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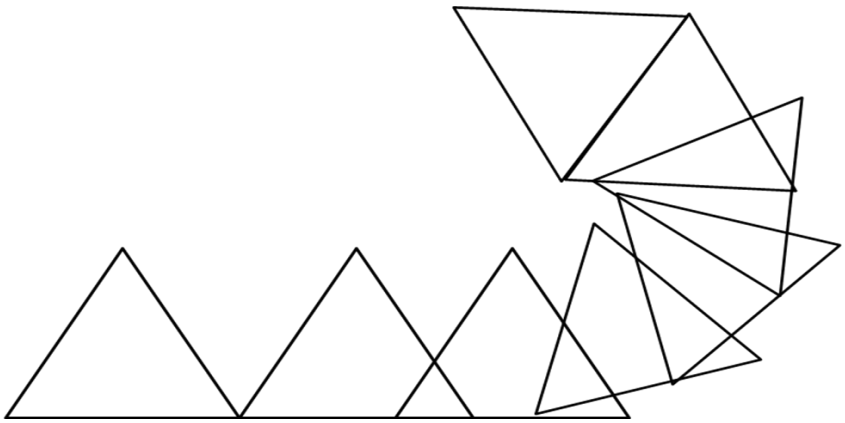
The appropriateness and effectiveness of the governance for research funding in Europe



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Abstract

The process of coordinating/aligning national research programmes at European level is addressed, in particular in relation with competitiveness and growth of territories.

Different aspects are involved when Member States cooperate: increasing critical mass, competitiveness, patrol or control, reducing fragmentation and costs. This implies usually the identification of common goals through hierarchically or self-organized decision-making processes. The pros and cons of the identification of "top-down (hierarchically) and bottom-up (self-organized) driven" priorities are described in a period of economic crisis, when funding agencies and performing research organizations can conflict.

While Europe is asking to cooperate for joint actions and increase impact in tackling societal challenges, the policy for aligning research could facilitate the agglomeration of skills/excellence and competitiveness in some areas, resulting therefore in geographical unbalances at European level.

This paper aims at stimulating a debate on the appropriateness and effectiveness of the governance for research funding in Europe, having in mind that, in a complex system as the European Research Area and its links with industrial competitiveness, it is difficult to evaluate the direct impact of trans-national actions in shaping the evolution of the system itself.

Keywords

Public funding system; Coordination modes; R&D cooperation; knowledge economy

1. INTRODUCTION

Europe is facing the challenge of both increasing its global competitiveness in research and boosting its internal growth in the area. One avenue for increasing the impact of current research efforts is through improved cohesion and coordination of the different national research programmes of the member states. Achieving this, however, will require overcoming many barriers.

In this period of economic crisis, Europe is looking to Research and Innovation (R&I) to play a fundamental role in supporting its global industrial competitiveness, internal growth and in tackling societal challenges (European Commission 2014, Council of the European Union 2014). However, success in this endeavor will likely require both achieving critical mass among the European Member States and optimizing the effectiveness of each State's research efforts. These may prove difficult given that investment in R&I is largely inhomogeneous among the different States (Zylicz 2015).

One potential avenue for increasing the impact of current R&I is to improve the coordination of the different national research programmes of the Member States. This will most likely require the identification of common priorities. Unfortunately, although a variation of this approach is currently used in some European Commission's initiatives, the initial findings indicate EU Member States rarely cooperate within joint programmes (Reale et al. 2013). In addition, despite the effort to widen the participation and investment in research through different EU instruments and incentives, excellence and competitiveness remain limited to a few geographical areas. Interestingly, the notion of "focus and cooperate," that is being promoted, could further exacerbate this unbalance when the differences between "who" produces excellence/technologies and the impact of the technologies on the territories are considered. This imbalance seems to be inevitable (Schwab 2013).

In this paper, the EU policy for research & innovation is analyzed in particular for its impact on the EU geographical distribution of excellent skills and competitiveness of territories.

2. THE ALIGNMENT OF EU RESEARCH PROGRAMMES

2.1 Science dynamics

It is well known that research is developed and performed by people. The cooperation between people investigating the same topic results in a sort of social network that eventually evolves into a "research field" (Nedeva 2013, Lepori 2011). A research field can be described as an ensemble where ideas and experiments build a community linking people and infrastructures through remote or physical exchange/access to knowledge and data. The motivation behind a research field is typically either curiosity or a desire to solve a problem. While curiosity is mainly associated with a bottom-up approach, problem solving can also be driven by a top-down approach, that is, by a request external to the community involved in the research field. In any event, for a research field to remain vital requires money to support the people and the necessary infrastructure, e.g., buildings, equipment, administrative support, etc. This dependence of the activity on the availability of money typically leads to the research fields being organized into "research spaces", that is the essential relationships between the research organizations are linked to the utility of knowledge (Nedeva 2013). In practice, nationally bound research organizations are requested to interact through exchange/access of resources (personnel, data, infrastructures, funds for specific projects, services, competencies, techniques, patents etc.) at different "levels" (that is, policy makers, funders, performers, individuals).

These resources can be "controlled and oriented" mainly as institutional funds, where research content is left to the performing institutions, non-oriented research funds where projects need client's approval (free proposals), but the performers are free to choose the research topic, and oriented research funds, e.g. programmes that specify an overarching theme or tenders that specify in detail the problem to be studied (Cave et al., 1999).

2.1 Joint funding versus joint programming

In Europe the majority of the total funding that is available for research is embedded in national budgets and activities that are programmed and conducted within national borders (see figure 1 and 2). These budgets are mainly used to sustain the infrastructure and personnel at the various national institutions and the funds that are available to develop research projects, through competitive calls, typically do not allow access to foreign researchers or permit the portability of the grants abroad. Moreover, although the individual national agencies address the priorities for the research activities, critical evaluation of the results from the research that is selected for funding is largely absent. Without this monitoring step it is difficult for the agencies to obtain an objective assessment of the overall impact of their programs and the return on their investments.

Most of the coordinated European funding is associated with the Framework Programmes of the European Commission (named Horizon 2020 for the period 2014-2020). In this case the member states create a genuine common pot of funding for competitive research projects and the national contribution loses its identity, that is, it can be transferred to foreign teams.

However, this common pot accounts for less than 3 % of the whole European Union (EU) public expenditure in research.
Although a few inter-governmental initiatives, such as European Space Agency (ESA), use a common pot for their budget, the national contributions from each member state are typically spent for supporting the corresponding national teams in cooperative projects. That is, the money is "returned" to the source.

Recent analysis (Bertrand & Niehoff 2013, Lepori et al. 2011) highlights several important points. First, joint funding out of the Framework Programmes accounts for less than 5% of R&D funding. Excluding the ESA programme (accounting approximately 4%) this figure drops to approximately 1%. Second, most of the EU joint programmes have small budgets and most of these budgets is allocated to just a few programmes. Third, Member States rarely contribute to joint programming or joint funding initiatives without incentives from the European Commission (EC). Forth, there is a large diversity between the countries in the level of their participation and the coordinated initiatives only strengthen networks of countries around a core group of countries (UK, DE, FR, NL). Lastly, EU regions are rarely involved in cross-border joint programmes, even though their budgets for research through the regional funding programmes is comparable to that allocated in Horizon 2020.

Nowadays, we are facing global societal challenges (demographic explosion, food security, energy, human health etc.) and trans-national cooperation is fundamental, since a single country cannot address effectively. The research oriented to face these challenges requires achieving critical mass, cooperation and huge funds: but joint programming (and trans-national cooperation) has been mainly associated, or confused, with the joint funding of projects. Two aspects have probably influenced this behavior. First, member states usually coordinate their national programmes when a multinational agency is managing the process, and this agency is typically the EC. Second, the instruments (mainly consisting as glue money allocate for networking) provided by the EC are mainly focused on coordinating national funding and produce a leverage effect on joint funding.

Joint research funding does not mean directly increasing the impact. As an example, the Global Competitiveness Index map
(see http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf) shows that, while there is some correlation between competitiveness and the investments in research (excluding ITA and ES), there is a large diversity between EU Member States (DE, UK, NL, SE and FI leading, FR, AT, DK just behind).

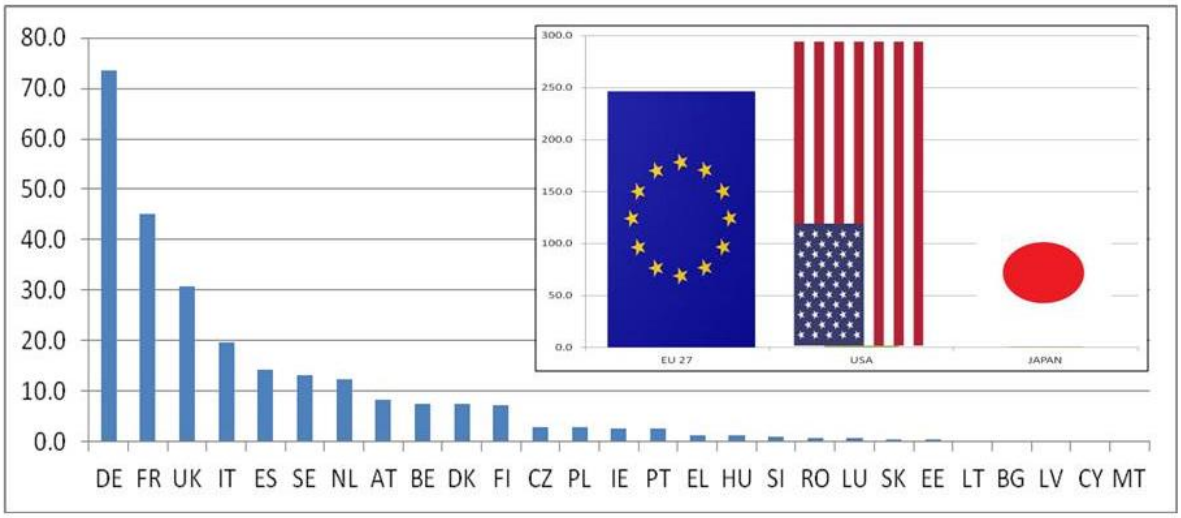

Figure 1. This histogram shows the EU national budgets for R&D (billion euros) in 2011 (source Eurostat). The overall EU budget for R&D (billion euros) is comparable to those of the USA and Japan (see inset: figures are for 2010, source Eurostat). The level of joint funding at the EU level accounts for less than 10% of the overall EU R&D budget, the rest in mainly allocated to support personnel and infrastructure.

2.2 Structuring the governance of the European Research Area

The European Research Area (ERA) is a concept to promote and implement an open space for knowledge and growth based on research and innovation. It mainly implies the coordination of actions between EU Member States. In its role to support European competitiveness and tackle societal challenges, it faces barriers at different levels: political (that is legislation), organizational (that is instruments and incentives), and inclusiveness (in terms of involvement of stakeholders). In brief, the complexity of the system no longer permits tackling the challenges with linear, independent approaches, but now requires a dynamic planning where the governance and the implementation of the actions have to be closely integrated to achieve them efficiently.

Already in the 1970s it became evident that States were no longer able to effectively provide collective goods and services and had to rely on the private sector for resources, such as information, expertise, money, and political support to address societal problems. In exchange for these resources, the private sector received substantial influence on policy formulation and implementation. Step by step, the boundaries between the decision makers and the private sector, or more generally providers, became blurred.

At this stage, the adequateness of governance to realize a modern ERA has to be questioned: are funding agencies still the primary stakeholders to involve in the process? Should a few member states rule the game at the decision-making level? Is Europe the real candidate for cooperation and partnership on a global scale?

In a period of economic crisis, the roles of the fundamental stakeholders of research can in fact dramatically change, resulting in a self-organization of some of them that can conflict with the responsibilities addressed to others. As a matter of fact, researchers often plan and implement their activities by adapting to the opportunities of funding and, when the budgets for projects are reduced and geographically jeopardized, performing organizations increase their role with their personnel and infrastructures.

This process results in the decision phase being strongly linked to the implementation phase. This, in turn, results in a mixing of top-down and bottom-up approaches that can affect the efficiency and impact of the adopted actions. If the decision phase is usually driven by a hierarchical approach, which could indeed include broad consultation, the implementation phase mainly results in a self-organizing of the system that adapts to the rules and funding instruments. In this context, the governance and management of the processes and actions are inter-dependent, even if successive in time, and the evolution of the system can show timescales that are shorter than the capability of the decision-makers to intervene.

To better understand the process of the relation between the governance and the implementation of joint action, we stressed the two extreme situations where either a total top-down (hierarchical) or bottom-up (self-organized) process drives the system (see figure 2 and 3).

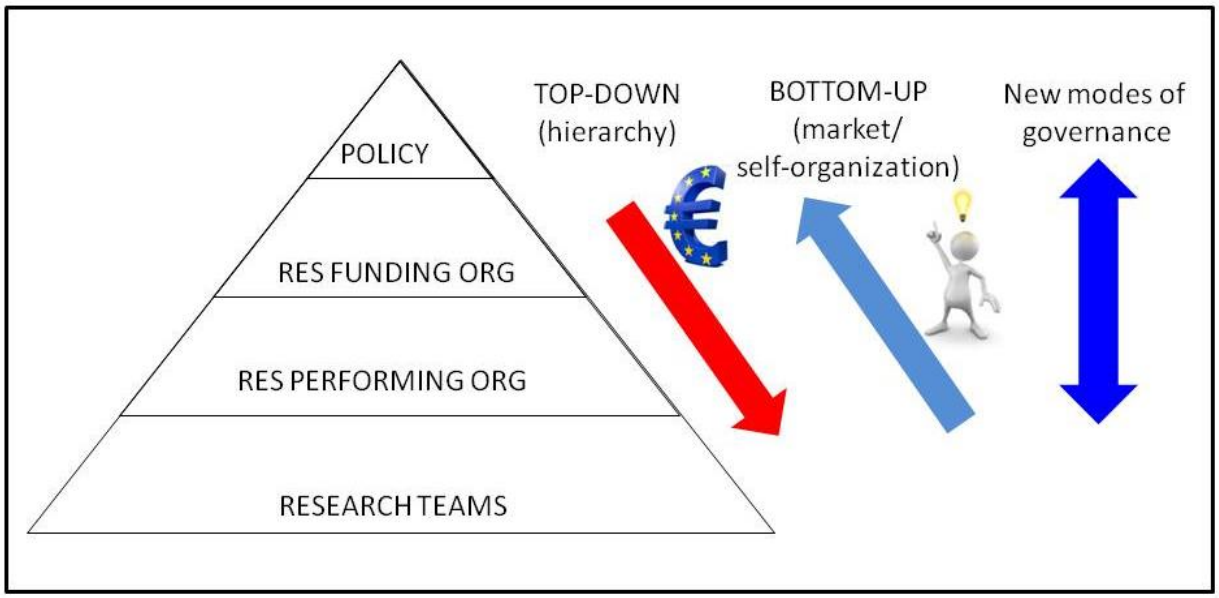

Figure 2. a graphic representation of the research levels (policy makers, research funding organizations, research performing organizations, research teams) and the governance approaches, where the two extremes result when funds or ideas rule the process.

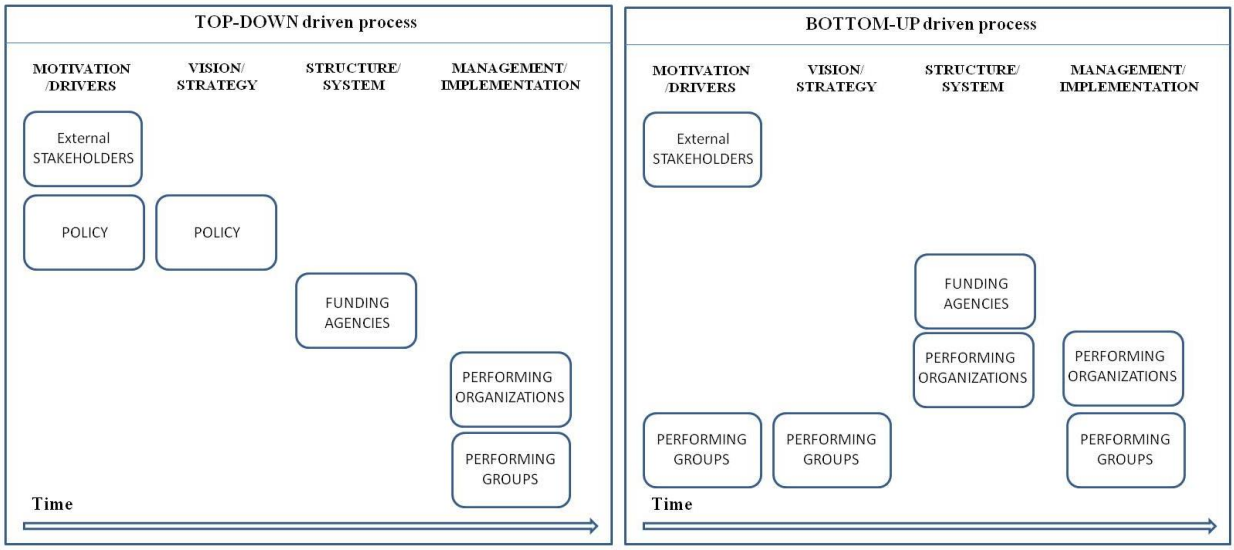

Figure 3. Left: the situation of a top-down driven process of governing and implementing research activities. Phases of programming are shown as columns and the stakeholders as rows. For sake of simplicity, we can summarize that in the top-down approach, the performers receive the money to implement the actions defined by funders and proposed by policy-economy drivers; in the bottom-up approach, the research groups address societal challenges or curiosity and ask for money to the funders. In case of economic crisis and scarcity of funds, performing organizations increase their role and self-organize to cooperate and/or lobby for funds.
Nevertheless, the small amount of money allocated to projects can dramatically influence the development of selected issues.

The appropriateness of the process in defining the priorities and implementing the actions is the crucial aspect. In this regard, the consultation of the stakeholders, including Member States, and the interaction between different levels of competences and responsibilities, from decision-makers to performing organizations and experts, are fundamental in providing the priorities, the strategies, the agendas and the results. It is highly probable that the "effective governing" entities, in a long-term timescale of persistence of economic crisis, will evolve from the funding organizations to the performing organizations. The approach with national funding organizations, more and more limiting the resources to personnel and infrastructure solely, ruling the process in the definition of objectives and actions, becomes weak and unstable. And in trans-national cooperation, this instability will probably increase due to the diversity of approaches between countries too. In practice, we have to be prepared to face an evolution of a system ruled by the money (funders) to one ruled by people (performers). In the transition phase between the two extreme situations, the few funds available can dramatically steer the process.

3. A SKEWD EUROPEAN RESEARCH AND INNOVATION MAP

There are serious doubts regarding the adequacy of traditional modes of governance (e.g. hierarchies and markets) for addressing socio-economic challenges. The governance at European

level for making joint decisions at the Council is indeed an historical evolution of the Peace of Westphalia treaties, which initiated a new system of political order in central Europe. In decisions, each State has a vote, while in actions, often a restricted number of countries and/or stakeholders contribute the most.
From the previous Framework Programmes for research to the last, Horizon 2020, we observed the evolution from a science-driven to a policy-driven framework for funding joint research activities, implying a challenging mix between top-down and bottom-up processes. And this has been largely influenced by the structuring of governance, since Horizon 2020 for the first time has been launched as a Regulation, that is, a legislative act of the European Union that becomes immediately enforceable as law in all Member States simultaneously.
But the diversity between national scenarios is large making the evolution at the EU level very complex.

To date, approximately ten percent of the global population lives in just 20 megacities, the trend to the agglomeration is increasing and many aspects of the competition and cooperation between people, companies and States evolve at different timescales.
Cooperation between researchers, despite the global nature of research, seems does not to be linked to the incentives provided by EC in the previous Framework Programme (Chessa et a. 2013). Cooperation between funding organizations is costly (Cuijpers et al. 2011) and mainly linked to incentives (Lepori et al. 2011). Last but not least, national legal barriers, as an example for mobility of researchers, to realize a real European Research Area are far to be removed.
The proliferation of research alliances at European level (EERA, ECRA, EURA, etc.) suggests that the largest research performing organizations are self-organizing to achieve critical mass for solving common challenges and lobbying for allocating the very few funds available.
Despite the regions are considered the real incubators for innovation due to the geographical proximity between researchers, industry and end-users, regions are very rarely involved in coordination of research at trans-national level (Lepori et al. 2011). Indeed, in Europe the funds allocated for joint research in Horizon 2020 are comparable to those available through the Structural Funds and transferred to the regional budgets, where no cooperation is required as a criteria for accessing the funds. This cooperation is in some sense masked in the so called "smart specialization strategy", that is, a process which frames the actions defined and developed at regional level in a wider and coordinated European context.

The tendency of the agglomeration of people, and consequently of researchers and infrastructures, facilitate the geographical concentration of centers of excellence and the economic development linked to the urbanization. This concept is embedded in that of Knowledge Innovation Communities, where EC funds are allocated to incentive the networking of co-located centers with strong connections between education, research and industry.
The geographical distribution of innovation and excellence in research is very inhomogeneous in Europe (see figure 4) and this fact can result in an increased geographical de-coupling between the priorities and actions defined at the level of European Member States and their impact on the territories.

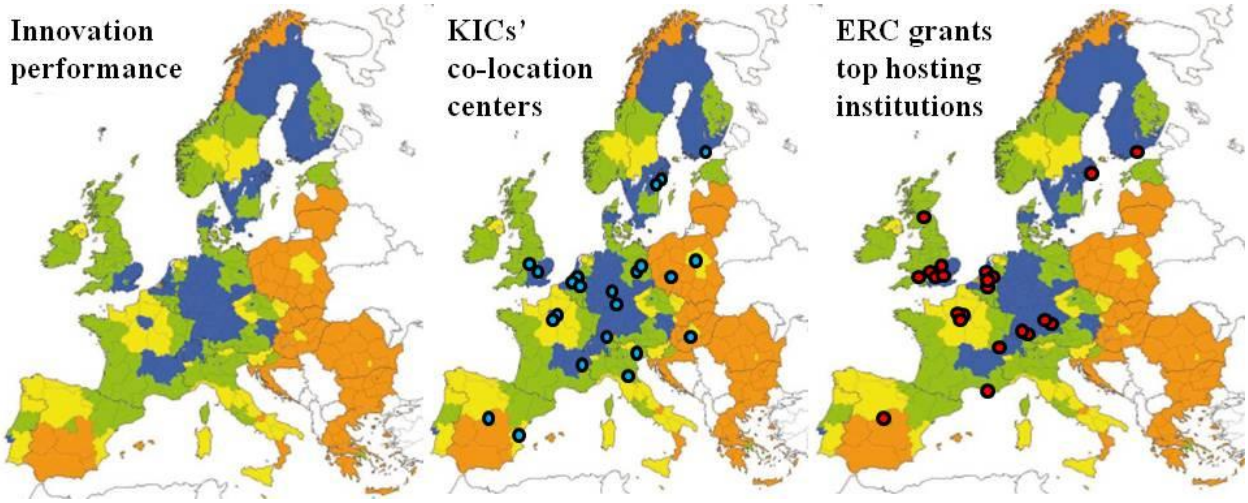

Figure 4: left: the European innovation performance in 2011 (from Regional Innovation Scoreboard 2012). Center: the geographical distribution of the Knowledge Innovation Community co-location centers (blue circles). Right: the geographical distribution of the European Research Council, ERC, top hosting institutions (red circles). ERC is the European programme for funding excellence in frontier research.

In practice, since the producers of knowledge and products tend to concentrate, it is crucial that the impact into the territories and the users have to be balanced.
Incentives are provided to smooth this risk (as for the coordination of spending structural funds allocated to regions and for creating synergies between structural funds and Horizon 2020) but effort and timescales seem to be low and long respectively.
In this context, the European Council through the Meeting of the Permanent Representatives Committee on 11 February 2014 recognized the diversity of national research systems between the different Member States and also within the different countries but also that the use of legislation at the European level to address obstacles to the ERA is currently not widely supported by the Member States and should occur only where a clear and significant need is justified. That is, probably very far in time.

4. CONCLUSIONS

From a practical standpoint, a necessary ingredient for success in securing future sponsorship for research will be a higher level of cooperation: both between researchers and between States. In addition, research efforts will focus more and more on topics determined by politics and not a fundamental quest for learning.
The alignment of research programmes requested to increase impact and reduce fragmentation is indeed time consuming, it is mainly driven by the European Commission, it probably will not be adopted by many Member States, and will increase the geographical unbalance of the growth/innovation performance, that is, participation to EU research plans may widen the gap when translated into the territories (Moretti 2015).
This will suggest some countries to maintain and reinforce bilateral relations even if continuing to play within the "European machine": the same approach will be probably adopted also for

other important initiatives framed in a EU level but strongly involving the national levels, as example in the Transatlantic Trade and Investment Partnership (TTIP).
So, will competitive European (like Germany) and non-European countries (like US) continue to cooperate on a basis of bilateral initiatives? Conversely, will they pass through "Europe," which involve a complex and time consuming process/governance?

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