collaboration

Study **Visits**

Action Plan implementation

Basic Elements in MARIE RRI concept: Regional Policymaking for S3

- ✓ Transparent stakeholder engagement/participation and inclusiveness/inclusion throughout the R&I process.
- ✓ Alignment of processes and outcomes with societal expectations.
- ✓ Flexibility/responsiveness to changing stakeholder/society values and circumstances.
- ✓ Mutual responsibility and ownership of the R&I process and its outcomes among participating stakeholders.
- ✓ Ex-ante (foresight/anticipation) and ex-post impact assessment of R&I outcomes in terms of societal desirability, ethical acceptability and sustainability.

RRI in the MARIE Framework

- ✓ "RRI is an approach that aims to foster regional stakeholder engagement and involvement, in a transparent and reportable way, throughout all stages of the R&I process lifecycle,
- ✓ with the goal of producing policy outcomes in the form of societally desirable, ethically acceptable and sustainable regional policy instruments (or improvements thereof) focusing on innovation delivery and promotion.
- ✓ This approach aligns the R&I processes and its outcomes with societal expectations and ethical considerations, as well as with RIS3 sectors in each region.
- ✓ It is flexible/responsive in accommodating changes in stakeholder/society values, S3 priorities or regional policy directions.
- ✓ In the MARIE RRI concept, participating stakeholders share responsibility and ownership of the R&I process and its regional policy outcomes.
- ✓ The impacts of policy outcomes are evaluated both before (ex-ante) and after (ex-post) their implementation."

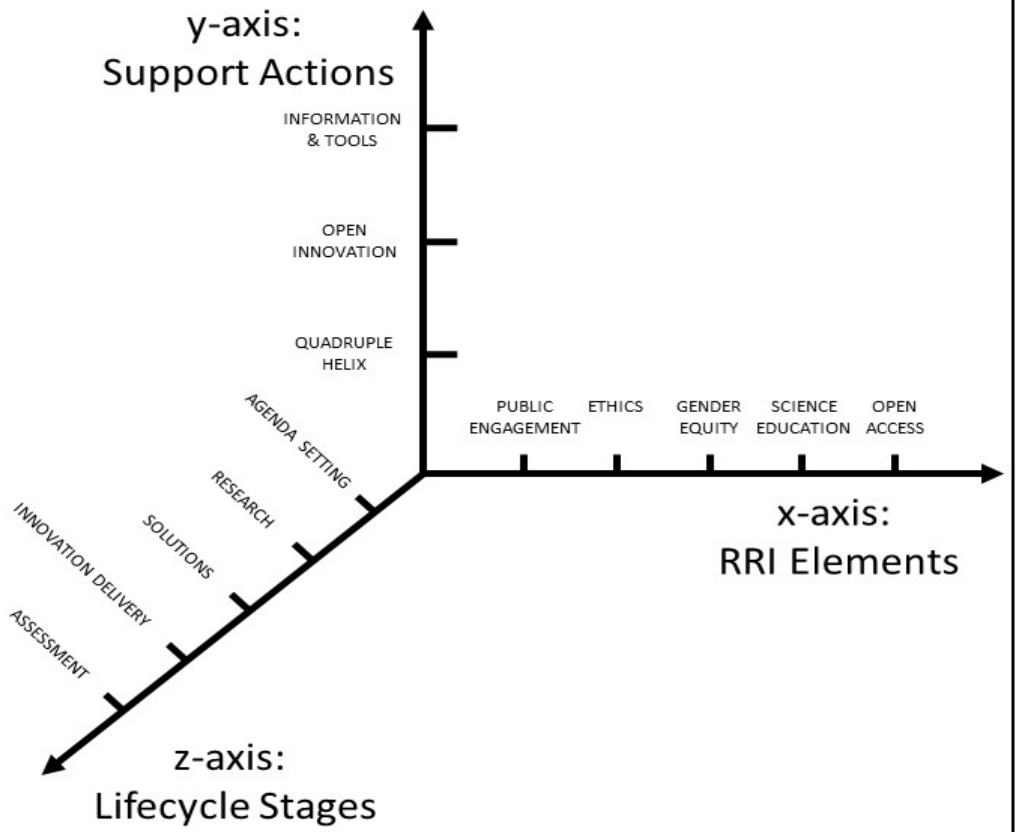
Source: Inception Report on the Marie RRI Concept, Athens University of Economics and Business - Research Center (AUEB-RC), /BCLab

Operationalisation of MARIE RRI Concept

- ✓ The MARIE RRI concept is focused on RIS3 policy development and the process of policymaking for innovation delivery.
- ✓ A three-dimensional space:
  - RRI thematic elements: public engagement, ethics and gender equality [mandatory as for project opinion] as well as science education and open access [Depending on appropriate scientific/academic content for open access and education]
  - Support actions: Quadruple Helix, Open Innovation, Information and Tools [such as events, training, information hubs, methodologies, standards, ICT tools etc. to promote understanding of RRI and assist informed decision- making]
  - R&I policy lifecycle: 5 stages [Agenda setting, Ongoing research, Technologies and solutions, Deployment/ innovation delivery, Impacts]
- ✓ It also includes three cross-cutting topics: Governance, Impact Assessment and Evaluation of regional RRI maturity

GOVERNANCE

- Inclusive participation
- Stakeholders' roles
- Transparency
- Flexibility and responsiveness



IMPACT ASSESSMENT

- Anticipatory / reactive
- Impact areas
- Types of assessment

Operationalising the MARIE RRI concept:

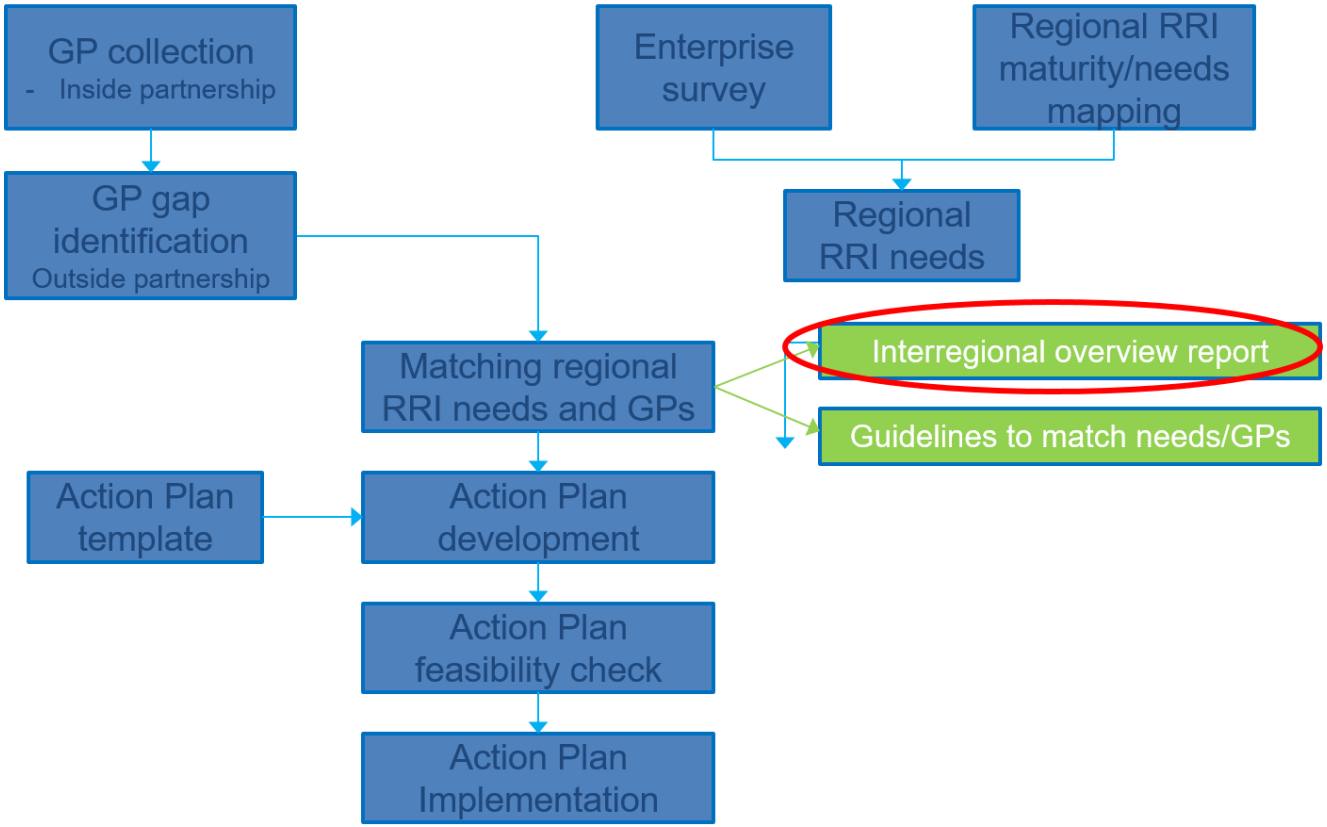
three-dimensional matrix

and

Two cross-cutting dimensions

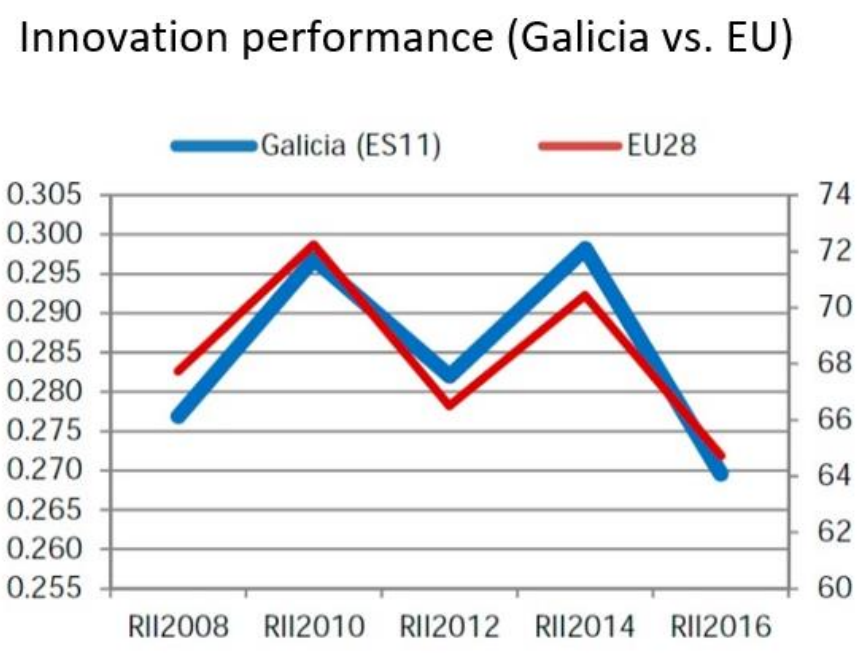
Source: Inception Report on the Marie RRI Concept, AUEB-RC/BCLab

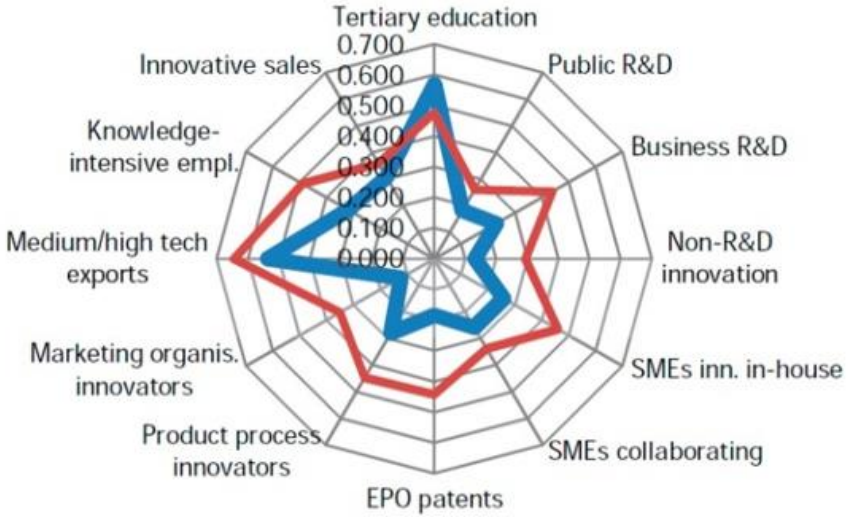
The Project process



RRI Maturity and Assesments

Galicia: A Moderate Innovator in the EU28





Source: Regional Innovation Scoreboard 2016 (Spain)

- ✓ Both the innovation index of Galicia and its comparative value in the EU28 follow a similar pattern with an important decrease from 2010 onwards.
- ✓ According with its overall position of Galicia is considered as Moderate Innovator.
- ✓ However, Galicia innovation profile shows relative strengths compared to the EU28 average:
  - in Tertiary education and exports of medium/high tech products,
  - to lesser extent in product and process innovators

RRI MATURITY BENCHMARKING

Thematic Elements	Indicator	Level of performance and correspondence to RRI maturity level	
Public Engagement	PE1: Public perceptions on public involvement in science and technology	>40%	Substantial
		20%-40%	Moderate
		<20%	Modest
	PE2: Formalisation and extent of public involvement in regional science and technology decision-making	- Formalised / high involvement	Substantial
		- Formalised / low involvement - Not formalised / high involvement	Moderate
		- Not formalised / low involvement	Modest

RRI MATURITY BENCHMARKING

Thematic Elements	Indicator	Level of performance and correspondence to RRI maturity level	
Ethics	E1: Ethical considerations in the evaluation for the regional funding of R&I proposals	>90%	Substantial
		80% - 90%	Moderate
		<80%	Modest
	E2: Ethical considerations in the monitoring of the implementation of regionally funded R&I projects	>90%	Substantial
		80% - 90%	Moderate
		<80%	Modest
Gender Equality	GE1: Gender gap of core human resources in science and technology	<5.0	Substantial
		5.0 – 15.0	Moderate
		>15.0	Modest
	GE2: Support for gender equality in regionally funded R&I projects	Substantial (>40%)	Substantial
		Moderate (20%-40%)	Moderate
		Modest (<20%)	Modest

RRI MATURITY BENCHMARKING

Thematic Elements	Indicator	Level of performance and correspondence to RRI maturity level	
Science Education	SE1: Inclusion of RRI-related training requirements in regional R&I strategy and projects	Substantial	Substantial
		Moderate	Moderate
		Modest	Modest
	SE2: Capacity building for RRI-related training (existence, percentage of funds allocated)	Substantial	Substantial
		Moderate	Moderate
		Modest	Modest
Open Access	OA1: Regional policies for dissemination of and open access to scientific information	Substantial	Substantial
		Moderate	Moderate
		Modest	Modest
	OA2: Inclusion of open access / open science measures in research policies and calls for proposals	Substantial	Substantial
		Moderate	Moderate
		Modest	Modest

RRI MATURITY BENCHMARKING

Thematic Elements	Indicator	Level of performance and correspondence to RRI maturity level	
Governance	G1: Extent of R&I networks (e.g. platforms, hubs, incubators, accelerators, funding mechanisms) promoting/supporting RRI in the region	Substantial	Substantial
		Moderate	Moderate
		Modest	Modest
	G2: Activities of funders to promote RRI at regional level	Substantial	Substantial
		Moderate	Moderate
		Modest	Modest

Interregional comparison of regional RRI maturity assessment results

MARIE
Interreg Europe

RRI Maturity Indicators \ Regions		Emilia-Romagna (IT)	Bucharest -Ilfov (RO)	Attica (EL)	Galicia (ES)	Tampere (FI)	Southern Ireland (IE)	Centre-Val de Loire (FR)	Schleswig -Holstein (DE)
Public Engagement	PE1	Modest	Modest	Moderate	Modest	Substantial	Modest	Moderate	Modest
	PE2	Modest	Modest	Moderate	Moderate / Modest	Moderate	Modest	Moderate	Modest
Ethics	E1	Moderate	Substantial	Modest	Modest	Modest	Modest	Modest	Substantial
	E2	Modest	Substantial	Modest	Modest	Modest	Modest	Modest	Substantial
Gender Equality	GE1	Modest	Moderate	Modest	Modest	Modest	Substantial	Moderate	Substantial / Moderate
	GE2	Modest	Moderate	Modest	Modest	Moderate	Moderate	Moderate	Substantial
Science Education	SE1	Moderate	Moderate	Modest	Modest	Moderate	Moderate	Modest	Modest
	SE2	Moderate	Modest	Modest	Modest	Substantial	Moderate	Modest	Modest
Open Access	OA1	Substantial	Modest	Modest	Substantial / Moderate	Substantial	Moderate	Modest	Substantial
	OA2	Modest	Modest	Modest	Modest	Substantial	Moderate	Modest	Moderate
Governance	G1	Moderate	Modest	Moderate	Modest	Substantial	Moderate	Modest	Modest
	G2	Modest	Modest	Modest	Modest	Moderate	Modest	Modest	Modest
Overall Level of Regional RRI Maturity		Modest	Modest	Modest	Modest	Moderate / Substantial	Moderate	Modest	Moderate / Modest

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Outcome

- **Learning and knowledge** for both public administration and other private & public stakeholders
- Growing **interest** about RRI in Galicia
- RRI in **Higher Education** offer
- First **initiatives** introducing RRI dimensions in calls for proposals/grants

What´s next

- **Monitoring** RRI dimensions in call for proposals

- Engagement in new project: **RRI2SCALE**
  Embed actionable RRI values in regional innovation governance processes

- **Supporting** other initiatives in this regard - **ResponS3**
  SUDOE project proposal led by UDC

Current Insights in RRI: Broadening Scope of Impacts

Science Foundation Ireland - Interreg Europe
Broadening the Scope of Impact Background

- SFI's focus on scientific excellence and defines impact as the "demonstrable contribution that excellent research makes to society and the economy".
- Impact is according to 8 pillars (types of impact), which are underpinned by 3 thematic areas.

SFI Pillars and thematic areas

Underpinning thematic areas

1. creating new products, processes policies & behaviour;
2. improving efficiency & efficacy of existing practise; and
3. research to improve resilience & sustainability.

Pillars / type of impacts

1. Economic;
2. Societal;
3. Internationalengagement;
4. Policy & public service;
5. Health & wellbeing;
6. Environmental;
7. Professional Services;
8. Human Capacity.

Impact Statements

- Stages: Impact or Outcome Statament as part of the proposal: 1) submission of pre-proposal, 2) submission of full proposal
- applicants should briefly outline previous indicators of the relevance of their research.
- Impact statements should be written primarily in lay non-technical language, be as specific and comprehensive as possible and cover potential impacts by answering the questions:
  - Who will benefit from this research?
  - How will they benefit from this research?

Reporting and Monitoring

- As part of the Impact Statement, SFI awardees are asked to set targets against many Key Performance Indicators (KPIs). The KPIs and targets are viewed to directly support delivery of impacts across many areas and are reviewed periodically by SFI, in addition to being used by review panels to gauge progress.
- Reporting on "Strategic Impact" by prioritising at least five relevant Impact declarations. Award holders are provided with a list of 11 Impact 'declarations' or statements.
- At least one statement must be selected but award holders are encouraged to rank up to 5 statements, starting with the number 1 (being the most relevant).

A Sample of impact questions I

1. The research conducted through my award has enabled me to leverage international funding through industry/collaborative research **[Economic and Commercial, International]**
2. The research conducted through my award has resulted in the start or expansion of a company which has resulted in the creation of high value jobs **[Economic and Commercial]**
3. The research conducted through my award has attracted developing and nurturing businesses **[Economic and Commercial]**
4. The research conducted through my award has attracted international scientists and talented people **[Human Capacity; International Engagement]**
5. The research conducted through my award has resulted in a new policy being implemented and/or an improvement to the delivery of a public service **[Public Policy and Services]**
6. The research conducted through my award has enhanced the quality of life and health of Irish citizens **[Health & Wellbeing, Societal Impact]**

A Sample of impact questions II

7. The research conducted through my award has improved the environment and/or the sustainable relationship between society, industry and the environment **[Environmental Impact]**
8. The research conducted through my award has increased the knowledge, appreciation and understanding of science, engineering and technology amongst the general public. The research conducted through my award has developed the country's international reputation **[Societal Impact, International Engagement]**
9. The research conducted through my award has resulted in the creation of employment through directly influencing and inspiring the future workforce and/or the production of a highly educated and relevant workforce in demand by industry and academia **[Human Capacity, Economic and Commercial]**
10. The research conducted through my award has impacted in other areas not reflected in the choices provided, for example by enhancing the creative output of Irish citizens **[Environmental, Professional Services, Societal]**
11. The research conducted through my award has not yet realised any significant Impact

MUCHAS GRACIAS

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Información sobre cursos RRI

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References

This presentation is based on the materials and reports of the MARIE project. It is worth mentioning others references like the ones below:

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