

# Openness as driver for a 21<sup>st</sup> Century mission-oriented research policy

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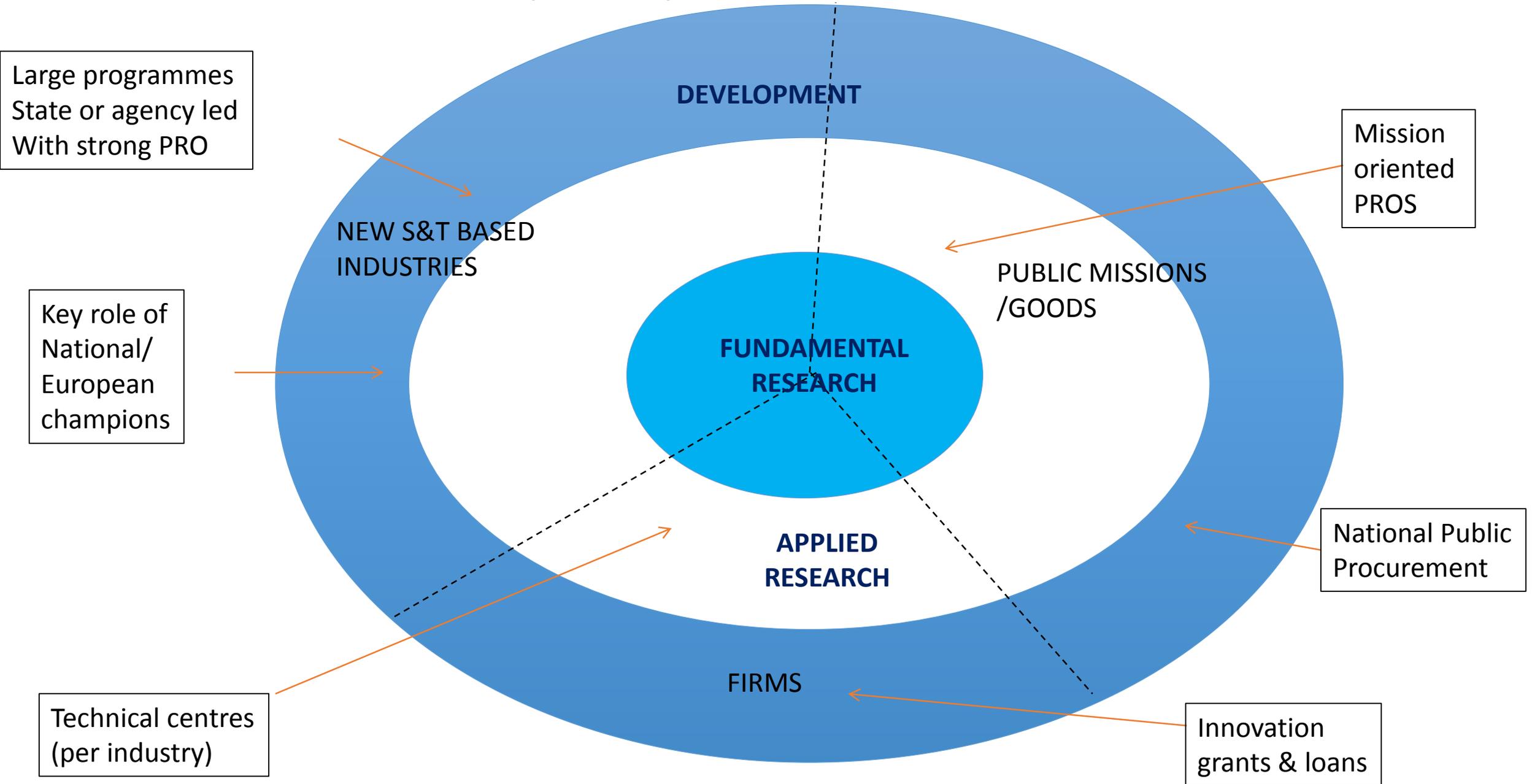
# Outline

- The focus in my presentation will be on the policy side of research and innovation (R&I).
- The conceptual, theoretical, empirical and measurement challenges are of course also rather crucial in our field but have well been covered in the keynote/invited speeches of Dirk Pilat, Uwe Cantner and Scott Stern. The policy challenges appear, as I'll try to argue here, attention, particularly in Europe.
- R&I policy appears stuck in an old ***industrial, national*** and ***professional “research lab”*** framework.
- Furthermore, in Europe R&I policy has become part of a so-called “shared” responsibility between Member States (MS) and the EC with increasingly issues about overlap and primary responsibility.
- Hence, a need for a new “direction” in R&I policy, particularly in Europe. The launch of the idea that “openness” in science, innovation and to the outside world might form for Europe the core policy doctrine (the “RISE doctrine”).
- How to combine such openness with the increased international IPR pressures across value chains on the one hand and national closed state priorities on research missions.

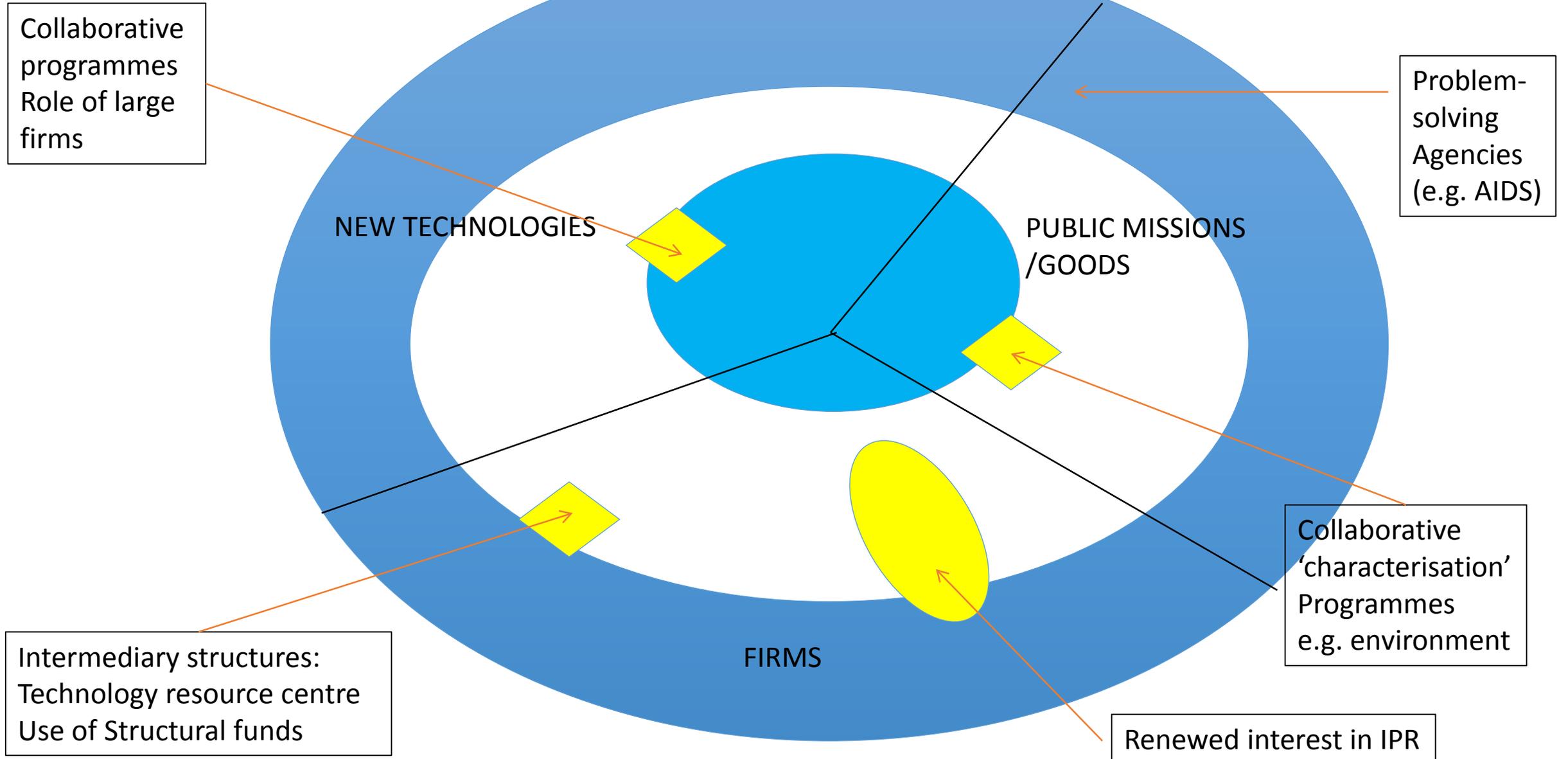
# When some of us were young...

- The old 'characterisation' framework of the OECD in the 80's (the TEP-programme) with three different types of RDI activities: fundamental research (science), applied research (technology) and development had its advantages in terms of simplicity and policy clarity.
- It could convincingly be translated into three straightforward policy macro objectives: supporting science "for science"; research and innovation for national priority missions (what is called today "science for society"); and last but not least supporting corporate R&I to help firms "shape their innovation space" (what is called today "science for industry").
- Since TEP various instruments have been developed first at national level, later on at EU level to address those objectives.
- Philippe Laredo e.g. described quite neatly the creation of national and European R&I policy instruments within this framework following three periods, a line of reasoning which appears very similar to Uwe Cantner's historical categorisation of yesterday.

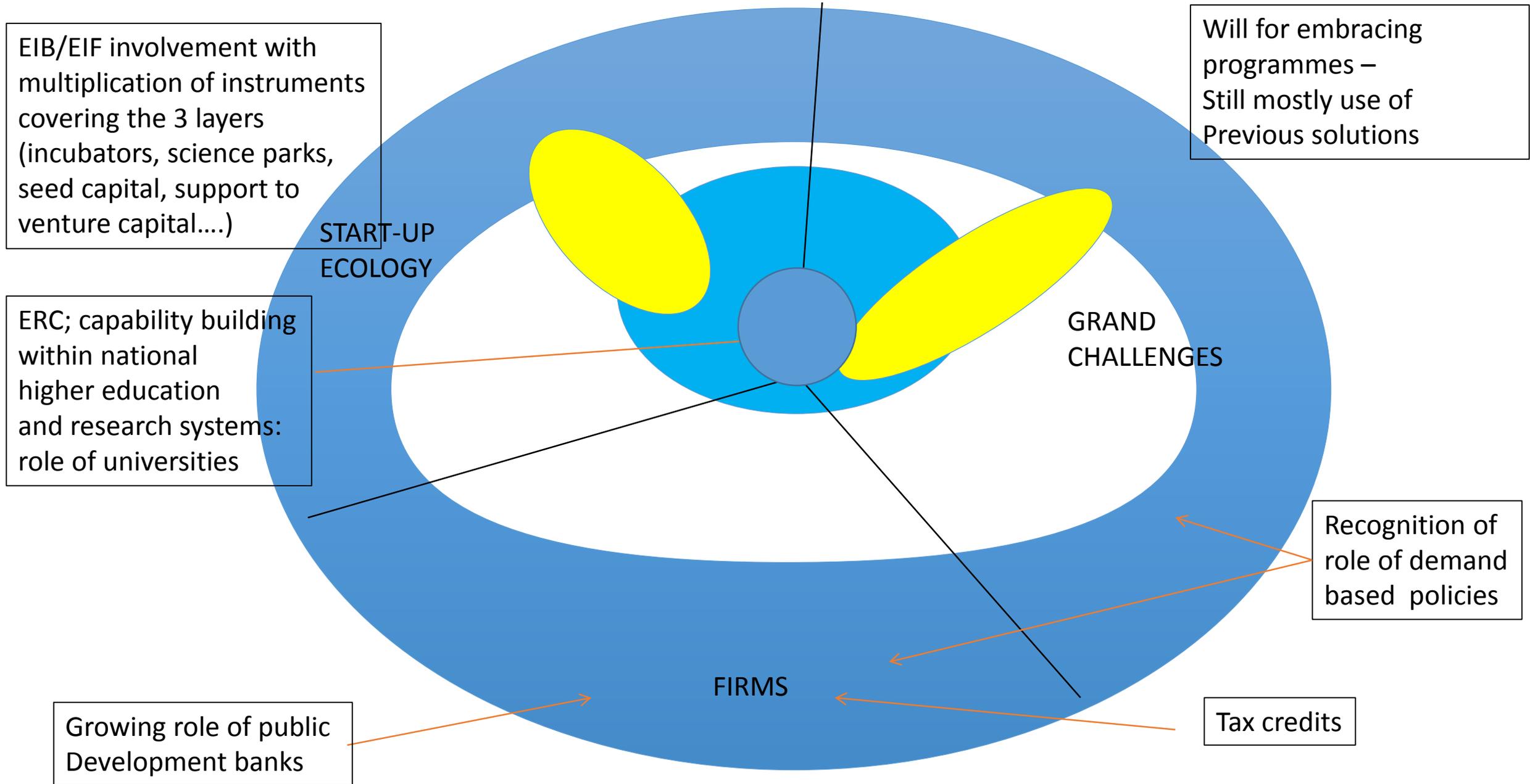
# FIRST GENERATION OECD POLICIES (Ph. Laredo)



# SECOND GENERATION FP POLICIES & NATIONAL INNOVATION SYSTEMS (Ph. Laredo)



# THIRD GENERATION POLICIES (Ph. Laredo)



EIB/EIF involvement with multiplication of instruments covering the 3 layers (incubators, science parks, seed capital, support to venture capital....)

START-UP ECOLOGY

ERC; capability building within national higher education and research systems: role of universities

GRAND CHALLENGES

Will for embracing programmes – Still mostly use of Previous solutions

Recognition of role of demand based policies

Growing role of public Development banks

FIRMS

Tax credits

# A multi-level “assemblage” of instruments

- With a de facto “specialisation” between the EU, nation states and regions:
  - A European framing of an innovation friendly environment (Innovation Union, IPR, regulation and standards, frames for demand-based policies..);
  - A new role for the EC in frontier S&T (ERC) incentivizing research mobility
  - National MS support to universities, PROs and individual firms (institutional and competitive funding; subsidies, tax credits and development banks) and for science policy at large as ‘capability building’ and national identity;
  - Regions increasingly involved in capacity building in research and innovation within ‘smart specialisation strategies through own regional funding and structural funds.
- There were good economic arguments to do so even if their particular relevance appears primarily ex-post.
- In the case of European Research and Innovation (R&I) collaboration, this is, given the European Union’s structure composed primarily of small countries, a typical area with high costs of “non-Europe”.

# The costs of non-Europe in Research

- E.g. we like to present EU research performance as the simple addition of the 28 – actually more as for some MS (such as Belgium) these are governed at regional level – national research budgets to compare the EU's Research and Development (R&D) performance with that of the US or China, ignoring any of those costs of “non-Europe” and simply assuming that EC and MS collaboration is optimized as if it was one country...
- The observation that there are high costs of “non-Europe” holds of course first and foremost for research. The launching of the ERA back in 2000 in Lisbon attempted to mimic in a certain way Europe (EU plus associated members) as one geographical “nation” unleashing in this way:
  - the benefits of size and scale considered important in many areas of research;
  - better coordination of investments in large research infrastructures crucial in many areas of fundamental and applied research; and
  - mobility of researchers across Europe with fast (open) access to research output.

# The costs on non-Europe in Innovation

- The recognition that there might be high costs of “non-Europe” holds also in a very different way, for innovation. The idea and creation of an Innovation Union in 2010, led to a much greater focus on the demand side of the research-innovation nexus:
  - access to new potential demand with the Single Market as possible first step towards global market presence;
  - barriers and differences in national regulations preventing rapid scaling-up; and
  - the lack of public procurement at European level.
- Since Lisbon, FP5, FP6, FP7 as well as Horizon 2020 have developed instruments to incentivize European partnerships to address those issues:
  - geographically amongst MS so-called Public to Public (P2P) partnerships; and
  - amongst different research and innovation stakeholders in particular Public Private Partnerships (PPP).
- As in many areas implementation is critical. With every new FP, new partnership instruments were proposed: there are always good reasons to come up with new instruments, while it is much more difficult to close or replace existing ones.

# Horizon 2020 in 2017...

- The list today of instruments (not just partnerships) is impressive. The recent Lamy report proposed: “a minimum objective should be to eliminate one third of R&I funding schemes, instruments and acronyms across the landscape” (p.17).
- Hence from a concept aimed at reducing the “costs of non-Europe”, European research and innovation policy instruments appear today to increase the cost of carrying out research in Europe: the fragmentation amongst countries and stakeholders being replaced with fragmentation across instruments.
- At the same time, times are changing: the European FP perspective, including today’s H2020, viewed with the binoculars of 2000 is rather different from the one viewed in 2017:
  - Most of the societal challenges appear today global in nature such as sustainability, food safety, migration, (cyber-)security, social in/exclusion, etc.;
  - Openness in geographical terms goes well beyond Europe and the European Research Area;
  - Openness in research and innovation goes well beyond traditional research fields and disciplines but involves today, translational research, innovation without research, citizen science and user innovation, experimentation with regulatory “sandboxes”, etc.

# The very different nature of research

- What struck me as rector of a university, is the intrinsic but crucial differences between research disciplines and fields: there is a huge difference between scientific fields such as neurosciences, nano-computing, history, artificial intelligence or life sciences in the need for – and the list is non-exhaustive – scale, partnership with large enterprises or on the contrary angel investors and venture capital, the use of and reliance on large costly research infrastructure, close interaction with users, sometimes with local citizens, etc.
- In this sense, the FPs including H2020, appear to have been developed as instrument-led programmes. Evaluation of the individual instruments provides little insights in the complementarity of those instruments and their overall “systemic” performance. In some areas particular partnership programmes are likely to have performed particularly well. In other fields, the available instrument landscape appears fragmented raising questions about overlap.
- Two examples from two very different research and technology fields: micro- (today rather nano-) electronics and health to make my point.

# Electronic Components and Systems

- Today the Joint Technology Initiative ECSEL is pulling together research and innovation efforts in the area of Electronic Components & Systems and their applications:
  - It merged ARTEMIS and ENIAC, previous JTIs and pulled together critical mass;
  - It developed a common Strategic R&I Agenda covering the full spectrum of Technology Readiness levels from TRL 2 to TRL 8;
  - The 1.2B€ from H2020 will leverage 1.2B€ national co-funding and at least 2.4 B€ from private R&I actors;
  - The stakeholders involved in collaboration include the full value chains in different areas of development and application: universities, research institutes, large firms and SMEs;
- ECSEL appears open, transparent and inclusive
  - It has open calls for proposals; open membership of industry associations;
  - With a transparent governance structures and processes;
  - A broad annual stakeholders forum
- In a certain way ECSEL implemented a real European Research Area in the electronic components and systems area with a significant impact on that part of the digital European economy.
- Yet at the same time, ECSEL represents a typical industrial-led research and innovation support programme having undoubtedly contributed to strengthening European incremental, sectoral technologically-based competitiveness but not having allowed or incentivized radical, disruptive innovation to emerge.

# A societal challenge: the case of “Health”

- Health is of course a very different “sector” relying on research and more broadly knowledge input from very different disciplines and areas: not just medical sciences, but also life sciences, material sciences, nutrition, psychology, ICT, social sciences, economics, law, etc.
- At the same time, there are huge differences between MS in the institutional set-up of health research, its funding, public-private involvement, the pricing structures of drugs, hospital reimbursements, health insurance schemes, etc.
- Not surprisingly, this complexity is also reflected in a significant instrumental fragmentation within H2020 of health with no less than 17 different initiatives:
  - 1 Societal Challenge
  - 2 Joint Technology Initiatives
  - 5 contractual Public-Private Partnerships
  - 2 Public-Public Partnerships
  - 2 Joint Programming Initiatives
  - 2 Large Scale Pilots on Internet of Things
  - 2 EIT Knowledge & Innovation Communities
  - 1 European Innovation Partnership
- And each initiative has its own strategic agenda, calls and projects.
- There is, I would argue here – and in many other societal challenges areas – a dramatic need for more vertical “orchestration” along the different impact/value chains of the “health” challenge to ensure that research and innovation support fulfills its promises in terms of societal impact.

# Back to basics

- The Health example is a perfect illustration of an instrument-based approach to European research and innovation partnerships. What is needed today is the opposite: a common agreed definition of an aim or “mission” and then subsequently defining the use of existing or the development of new instruments – all flexible, open, transparent – to realize that mission.
- Each of such missions would in other words involve a different use of instruments. Sometimes the importance of large firms would be crucial in realizing that mission. In other cases it could be that SMEs or even new technology based firms would have to be essential partners.
- “Openness” takes on within this context a new meaning: in a vertical sense breaking up the traditional sectoral focus of R&I support policies and in a horizontal sense allowing for more systemic changes aimed at achieving e.g. the Sustainable Development Goals.
- From this perspective, the current long Christmas list of different partnership programs reflect rather a stalemate of “incumbent instruments” in the R&I field preventing new ones to emerge with no exit of existing ones, except in the rather limited cases of lobby failure..

# A broken knowledge diffusion nexus

- Research as presented here and at individual firm level, points to the fact that it is the gap in productivity growth between global frontier firms and the other more domestically oriented firms which raises questions as to the ability of most advanced firms nationally to adopt new technologies and knowledge developed by such global leaders, and for the firms trailing them at national level to catch up. In a speech in 2016, the OECD Secretary General, Angel Gurría, concluded: “It’s clear that the knowledge and technology diffusion “machine” is broken”.
- A major factor underlying Europe’s innovation deficit points to the growing gap between the productivity gains achieved by the best, most innovative firms and the rest – an apparent breakdown in the trickling down of innovation towards the other, following firms. Particularly in Europe, the high productivity of firms active at the global frontier does not seem to ‘trickle-down’ to other firms operating predominantly in national and local markets.
- It is the failure to diffuse best practices throughout the economy, to let the best firms attract the resources they need to grow which appears to be one of the main structural reasons for Europe’s productivity slowdown.
- It has resulted in a rising number of low-productivity firms that just “survive”. In many, either geographically segmented, or product, or service delivery segmented markets in Europe low-productivity firms operate in a sheer “zombie mode”.

## 2. Openness as new policy approach

- It is here that a more open, transparent approach is likely to help:
  - accelerating reforms that remove obstacles to competition in particular segments of the services sectors;
  - reforms that maintain and upgrade workers' skills and facilitate their mobility across firms so as to sustain an efficient reallocation enabling the growth of high-productivity firms;
  - challenging some of MS "closed" national higher education systems limiting the mobility of students and staff;
  - supporting lifelong training and removing obstacles to residential mobility across Europe through e.g. lowering transaction costs in housing markets;
  - reforms in financial markets and exit policies such as removing banking sector distortions induced by non-performing loans and reviewing inadequate insolvency regimes, etc.
- The failure of trickling-down has also implications for growth convergence and social cohesion, a crucial feature of European integration and the formation of the EU. There is a trend towards an increased concentration of economic activities and innovation in core regions and cities, with less favoured regions lagging increasingly behind.

# Principles of the open “RISE doctrine”

- Openness as tool addressing the grand societal challenges of our time; with Europe as central player in addressing those challenges with applications at the global level and at the local (city) level, enabling new firms to emerge in newly constructed markets and the scaling-up of existing firms.
- Second, openness as inclusive tool: as “commons”. Openness started here from within the scientific community – the community for whom the production of knowledge is to quote Jean-Claude Guédon (2014) “*the most noble thing human beings can do*” or “*the place where we feel most human*” – with the initiatives on open access and open data, but which became quickly broadened to many other networks and communities building on trust as a precondition to reach higher levels of community thinking and focusing on people as actors of change, rather than institutions.
- And finally, openness for experimentation, for enabling radical change, for the emergence of, now and then disrupting innovations in new areas, with European and local procurement as open but effective leverage tools using innovation-friendly regulation and a regulatory sandbox providing additional degrees of freedom for testing, for local co-creation, for living labs; for market creation mechanisms to emerge and flourish.

# Openness addressing big challenges

- The first principle of “openness”, the openness as tool addressing the grand societal challenges of our time, should ultimately be seen as our long term guarantee to sustainability, as the conceptual framework for Europe in addressing the SDGs. Such openness positions Europe as it always was: an open knowledge gatekeeper for addressing the societal, global challenges confronting the world as a whole, and Europe in particular. With the high concentration of researchers and research facilities in Europe, the EU owes it to itself and the rest of the world to remain a central player in addressing the big, societal challenges of our times. But here too the knowledge-innovation axis appears more complex than generally assumed and can be said to function poorly today. Traditionally, addressing societal challenges has been a primarily “supply-pushed” concern with the research community playing a central role and becoming even a stakeholder in the way to address such “big challenges”, relying in its financial sustainability increasingly on EU-funded research projects addressing those societal challenges. Implementation in terms of innovation has, however, often been disappointing. Typically, users and more broadly the demand side, has been insufficiently involved in the design and development of innovative ways to address those societal, global challenges.

# Openness as “commons”: as inclusion

- The second notion of openness addresses individual or group exclusion. Openness should be viewed here as inclusive tool: openness as “commons”. Again, the debate on such “inclusive openness” started from within the scientific community with the debates on open access, open data, citizen science and the necessity of the academic community to adhere to strict rules of scientific integrity to keep the trust it had historically built up. But it includes today also the inclusive openness with respect to global networks and local communities’ way in which knowledge is being absorbed, developed, refined through which new high value added is being created. And it includes today much more people: innovators, as actors of change. Such openness as inclusion tool, as commons depends essentially on trust.

# Openness as regulation tool

- The third meaning of openness is in relation to experimentation. It is of course the livelihood of science and research, but here too openness for experimentation, for innovation deals, for green deals, for testing, for local co-creation, in experimental areas in cities; for market creation combining new sorts of opportunities for exchanging and extraction value, is part of such openness. For an old continent such as Europe, with its complex institutional set-up with old European treaties fixing more or less in cement the governance modes of EU and MS policy prerogatives, this is of course a formidable challenge. It is, however, a central factor behind the broken European knowledge-innovation axis. Tackling it will require similar creativity, research and innovation. But here too once one is prepared to go into the detail of policy opportunities; there appear numerous opportunities for reigniting the knowledge innovation axis. Policy measures to harness public procurement in support of innovation such as the Lead Market Initiative can be scaled-up with measures incentivising private procurers to be more demanding in terms of requesting innovative solutions. Such scaling up can take place at local city level, involving city-labs and various other regulatory-sandbox experimental zones. The EU has plenty of internal borders which could become ideal experimental zones for such openness to experimentation.

# Conclusions

- The central question addressed in this RISE book was whether the 3 O's paradigm shift in research and innovation, as proposed by Commissioner Moedas, was likely to bring about new dynamics to Europe's "broken" knowledge-innovation nexus. Our answer is yes, but only if it is fully embedded within a new policy vision. A vision which sets out a European long-term framework: a new social contract, allowing for flexibility, learning and experimentation whereby openness in research and innovation and openness to the world is part of the new digital democratization process bringing together citizens, academics, researchers, innovative firms building a common project "*to the benefit of all*". A vision which stands for values which might have come under pressure in other parts of the world but which remain for Europe core values: values not open for debate.