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COVER NOTE

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Subject:	COMMISSION STAFF WORKING DOCUMENT INTERIM EVALUATION of HORIZON 2020 ANNEX 1

Delegations will find attached document SWD(2017) 221 final - PART 6/16.

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PART 6/16

COMMISSION STAFF WORKING DOCUMENT

INTERIM EVALUATION of HORIZON 2020

ANNEX 1

{SWD(2017) 220 final}
{SWD(2017) 222 final}

M. IMPACT OF THE NEW MANAGEMENT MODES ON THE PERFORMANCE OF HORIZON 2020 – FOCUS ON EXECUTIVE AGENCIES

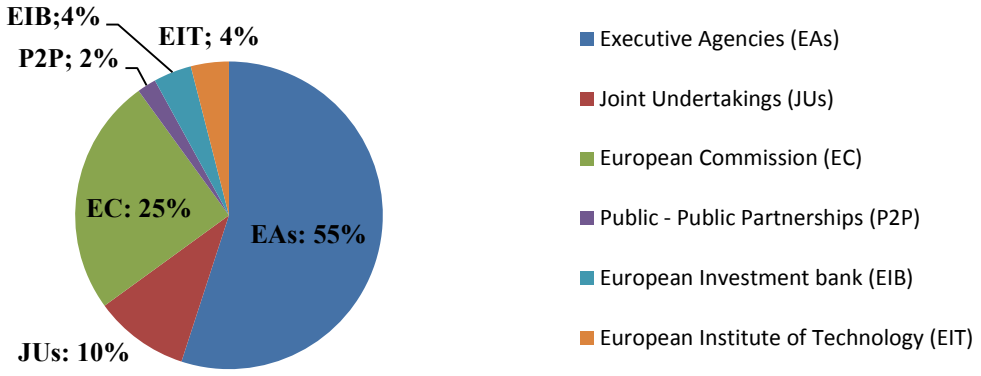
M.1. Background

New Management Modes are a new way to manage implementation activities in the field of EU research and innovation. Their first major use was in the Seventh Framework Programme (FP7) when two Executive Agencies[1] and five Joint Undertakings were established[2] with the aim to support Commission activities with a more focused and efficient toolset tailored specifically to the implementation of FP7. As the political importance and budgetary weight of research programmes increased, the Commission began looking into alternative methods of accomplishing these goals.

With the substantial increase in budget allocated to Horizon 2020 (EUR 74,8 billion compared to EUR 55 billion for FP7) and with the available human resources becoming more and more scarce over its duration (5% staff reduction over 2014-2020 period), the Commission has to make the best use of reduced human resources by focusing on its core institutional tasks, such as policy-making, implementation and monitoring of the application of EU law, and strategic management, whilst guaranteeing the most effective and efficient implementation of spending programmes for which it remains ultimately responsible.

These principles pursued by the Commission are fully reflected in the implementation of Horizon 2020 where much greater recourse to management modes (i.e. Executive Agencies and other external bodies), different from direct in-house management is made. Capitalizing on the positive experience[3] from FP7 when the two Executive Agencies (REA and ERCEA) implemented almost 30% of FP7 budget, the New Management Modes are expected to implement 65% of the Horizon 2020 budget (Executive Agencies 55% and Joint Undertakings 10%) between 2014 and 2020.

Figure 91 Total Horizon 2020 budget: EUR 74,8 billion for the period 2014-2020



Source: Calculation by the Commission

New Management Modes are translated into a number of distinct structures created by the Commission (Executive Agencies) or in cooperation with industry (Joint Undertakings).

[1] Research Executive Agency (REA) and European Research Council Executive Agency (ERCEA)
[2] Clean Sky, Fuel Cells and Hydrogen (FCH), Innovative Medicines Initiative (IMI), ARTEMIS, ENIAC and Single European Sky Air Traffic Management Research (SESAR)
[3] Evaluations of REA and ERCEA (2009-2012) and interim evaluations of the first generation Joint Undertakings under FP7

Though separate legal entities, they are bound to the common objectives through legal means (Council Regulations or Establishment and Delegation Acts), political and budgetary arrangements (they implement parts of the Union budget and are accountable to the College or to the Parliament) and internal management arrangements put in place to monitor and supervise their activities.

Currently, there are six Executive Agencies of which four are part of the Research family and implement delegated Horizon 2020 tasks, namely: the Executive Agency for Small and Medium-sized Enterprises (EASME), the European Research Council Executive Agency (ERCEA), the Innovation and Networks Executive Agency (INEA) and the Research Executive Agency (REA). They all have a different mission, from supporting small and medium-sized enterprises, to assisting with the construction of large trans-European infrastructure networks, to managing big project portfolios of high visibility in Horizon 2020, to supporting the cutting edge research no matter where it comes from or in which form (see table below).

Table 72 Four Executive Agencies and their role in Horizon 2020

	ERCEA	REA	INEA	EASME	Horizon 2020
Horizon 2020 delegated tasks **(number)**	1	8	2	4	22
Delegated budget 2014-2020 (**€ billion)**	12,7	13,9	6,4	6,9	74,8
% of total Horizon 2020 budget	16.9%	18.1%	8.3%	8.9%	100%

Source: Delegation Acts

M.2. Setting up Executive Agencies under Horizon 2020

M.2.1. General framework

Since the very beginning of FP7, the Commission has been committed to ensuring good coordination between the different Commission services implementing the programme. For this purpose, the Commission has set up a range of mechanism (e.g. Research Enquiry Service) for identifying and resolving instances of incoherent treatment by different Commission services.

With the launch of Horizon 2020, the Commission decided to make more extensive use of the existing Executive Agencies and entrusted the execution of 55% of the Horizon 2020 budget by delegating implementation tasks to them. The Commission has been conscious of the potential risks associated with the more extensive recourse to Executive Agencies such as, for example, increased fragmentation of Horizon 2020 implementation efforts and ensuring a high level of transparency and effective coordination processes, clarity of roles and responsibilities between the Commission and agencies as well as increased demand for monitoring, governance and control arrangements. For these reasons, it introduced a number of concrete rules and measures to ensure a **coherent and harmonised implementation process**.

- Under Horizon 2020, a **single set of rules** on reimbursement rates, evaluation and grant management applies across the board, regardless of which implementing body is managing the delegated parts of the programme. Simpler guidance and advisory services to applicants and participants are provided through a unique IT portal, i.e., the Participant Portal.

- Multi-annual Horizon 2020 work programmes are drafted with the participation of all Horizon 2020 services designed to maximize the potential for synergies between research and innovation programmes and minimize the risk for duplication of research activities.

- A Common Research Datawarehouse was set up, maintaining the complete Horizon 2020 historical data on submitted proposals and signed grant agreements, available to and used by all Commission services.

- Common rules have been developed relating to the feedback of results into policy making as part of the 'Strategy for an Effective Dissemination and Exploitation of Research Results in Horizon 2020'.

- The Horizon 2020 Common Support Centre (CSC), hosted by DG RTD, is providing services on legal support, business processes, IT systems and operations, programme information and data, and ex-post audits. These services are provided to all DGs of the Research and Innovation family and all Executive Agencies and Joint Undertakings involved in the implementation of Horizon 2020.

- Beside the CSC, the REA is providing common administrative and logistical support services to the programme implementing actors, in particular support for the evaluation of proposals, management of expert evaluators (contracting and paying) and the validation of beneficiaries' legal status and financial data.

- Both the CSC and REA's administrative and logistical support department are the two facets of a centralised support aiming to provide a consistent application of the single set of rules underpinning the implementation of Horizon 2020. Some of the REA tasks have even been extended beyond Horizon 2020 to other programmes, such as COSME, ERASMUS+, etc. as regards the validation of the legal entities and verification of the financial capacity of participants.

M.2.2. Governance and division of responsibilities

The delimitation of responsibilities between the Executive Agencies and various parent DGs, and the ERC Scientific Council (in the case of ERCEA[4]) is clear. Governance of each of the Agencies is based on a well-developed framework providing detailed guidance on its operation[5], as explained below.

4 ERCEA is unique with respect to the rest of the other EAs in terms of mandate and the dual leadership under which the Agency operates as the Dedicated Implementation Structure of the ERC. ERCEA is entrusted to handle the administrative implementation and programme execution of the ERC actions and support the ERC Scientific Council in the conduct of all its tasks.

5 The recent evaluations of REA and ERCEA concluded that no evidence regarding 'micro-management' was found. The legal basis clearly distinguished the different roles of the Commission, the ERC Scientific Council in case of ERCEA and

Firstly, the political responsibility for the implementation of all parts of Horizon 2020 **rests with the Commission** which monitors the activities of the Executive Agencies on the basis of the detailed legal provisions set inter alia in Council Regulation No 58/2003 and in the respective Instruments of Delegation. More specifically, it is the Commission's responsibility to strike **the right balance** between making sure that the Executive Agencies are efficient and follow the instructions and objectives assigned to them as part of their mandate while respecting the fact that they are separate legal entities with their own leadership and management structures. Any attempt by the Commission to micro-manage by interfering in the operation of an EA would be counter-productive, effectively leading to duplication of roles and to a waste of resources and opportunities.

The Agencies are set up **only to perform the tasks delegated by the Commission**. The division of tasks between the Commission services and the Agencies is clearly defined and documented in the respective delegation acts;

- The **Commission's departments** perform tasks implying policy choices, in particular: setting objectives and priorities, adopting work programmes (including financing decisions), representing the Commission in the Programme Committees and adopting award decisions subject to comitology.

- The A**gencies** are responsible for implementing tasks, such as organising and carrying out proposal evaluations, launching and concluding grant procedures, adopting, project monitoring, financial control and accounting, and contributing to programme evaluation and various support tasks.

The continuous coordination between the Commission and Executive Agencies on procedures, tools and working arrangements **ensures coherence and complementarities and helps avoiding gaps in responsibilities or duplication of efforts**. In addition, regular contacts take place between the Executive Agencies and the parent DGs' services responsible for the programmes that are implemented by the Executive Agencies These contacts take the form of coordination meetings at Directors level, Head of Department/Head of Unit level and contacts at working level. The Executive Agencies participate to the weekly Directors meetings of their parent DGs. In addition, the Executive Agencies are involved in the structures governing Horizon 2020 – challenge groups, cross-cutting issues groups, steering committees and thematic working groups as well as in the governance of the Common Support Centre (Executive Committee, Business Process steering committees and user groups).

M.3. Assessment of implementation of Horizon 2020 activities delegated to the Executive Agencies

M.3.1. Calls management

Since the start of Horizon 2020 in 2014, 148 calls launched by the Executive Agencies were concluded by September 2016. The legal provisions along with the common rules, procedures and IT tools catered by the CSC contributed significantly towards an increased

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the agencies. The Steering Committees were efficiently used by the Commission as the key instrument for day-to-day management of the Agencies.

harmonisation of project implementation practices and effective coordination among Horizon 2020 implementing services, be them in Executive Agencies or in the Commission.

Table 73 Main statistics related to the main overall implementation of Horizon 2020 calls launched by the Executive Agencies in 2014-2016

Calls management	ERCEA	REA	INEA	EASME	All calls in Horizon 2020
Calls concluded	10	73	22	43	274
Eligible proposals	15,782	28,905	1,495	29,047	86,995
Retained proposals	2,080	3,970	306	2,304	10,460
Success rate (%)	13,2%	13,7%	20,5%	7.9%	12%
Grants signed[6]	2,091	3,733	261	2,323	9,913
EU contribution to grants (millions)	3,355.1	3,472.5	1,754.7	1,709.8	17,246.8
Average EU contribution (millions)	1.60	0.93	6.72	0.74	1.74
Total ongoing projects (31/12/2016)	5.459	6.658	290 (1.220 total for EA)	1.644 (2.469 total for EA)	n.a.

Source: eCORDA release September 2016

The low number of redress procedures upheld provides an indication of the robustness of the grant award process and assurance on the effectiveness of the internal control system.

The analysis of the Agencies' performance is based on analysis and interpretation of the Key Performance Indicators (KPIs) related to:

- **Timely execution** of the delegated functions;
- **Cost-efficiency** of the management of delegated activities;
- **Budget execution** of commitment and payment appropriations.

M.3.2. Timely execution of the delegated functions

The summary table below shows that the Agencies were effective in producing the planned outputs (issuing calls, evaluation proposals and administering grants) and achieving good results in terms of Key Performance Indicators (KPIs). The results achieved in terms of 'Time-To-Grant' and 'Time-To-Pay' are considered good as they remained below the defined targets in most of the cases. In 2014 - 2015 all calls for proposals were published and closed

[6] Most of the granting activity in 2015 related to the preparation of grant agreements from the 2014 calls and their budgetary commitments. As regards INEA and EASME, the Commission handed over to the agencies the calls launched by its services, therefore the number of grants signed are higher that resulting from the calls fully launched by these agencies.

according to the plans of in the respective work programmes. The KPIs achieved in 2016 demonstrated an improvement compared to the results achieved in 2014 and 2015.

Table 74 Summary tables for 2014, 2015 and 2016 on key indicators related to the timely execution of the delegated functions – Executive Agencies

Call management (2016)	ERCEA	REA	INEA	EASME
Average Time to Inform (target -153 days)	From 77 to 207 days	132	120	117
Average Time to Grant (target 245, ERCEA - 400)	399	193	226	224
Average Time to Pay (% on time within legal deadlines)	98,8%	95,4%	100%	96%
Average evaluation cost per proposal - external experts paid/ total number of proposals evaluated	€1.335	1.471	n.a.	n.a.

Call management (2015)	ERCEA	REA	INEA	EASME
Average Time to Inform (target -153 days)	From 94 to 164 days	142	139	131
Average Time to Grant (target 245, ERCEA - 390)	357,7	203	224	239
Average Time to Pay (% on time within legal deadlines)	89,2%	96%	100%	94%
Average evaluation cost per proposal - external experts paid/ total number of proposals evaluated (% of the amount recommended for funding)	0,07%	<2%	0,05%	n.a.

Call management (2014)	ERCEA	REA	INEA	EASME
Average Time to Inform (target -153 days)	From 118 to 133	141	152	n.a.
Average Time to Grant (target 245, ERCEA - 390)	173	217	238	240
Average Time to Pay (% on time within legal deadlines)	91.4%	97%	100%	98%

Source : Annual Activity Reports 2014-2016, calculation by the Commission. Data refers to Horizon 2020 activities only

M.3.3. Cost-efficiency of the management of delegated activities

According to the financial regulation (Article 30), the principle of economy requires that the resources used by the institution in pursuit of its activities shall be made available in due time, in appropriate quantity and quality and the best price. The principle of efficiency concerns the best relationship between resources employed and results achieved.

Efficiency for this analysis is defined as the ratio between inputs (staff) and outputs (the budget managed by the Agency). The indicators for measuring efficiency are the ratio between the administrative and operational budget (%) and the budget "per staff head" (€ million). The estimated average budget managed by 'head' for all Executive Agencies in the

Commission Communication[7] was expected to increase from € 3,47 million in 2013 to €4,6 million per staff member in 2020.

Table 75 – Overview of administrative efficiency in Executive Agencies

Administrative efficiency 2016	ERCEA	REA	INEA	EASME
Programme management cost ratio (administrative/ operational budget)	2.75 %	*2,6% (3,6% with CSS)*	0.77%	2,7 %
Research project - budget 'per head' (EUR million)	4,42	3,2[8]	11,4	5,2 (all EA projects -3,8)
Average number of running research projects per staff member (operational activities)	17	36	6,7	9 (all EA projects -7,2)

Source: Annual Activity Reports 2016, calculation by the Commission.

The differences in the cost ratios, the overall number of running projects and the average number of projects per staff can be explained by the different portfolios as well as nature of projects of each agency which vary in terms of grant size, number of participants, duration and number of transactions involved.

In order to allocate and mobilise human resources in a timely manner, REA developed a tool for staff allocation based on workload measurement on the basis of the Cost Benefit Analysis (CBA) model used at the time of the extension of REA's mandate in 2013. REA runs the workload simulation every year at the time of establishing the Annual Work Programme of the next year and allocates the resources accordingly.

In the same manner, ERCEA has developed workload indicators which are used on a yearly basis for the purposes of establishing the staff allocation of the following year. The workload estimations are revised annually taking into account the volume of transactions reported at the end of the year.

As regards INEA, a workload analysis was prepared and revised each time the estimated figures on the number of projects managed are updated. When necessary, the recruitment and staffing plans are revised in order to balance the workload and temporary support can be given from one unit to another.

Finally, based on the methodology of the recent common Cost Benefits Analyses, EASME developed a pragmatic and cost-effective approach for a workload assessment that was first performed in 2016. The assessment will serve as an input to the Agency staffing plans for 2017.

M.3.4. Budget execution of commitment and payment appropriations in 2014-2015

All Agencies managed to execute their available budget almost at 100%, with the exception of payments out of the administrative budget.

[7] Communication to the Commission on the delegation of the management of the 2014-2020 programmes to executive agencies (SEC(2013)493).
[8] This does not include the REA staff providing the administrative and logistical central support services

Table 76 Budget execution in Executive Agencies

Budget execution 2014-2016	ERCEA	REA	INEA	EASME
Operational budget				
Budget execution (% to Commitments)	99,90%	100%	100%	100%
Budget execution (% to Payments)	100%	100%	100%	100%
Administrative budget				
Budget execution (% to Commitments)	99,42%	99,40%	98.86%	99%
Budget execution (% to Payments)	93,45%	91,79%	96.14%	89,7%

Source: Annual Activity Reports 2014-2016, calculation by the Commission

M.3.5. Monitoring, dissemination and exploitation of research results

The existing monitoring arrangements and reporting obligations allow for an effective provision of evidence for policy making. Specifically, supervision and monitoring of the Executive Agencies is ensured by the drafting and submitting to the Commission of detailed activity reports on a bi-annual basis. In order to harmonise the periodic reporting as much as possible among the different Executive Agencies and Joint Undertakings, a set of common KPIs and reporting templates have been designed.

The Strategy for an Effective Dissemination and Exploitation of Research Results in Horizon 2020 was adopted in September 2015 and applies to all Horizon 2020 implementing services including the Executive Agencies. The objective of the strategy is to increase the availability of outputs stemming from EU funded research and innovation projects and thus, increase their use in different contexts, such as having an impact on commercial markets, helping create jobs and growth and supporting policies in tackling societal challenges.

Against this background, the strategy aims at outlining how the European Commission will support and enhance the dissemination and exploitation activities of the project consortia, and how it will benefit from the Horizon 2020 project results as input into its policy making and programming activities.

Taking into account that the implementation of Horizon 2020 has been delegated to a large extent to Executive Agencies, it is essential to ensure that there is no interruption in the flow of research results from projects and programme implementation into policy making and programming. The roles and competences of everyone involved have been defined in the revised Memoranda of Understanding between parent DGs and the respective Executive Agencies (signed in 2015).

M.3.6. Proximity to beneficiaries

The delegation of certain parts of Horizon 2020 has enabled the agencies to focus their existing communication and outreach channels, which have developed over time to keep them close to beneficiaries and to improve the EU's visibility as the promoter of the programmes. In particular, the agencies provide an increased level of direct exchanges with beneficiaries through info days, kick off meetings for larger and multi-annual projects, and monitoring visits. At the same time, all potential beneficiaries have a single entry point.

In 2015 ERCEA continued its tailor-made services for ERC beneficiaries. Four training conferences for Principal Investigators (PIs) have been organised (in Brussels, Sweden,

Spain and Austria). The aim of these conferences is primarily training PIs on procedures and rules and facilitation of a dialogue amongst ERC grantees. Almost 200 PIs attended these events and like in previous years, these training events were very well received.

The REA cooperates closely with the parent DGs on communication throughout its project portfolio. It organise regular information days for proposers in Brussels and abroad, coordinators' days for running projects and various other events related to the projects and actions, in close collaboration with the parent DGs.

INEA mainly focused on two aspects. The first one is consolidating the stakeholders and facilitating and preparing the communication aspects of project management relationships with its key Horizon 2020 stakeholders – potential applicants and beneficiaries – to promote funding opportunities. A total of 6.189 participants registered in Horizon 2020 events (e.g. info days) organised by INEA in 2015 and 2016, and another 11.544 followed the events and presentations online via web-streaming. 89,2% of the participants expressed their satisfaction with these events. The events attracted 54,5% new participants in transport and 62% in energy sectors. The second is organising workshops with the representatives of the ongoing projects on selected themes, such as geothermal energy, carbon capture and storage, smart cities and communities, intelligent transport systems and urban mobility, in order to encourage the projects to work together, to avoid duplication and promote synergies, particularly in the dissemination and communication aspects of projects.

Three info days for Horizon 2020 beneficiaries were organised by EASME in 2015 and were attended by close to 2.000 participants on site and several hundred on line, learning more about upcoming calls for proposals. These events were very successful and had a very high satisfaction rate. In addition, the Agency promoted the delegated programmes via newsletters, on social media and during major events (such as, for example, the EU Sustainable Energy week, Green Week, SME – instrument Innovation Summit).

M.4. Main findings and conclusions from the recent evaluations of ERCEA and REA operations

The recently completed evaluations of the operations of ERCEA and REA cover the period from July 2012 to July 2015, encompassing two different Framework Programmes (Seventh Framework programme and Horizon 2020). The compulsory 3 year evaluations of the other two Agencies that implement Horizon 2020 (INEA and EASME) will be carried out in 2017 and will cover the operations of these Agencies during the period 2014-2016. The main conclusions drawn from the two parallel evaluation exercises are as follows.

The establishment of the two Executive Agencies resulted in significant savings to the EU budget in comparison to the alternative options as shown by the retrospective CBAs (Cost-Benefit Analyses) for 2012-2015. Overall, the results indicated that the Executive Agency scenario remained considerably more cost-effective than the in-house scenario, generating substantial savings to the EU budget.

As regards **ERCEA,** the analysis revealed that the actual costs of the Agency in 2012-2015 were by EUR 20.6 million (12%) lower than the initial estimation due to cost savings in overheads. On the other hand, actual staff related expenditure exceeded estimations for the period 2014-2015 because of higher than expected actual average staff costs. The actual cost savings of the ERCEA scenario amounted to 23% in comparison to the in-house

Commission scenario. In real terms, the actual savings from the programme delegation to the ERCEA in 2013 were very close to the initial CBA estimations, **EUR 46.5 million** compared to EUR 44.6 million.

Similarly, the retrospective CBA analysis for **REA** revealed that the actual costs of the REA in 2012-2015 were by EUR 34.8 million (15%) lower than the initial estimation due to cost savings in the staff and infrastructure expenditure. The actual cost savings of the Executive Agency scenario amounted to 21% in comparison to the in-house Commission scenario. The actual savings from the programme delegation to the REA in 2013 were 24% higher than the initial estimations, EUR 53.4 million compared to EUR 43.1 million.

The last evaluation of **INEA (ex. TEN-EA)** confirmed that the programme implementation (TEN-T Programme) by the Agency during the period 2011-2013 proved to be better 'value for money' in comparison to the DG MOVE in house scenario. The cost savings were estimated to EUR 8.8 million.

The results of the CBA from the last evaluation of **EASME (ex EACI)** covering the 2011-2013 period revealed considerable cost savings due to the Agency scenario, estimated between EUR 27 million and EUR 36 million, depending on the extent to which the Commission would use Contract Agents staff to carry out the delegated activities. The evaluation concluded that the Agency effectively and efficiently implemented the programmes entrusted to it.

The initial **identification of tasks entrusted** to the Executive Agencies and the produced savings **are still valid** for justifying the outsourcing.

The mandates of ERCEA and REA remain highly relevant to the needs of the Commission and the Agencies' applicants/beneficiaries for the remaining part of the programming period (from mid-2015 to 2020).

The ERCEA and REA performed in **an efficient and cost-effective way** in implementing the delegated programmes during the period 2012-2015.

The recent evaluations concluded that the process of grant management was judged to be very efficient in ERCEA and efficient in REA. Both Executive Agencies were effective in achieving objectives and producing planned outputs during the reference period (2012-2015). Despite increases in the operational budget and the number of proposals, the ERCEA and REA achieved good results in terms of main KPIs. The results achieved in terms of 'Time-To-Grant' and 'Time-To-Pay' are good and remained below the defined targets in most cases.

The two Executive Agencies not only improved management of the programme, but also rendered better services to the various stakeholders.

More specifically, the ERCEA beneficiaries' survey reported 93% of the respondents being very satisfied or satisfied with the services provided by the ERCEA. The overall satisfaction rate demonstrated an increasing trend during the 2011-2014 period (from 89% in 2011 to 93% in 2014). Moreover, an impressive 95% of independent experts were satisfied with the services provided by the ERCEA. The REA beneficiaries' survey indicated 82% satisfaction rate with regard to performance, up from 78% in 2011. In the area of support services (the REA contracts and pays all expert evaluators), 98% of the independent experts were satisfied

with the service of the REA and expressed their willingness to work with REA as an independent expert again in the future.

Externalisation of the research and development activities to the Executive Agencies allowed the Commission services to better focus on policy-making by freeing up resources for policy-related tasks and enabling a greater emphasis on their exercise. The benefits of outsourcing that have been actually realised would not have occurred had Commission staff worked on both policy-related issues and programme and project management at the same time.

In conclusion, the **ERC** has become a recognised success of the FP7, having established itself as an indispensable component of the European Research Area highly regarded for the quality and efficiency of its operations. The level of competition in Horizon 2020 guarantees excellence (success rate barely superior to 10%) and ERC grant is synonymous of Scientific Excellence for the worldwide scientific community.

As regards **REA**, the largest Executive Agency in terms of staff, it delivered a high quality and effective service to FP7 and Horizon 2020 participants and other stakeholders through its central support services, contributing significantly to a more consistent application of the Horizon 2020 rules.

As regards the other two agencies, **INEA** and **EASME**, during 2014-2015 the agencies grew considerably in size and were heading towards cruising speed. In 2015 the Executive Agency demonstrated their readiness to perform and implement the delegated activities and have in place the necessary arrangements to accommodate the new programmes. The main success would be the launch of Horizon 2020 calls in areas where no pre-existing research expertise or base existed and full project cycle management of the delegated programmes following the end of transitional arrangements when certain phases of the project life cycle were managed in house by parent DGs.

N. THE IMPACT OF SIMPLIFICATION AND THE NEW FUNDING MODEL

N.1. Context and legal requirements – Horizon 2020 new funding model

The funding model of Horizon 2020 comprises major simplification compared to the model used in the predecessor programme. In FP7, the reimbursement to which a project is entitled is determined via a complex matrix of organisation categories and activity types, making the financial management of the grant difficult and restricting the flexibility of the consortium in the implementation of the project. Moreover, for the calculation of indirect costs (overheads) in FP7, four different methods exist (two flat rate models, depending on the organisation categories; real indirect costs and a simplified method of determining real indirect costs). In particular, the real indirect cost options are a considerable source of financial errors.

The policy rationale for the Commission's proposal for the Horizon 2020 funding model was the following:

- To put the focus on the costs that are directly related to the project
- To simplify the financial management of projects, by a reduced complexity of the financial rules
- To reduce the financial error rate detected in ex-post audits
- To increase legal certainty for beneficiaries
- To increase the attractiveness and ease of access to the programme, in particular for newcomers, smaller actors, SMEs and industry
- To contribute to the acceleration of the granting processes

Consequently, the funding model of Horizon 2020 is based on two main features:

- A **single reimbursement rate** in a given project, without differentiation between organisation categories or types of activities. The reimbursement rate is up to 100% of the eligible costs for Research and Innovation Actions and up to 70% for Innovation Actions (with one exception: non-profit organisations are reimbursed 100% also in Innovation Actions).
- A **single flat rate** for contributing to the **indirect costs**. This flat rate of 25% is applied to the direct costs[9].

The results of a survey, addressed to all participants of signed Horizon 2020 grants in September 2015, show that an overwhelming majority of the respondents having experience with FP7 appreciate the new simplified funding model of Horizon 2020.

[9] Except costs for subcontracting, costs of financial support to third parties and in-kind contributions not used on the beneficiary's premises

Figure 92 How beneficial is the introduction of a single reimbursement rate for the project?

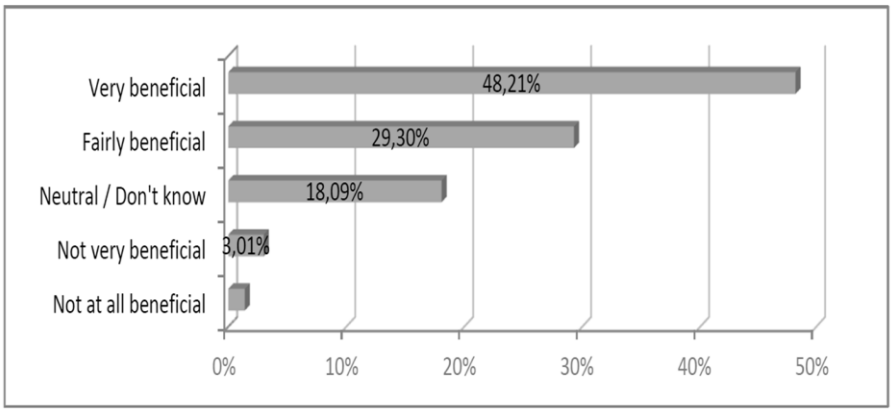
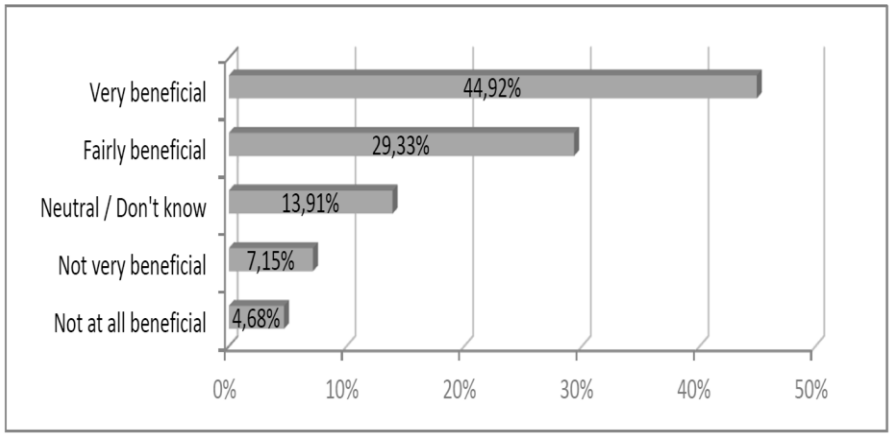


Figure 93 How beneficial is the introduction of a single flat rate for indirect costs?



More than 77% of the respondents consider the single reimbursement rate in a project as a beneficial simplification. More than 74% welcome the single flat rate for indirect costs.

Another feature of the Horizon 2020 funding model is the additional remuneration scheme (Article 27.2 of the Rules for Participation) introduced during the legislative process by the legislator. The feedback received from Member States' representatives and stakeholders indicates that its implementation is complex. Besides, it has a negative financial effect on those beneficiaries whose usual remuneration practices are based on very variable levels of remuneration.

In some Member States the salaries of researchers in the public sector are strongly dependent on availability of external funding. Under those remuneration schemes, project-triggered remuneration may count, for example, for as much as two third thirds of the total salary of the employee. That leads to situations where the cap of EUR 8 000 results in the ineligibility of a substantial part of the personnel costs. For certain groups of beneficiaries the provisions on additional remuneration imply that the eligible personnel costs for the same person for the same work are lower in a Horizon 2020 action than in a FP7 project.

N.2. The impacts of the new model on attractiveness, accessibility and participation in Horizon 2020

While a direct causal relationship between the funding model and the observed participation figures cannot be established, the statistics on participation show clearly that Horizon 2020 is highly attractive. About 120,000 proposals were submitted so far. The oversubscription rate (in terms of requested EU budget) is more than 8:1.

The programme attracts many newcomers (see Section R.3. Analysis of newcomers to Framework Programme). Similarly, the programme attracts SMEs (see Section O. Analysis of the companies participating in Horizon 2020). This shows the attractiveness of Horizon 2020 (including its funding model) for SMEs and newcomers.

Responding to the concerns of some large research organisations on the single flat rate for indirect costs, the Horizon 2020 Rules for Participation provide for the "Large Research Infrastructure" (LRI) scheme. To date, 13 entities (nine research organisations, three higher education establishments, and one enterprise) have lodged a request for an ex-ante assessment of the methodology for LRI.

Four entities (research organisations) have received a positive ex-ante assessment while 2 (research organisation) have been found not compliant. For five entities, the work is ongoing. Two entities have voluntarily withdrawn their application.

In conclusion, the number of applicants for the LRI scheme remains modest – reflecting the fact that overall only a few potential candidates comply with the set thresholds (minimum value of the infrastructure of 20 M€; at least 75% of the asset value in the balance sheet is research infrastructure).

This confirms that the thresholds as initially designed (i.e. targeting "large" infrastructure) have achieved their objective: targeting large research organisations with expensive research infrastructure and doing research as their core business.

N.3. The impacts of the new model on funding levels

The effective funding levels (EU contribution versus real project costs) in Horizon 2020 are determined by the nominal reimbursement rates (100% or 70%) and the flat rate for indirect costs (covering, on average, only a part of the real indirect costs). In FP7, the funding level is a function of the organisation categories, the mix of types of activities in a project and the choice by beneficiaries of the method for charging indirect cost (among the four existing options).

In FP7, around 90% of participating universities and more than half of research organisations use the 60% flat rate method for indirect costs and their reimbursement rate is 75%. For such organisations, the funding model of Horizon 2020 represents no major change. Their funding levels, compared to FP7, are slightly increased (by about 4%). The same applies to participations in projects under the European Research Council, for which the only change from FP7 to Horizon 2020 is the increase of the flat rate for indirect costs from 20% to 25%.

For industry and other organisations using in FP7 the real indirect cost option, the Horizon 2020 funding model represents a major change. A direct comparison of funding levels is not

possible. The average nominal funding level (EU contribution/ (direct costs + 25%) + subcontracting)) for non-SME industry in Horizon 2020 is 64% (compared to 54% in FP7). But this nominal funding level does not represent the effective funding level, as for these entities the real indirect costs on average are higher than 25%.

An estimation of the effective funding level was made, based on the known real indirect costs of the most frequent FP7 industry participants (non-SMEs) using the real indirect cost option. This results in an estimated average real funding level for (non-SME) industry in Horizon 2020 in the area of 58%, i.e. an increase of 4 percentage points compared to FP7 for this population of beneficiaries.

This moderate increase of the average effective funding level for non-SME industry did not lead to a higher share of the total funding going to big industry. While overall industry participation (including SMEs) has increased, the share in number of participations of non-SME industry has decreased by 12% compared to FP7. The respective share in EU contribution decreased even stronger by 28% compared to FP7. This is clear evidence that the nominal increase of the reimbursement rate for (non-SME) industry, from 50% (35% for demonstration activities) in FP7 to 100% (70% for Innovation Actions) in Horizon 2020, has not lead to an increase of the share of EU funding going to this category of participants.

An overall direct comparison of funding levels on a programme level between FP7 and Horizon 2020 is not possible, however estimations show that the average real funding level in Horizon 2020 remains at the 70%, the same as in FP7.

N.4. Lessons learnt and areas for improvement

The expected benefits of the new funding model have largely materialised. A big majority of the stakeholders appreciate the related simplification effects. The funding model is attractive for newcomers and SMEs. Its reduced complexity contributes to the acceleration of the granting process (88% of the grants in Pillars 2 and 3 are signed within 8 months from the call deadline). The effects on the simplification of financial management in the projects and on the error rate cannot yet be assessed, as very few financial reports were yet submitted and no ex-post audits were yet finished.

During the inter-institutional negotiations on the Horizon 2020 Rules for Participation some stakeholders raised concerns on potential detrimental effects of the proposed funding model on certain categories of organisations:

- The single 25% flat rate for indirect costs would deter organisations running big and expensive research infrastructures, because their real costs would not be adequately covered;
- The 100% reimbursement rate would massively increase the share of EU contribution going to big (non-SME) industry.

Concluding from the analysis of the data on the Horizon 2020 grants signed so far, these effects have not materialised.

One area for improvement is the broader acceptance of beneficiaries' usual accounting practice. Stakeholders indicate that there are still too many instances where they have to collect data and information specifically for obligations in their Horizon 2020 grants, in

parallel to their usual accounting system. This concerns in particular the obligations on staff time recording, the accounting for depreciation of equipment and for internally provided consumables and services, the handling of personnel costs outside closed financial years and some accounting detail for beneficiaries outside the Euro zone. The Commission has already reacted to these concerns and adapted the Horizon 2020 model grant agreements accordingly

Another area for improvement concerns the unintended effects of the additional remuneration scheme (Article 27.2 of the Rules for Participation) with the eur 8000 capping. A change to the Horizon 2020 model grant agreement, providing that personnel costs for researchers taking part in Horizon 2020 will be eligible at least at the level accepted in national projects, is under preparation for providing a quick intermediate solution. For the longer term, one could also consider a change to the Horizon 2020 rules for participation, requiring a legislative procedure involving Parliament and Council.

As concerns more substantial changes, the European Court of Auditors has suggested that the Commission should lean towards a trust-based approach in research funding and in this respect should consider moving away from its current system of reimbursing beneficiaries for proven costs, towards lump sum financing based on performance/results. The wider use of output-based funding with lump sums has the potential to reduce drastically the financial error rate and is also in line with the Commission's priority on Budget Focused on Results. Such forms of funding aim to shift the focus from checking inputs (i.e. costs incurred) to monitoring performance and outcome, covering the entire project life cycle, including new ways of ex-post audits. The revised Financial Regulation provides a fresh opportunity for an extended use of such simplified forms of funding (flat rates, unit costs, lump sums) and in particular for funding based on results/output/performance/fulfilment of conditions. In Horizon 2020 output-based funding with a lump sum is currently used only for the SME instrument phase 1 and there are only very few R&I funding programmes worldwide with similar schemes that could serve as an example. The challenge with funding based on output/results/performance in the field of research is to define the conditions for the payment of the lump sum. These conditions must take into account the intrinsically risky nature of research and innovation projects (i.e. unexpected scientific results or no results despite honest effort or the falsification of a scientific hypothesis must not be a reason for not paying the lump sum).

On this basis, the Commission is reflecting on some pilot actions on output-based lump sum funding within the last Horizon 2020 work programme (2018-2020), in view of the preparation of the next R&I Framework Programme.

O. ANALYSIS OF THE COMPANIES PARTICIPATING IN HORIZON 2020

A summary of the main findings on companies participating in Horizon 2020 is as follows:

- **12,324** private for profit companies (PRC) take part in Horizon 2020, making up **62.5 %** of all participants (02/2017).
- **EUR 6.841 billion** or **28 % of the total Horizon 2020 granted budget** was awarded to companies (02/2017).
- An average Horizon 2020 company has **1,715 employees** and **EUR 708 million revenue** a year (2014). However, most of the companies have revenue around **EUR 4.5 million.**
- The most frequent Horizon 2020 company was created in **2012** and the average company in 1997.
- The average EC contribution to a unique Horizon 2020 company amounts EUR 555,125. The most frequent grant amounts **EUR 50,000.**
- Bigger companies (in terms of revenues and number of employees) receive larger grants.
- Most of the Horizon 2020 companies are from the **Professional, Scientific and Technical activities sector** (33 %), the **Manufacturing sector** (27 %) and the **Information and communication sector** (17 %).
- **Start-ups: 23 %** of Horizon 2020 companies are less than 5 years old.
- **SMEs: 77 %** of Horizon 2020 companies **have less than 250 employees and 74 % have revenues up to EUR 50 million.**
- More than half of the Horizon 2020 companies come from **Germany, Spain, the United Kingdom, Italy, and France,** while **Czech Republic, Romania, Estonia, Slovakia, Cyprus, Bulgaria, Luxemburg, Lithuania, Croatia, Latvia, and Malta** each contribute less than**1 %**of Horizon 2020 companies.
- **83 % of companies are from EU15 (89 % of grants), 9 % from EU13 (6 % of grants) and 8 % from outside EU (5 % of grants).**

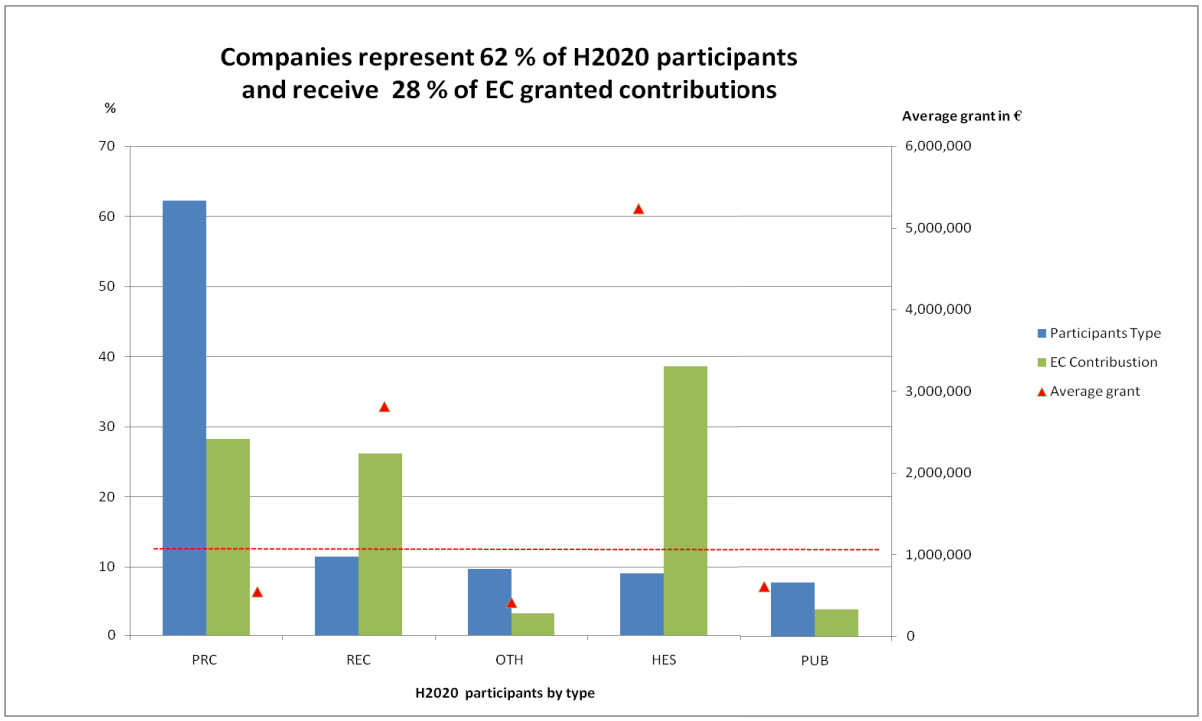
Horizon 2020 private for profit companies (further referred to as Horizon 2020 companies) were analysed on their country, age, employment, revenue, and economic sector. For this, companies from the CORDA database were matched with their data in ORBIS, a database of company data[10]. The analysis is based on 10,128 successful matches for companies in the 28 EU Member States. Since the data on the country of origin and grants originates from CORDA, non-Member States' participation is included.

As of mid-February 2017, 12,324 unique companies take part in Horizon 2020, making up 62.5 % of all distinct Horizon 2020 participants. 1,848 companies participated in more than one project. Overall, EUR 6.841 billion or 28 % of total so far granted Horizon 2020 budget

[10] Cut-off 16 January 2017. OrbisEurope was used, covering 38 countries: the EU-28 plus countries in Europe that are associated to Horizon 2020 (such as Norway, Iceland, Switzerland, Turkey). Countries outside Europe, such as Israel, are not covered in OrbisEurope. For the matching, companies' names were used as an identifier, using the batch search option of OrbisEurope. Out of the 12,324 companies in Horizon 2020, 10,128 companies were successfully matched to their Orbis data.

went to companies.[11] An average grant per company amounts EUR 555,125 and most frequent amount granted is EUR 50,000, what indicates that the companies frequently obtain the SME Instrument phase I support.

Figure 94 Horizon 2020 distinct participants by type and EC contributions (N = 19,796)



Source: European Commission, based on Corda data 15/02/2017

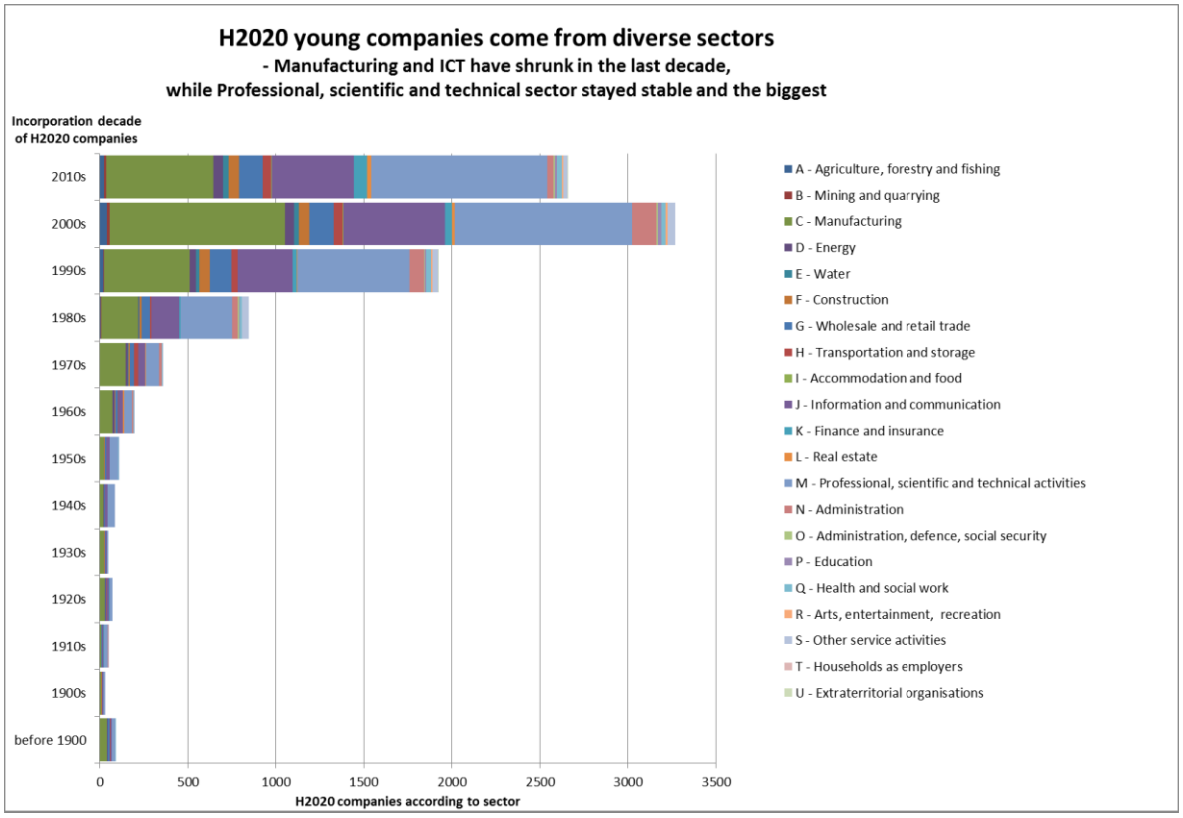
O.1. Company sectors by age and grants

Horizon 2020 companies were sorted on their sector, using the main NACE code[12]. This classification comes with a caveat: companies can operate in more than one sector, especially big companies but also new companies that combine e.g. finance and ICT. However, it is the only classification available.

Younger Horizon 2020 companies come from more sectors than older ones. Companies set up since 1990 are active mainly in Professional, scientific and technical activities and Information and communication, next to Manufacturing sector. Additionally, slowly rising are Construction, wholesale and retail trade and Administrative sectors. Older companies are mainly active in Manufacturing. In the last decade, their share has decreased compared to 2000s, while the share of Professional, scientific and technical activities sector and Information and communication sector stayed relatively unchanged Figure 95.

[11] Taking into regard total number of participations rather than distinct participants, companies (PRC) and higher and secondary education (HES) each represents 33 % of participations, research organisation (REC) 22 %, public bodies (PUB) 6 % and others (OTH) 5 % of participations.
[12] NACE 2.0 main sections: the single letter code, as registered in the national registrations used by Orbis.

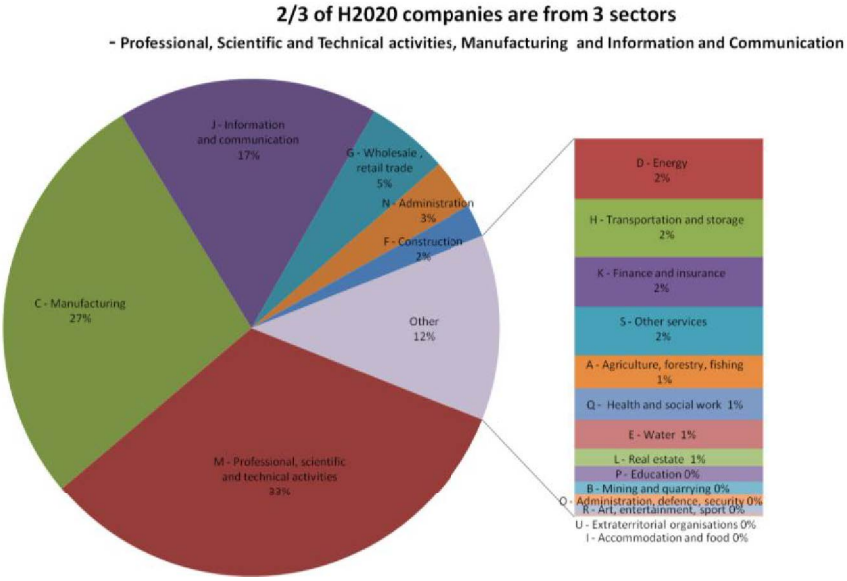
Figure 95 Companies by sector and decade (N = 9,763 companies)



Source: OrbisEurope, Corda16/01/2017.

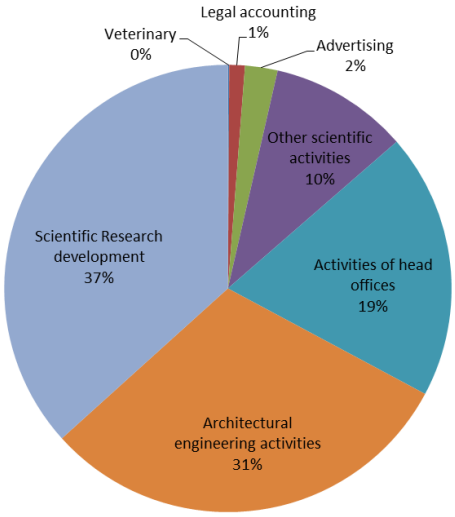
More than two-thirds of Horizon 2020 companies come from only three sectors – 33 % are in Professional, scientific and technical activities (e.g. Siemens Healthcare GmbH, Wiener Stadtwerke Holding, The Vision Belgium, Sol Voltaics, Solar Polar), 27 % are in Manufacturing (e.g. Daimler, Basf, BMW, Safran, Lithoz GmbH, Adidas, Nokia) and 17 % in Information and communication (e.g. Deutsche Telekom, Telefonica Sa, Alten Netherland, Global Robots). The remaining one-third comes from 17 other sectors.

Figure 96 Horizon 2020 companies by sector (N = 9,908 companies)



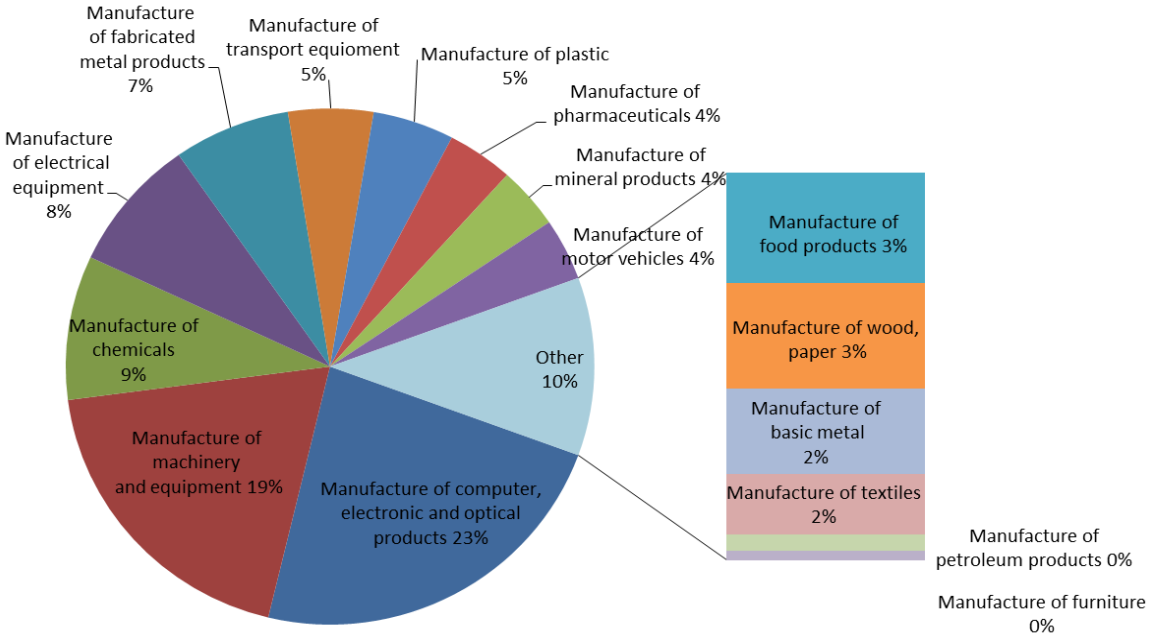
Source: OrbisEurope, Corda16/01/2017.

Figure 97 Professional, scientific and technical activities sector by subsectors(N = 3,020)



Source: OrbisEurope, Corda 11/01/2017.

Figure 98 Manufacturing activities sector by subsectors (N = 1,251)



Source: OrbisEurope, Corda, 11/01/2017.

More than three quarters of the biggest Horizon 2020 sector in terms of number of companies - Professional, scientific and research activities - consist of scientific research development, architectural engineering activities and activities of head offices. Veterinary, legal accounting and advertising present relatively small share of the sector (Figure 97). Out of the biggest ten grant recipients from the sector, 5 are specialized in technological innovation, focused on R&D and transformation of industry to 4.0 (Telefonica Investigacion Y Desarrollo, Philips Electronics Nederland, Innovacio I Recerca Industrial I Sostenible, Fonroche Geothermie, Marine Current Turbines), while the other five offer consulting, project management & control services and of special studies (D'appolonia S, Esteyco, GeoSea, Arttic, Amec Foster Wheeler Energy). Arttic's main activity in preparation of

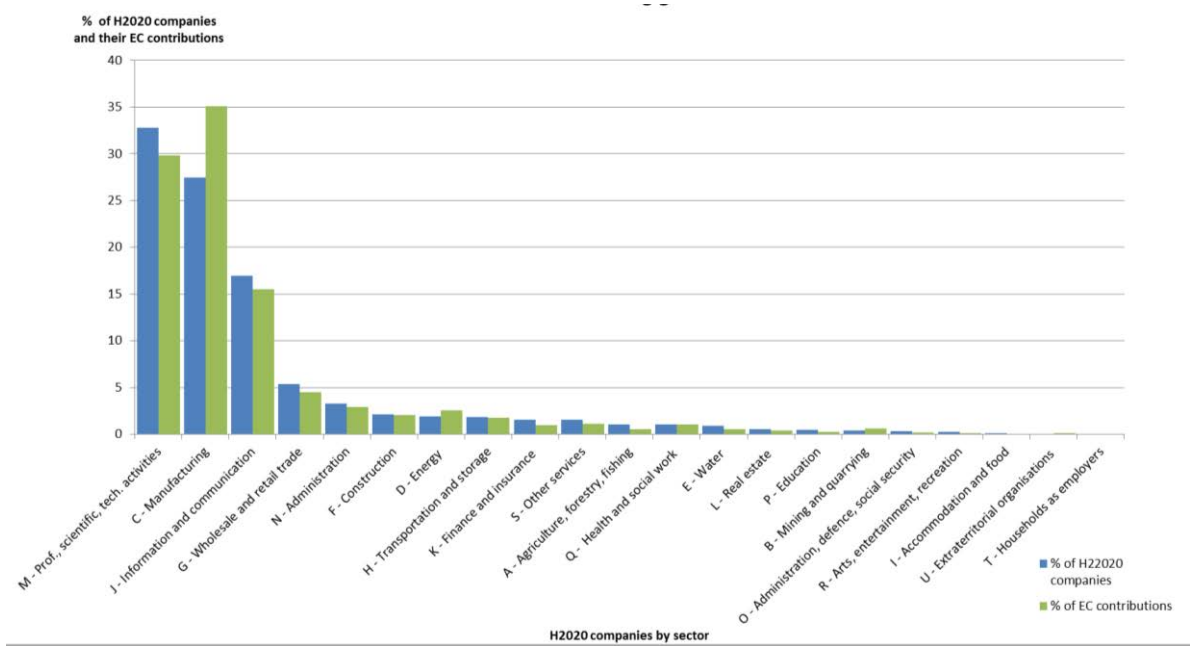
customers' Horizon 2020 roadmaps and has been so far participating in 19 Horizon 2020 projects and received more than EUR 7 million.

The second biggest sector - Manufacturing, is more diverse, although more than half of it consists of only three subcategories, manufacture of computer, electronic and optical products, manufacture of machinery and equipment and manufacture of chemicals (Figure 98). The smallest share represents companies producing furniture, petroleum products, textile and basic metal.

In contrast to manufacturing, the third biggest Horizon 2020 sector - Information and communication - is less diverse. More than three quarters of companies are in computer programming consultancy. Since there is no data on subsectors for all Horizon 2020 companies, the three analysed sectors are smaller than their respective shares.

80% of total grants to Horizon 2020 companies go to the three biggest sectors; 30 % to Professional, Scientific and Technical Activities, 35% to Manufacturing and 16% to Information and communication sector. The amount of grants awarded to each sector roughly follows the number of companies: money seems to be not sector-specific (Figure 99). The only slight exceptions are Manufacturing (relatively more money) and Professional, scientific and technical activities (less). This may be because of equipment costs in manufacturing and relatively smaller grants to consultancy companies.

Figure 99 Company grants by sector (N = 9,748 companies)



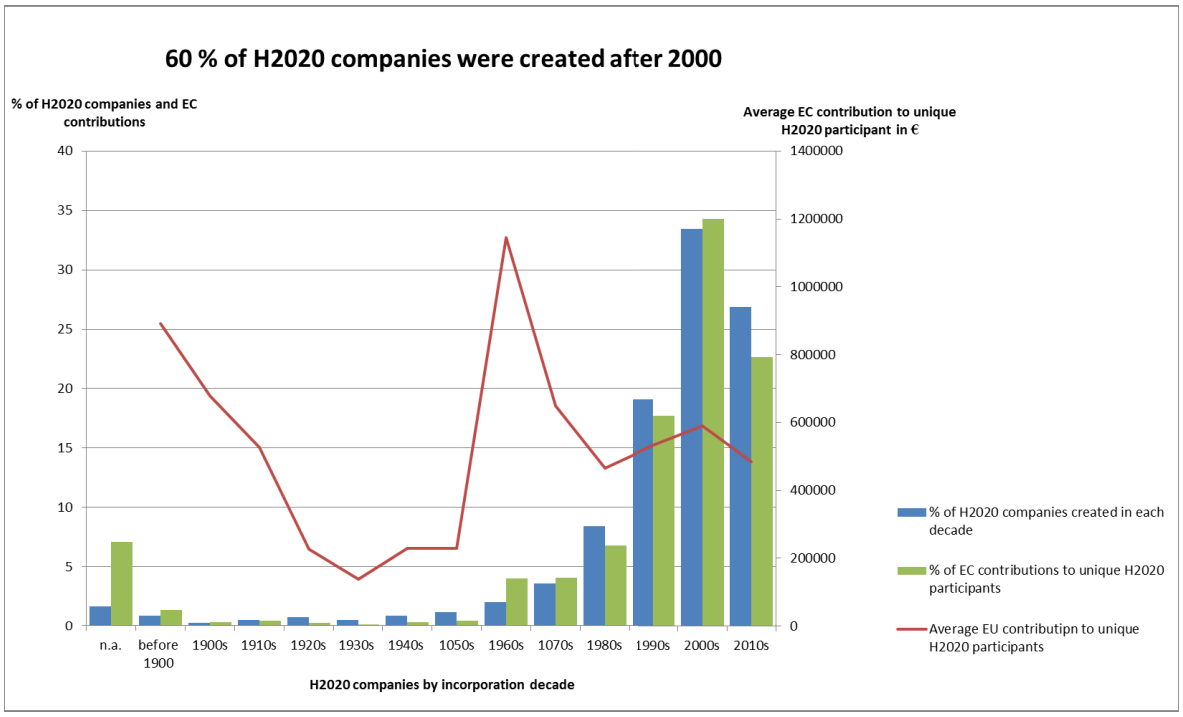
Source: OrbisEurope, Corda, 16/01/2017.

O.2. Company age and grants

The majority (60 %) of companies taking part in Horizon 2020 companies were created after 2000, 27 % after 2010, and 23 % since 2012 ('start-ups'). The oldest companies were created well before 1900 (Figure 100). The most frequent Horizon 2020 company was created in 2012. The share of grants roughly corresponds to the share of companies created in each decade, though the oldest and most established companies get the highest grants, while the

average amount decreases for the younger companies. They probably have smaller shares in the projects.

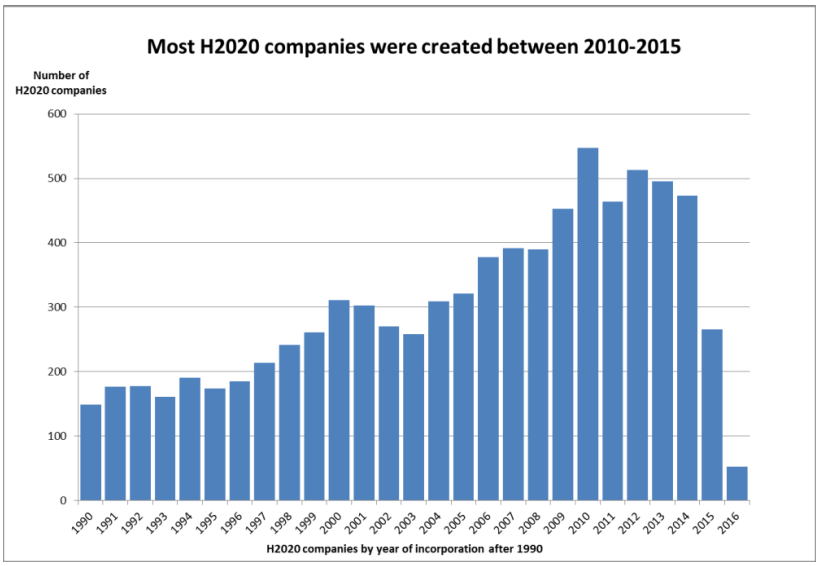
Figure 100 Companies by decade of incorporation and grants (N = 9,959 companies)



Source: OrbisEurope, Corda16/01/2017.

Figure 101 zooms into the 8,128 companies that were set up in 1990 or later. It shows that the share of Horizon 2020 companies was more or less increasing since 1990, with the largest cohort starting in 2010. The cohorts 2015 and 2016 are smaller, since they could not take part in the first calls of Horizon 2020, but these numbers are expected to go up in the years to come when more grants are awarded.

Figure 101 Companies by year of incorporation and grants since 1990 (N = 8,128 companies)

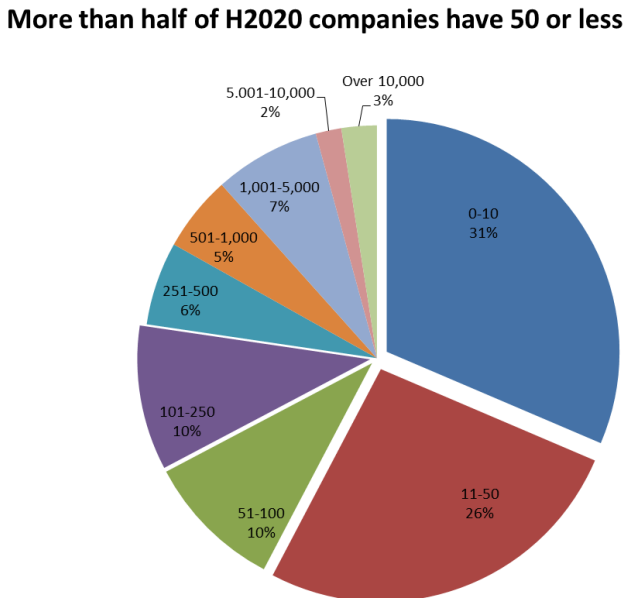


Source: OrbisEurope,Corda 16/01/2017.

O.3. Company employment and grants

Based on 2014 data, most of Horizon 2020 companies are small in terms of number of employees: 31 % have 10 or less employees (micro-enterprises), 57 % have 50 or less (small enterprises) and 67 % have 100 or less employees (Figure 102). This is in line with the majority of Horizon 2020 companies being young (see section 2 on age). According to the micro, small and medium size-sized enterprises (SMEs)[13] employment criterion of maximum 250 employees, almost 80 % of Horizon 2020 companies are SMEs. Average number of employees per Horizon 2020 company is 1,715, most frequent number of employees being only 1 and median at 31.

Figure 102 Companies by number of employees (N = 6,607 companies)

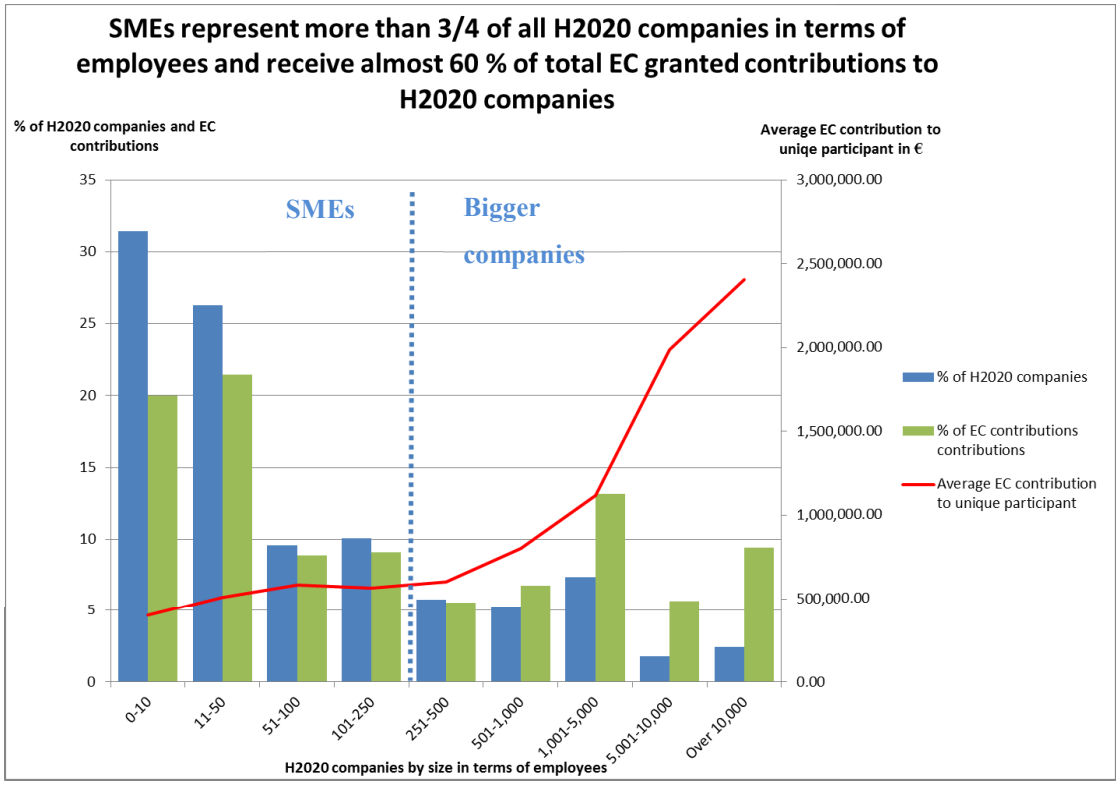


Source: OrbisEurope,Corda 16/01/2017.

Companies with 250 or less employees represent 77 % of all companies and receive 59 % of grants. Bigger companies represent 23 % of all Horizon 2020 companies and get more than 41 % of grants. Bigger companies get bigger grants on average (Figure 103).

[13] SMEs are identified as having less than 250 employees, a turnover not exceeding € 50 million and/or a balance sheet not exceeding € 43 million. In addition, in order to assure SMEs' autonomy, not more than 25 % of their capital or voting rights could be given to partner entities (Council Regulation (EC) No 859/2003 of 14 May 2003).

Figure 103 Companies by number of employees and grants (N = 6,738 companies)



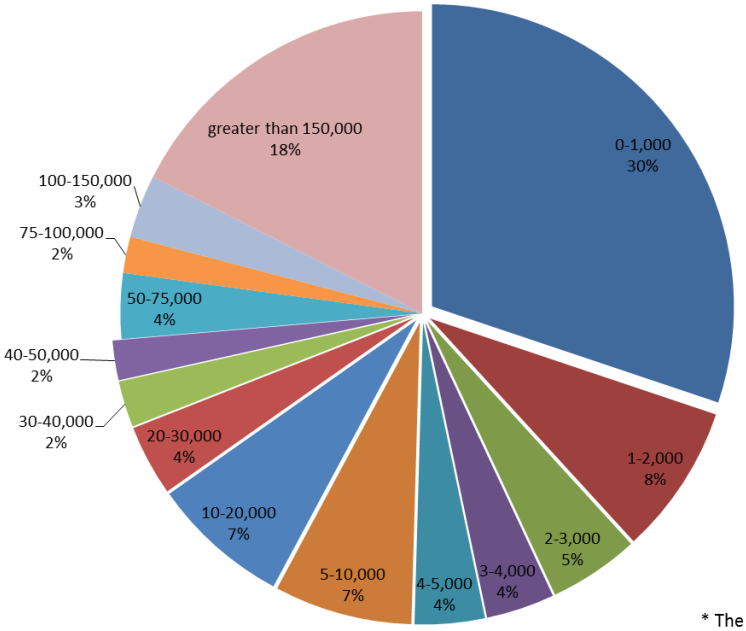
Source: OrbisEurope,Corda 16/01/2017.

O.4. Company revenues and grants

Based on 2014 data, 30% of the Horizon 2020 companies have revenues up to EUR 1 million, 58% have revenues up to EUR 10 million and 73% have revenues up to EUR 50 million, the maximum amount for SMEs in the EC definition (the balance sheet and ownership criteria were not taken into account). Almost a quarter of the Horizon 2020 companies (23%) have revenues higher than EUR 50 million. 4% of the Horizon 2020 companies have revenues higher than EUR 1 billion (Figure 104). The latter is the reason for the relatively high average revenue of Horizon 2020 companies at EUR 708 million, with the most companies have revenues of around € 4 million (median at EUR 4.77 million and mode at € 4.16 million).

74 % of Horizon 2020 SMEs in terms of revenues receive 54% of all grants. 46% of grants go to larger companies. The participation is the highest among companies with revenues up to EUR 1 million (30 % of all Horizon 2020 companies that receive 18% of all grants) on one side and the biggest companies with revenues above EUR 150 million (17% of Horizon 2020 companies that receive 37% of all grants) (Figure 105

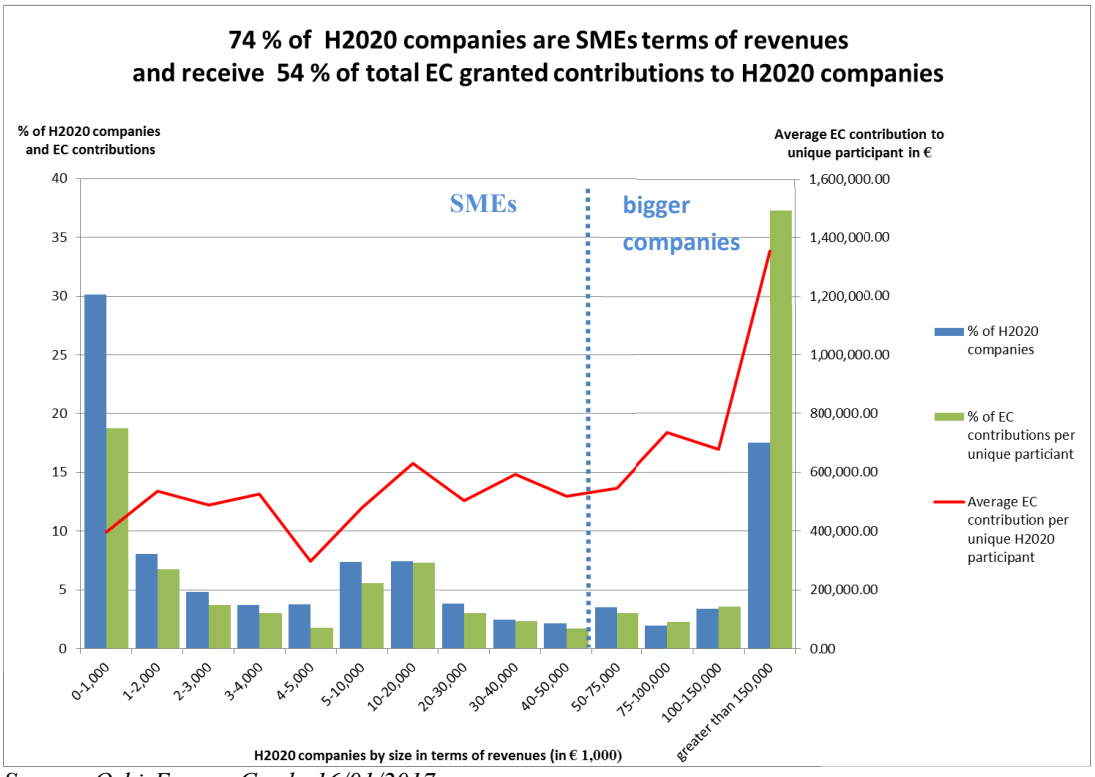
Figure 104 Companies by revenue (N = 6,222 companies)



* The numbers in the Chart are in € 1,000.

Source: OrbisEurope,Corda 16/01/2017.

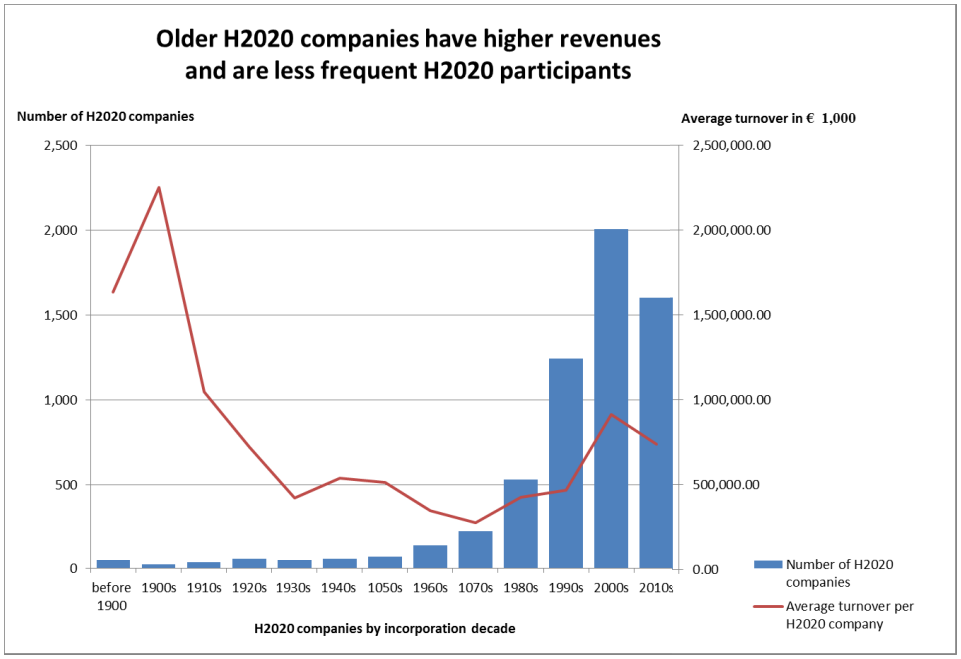
Figure 105 Companies by revenue and grants (N = 6,222 companies)



Source: OrbisEurope,Corda 16/01/2017.

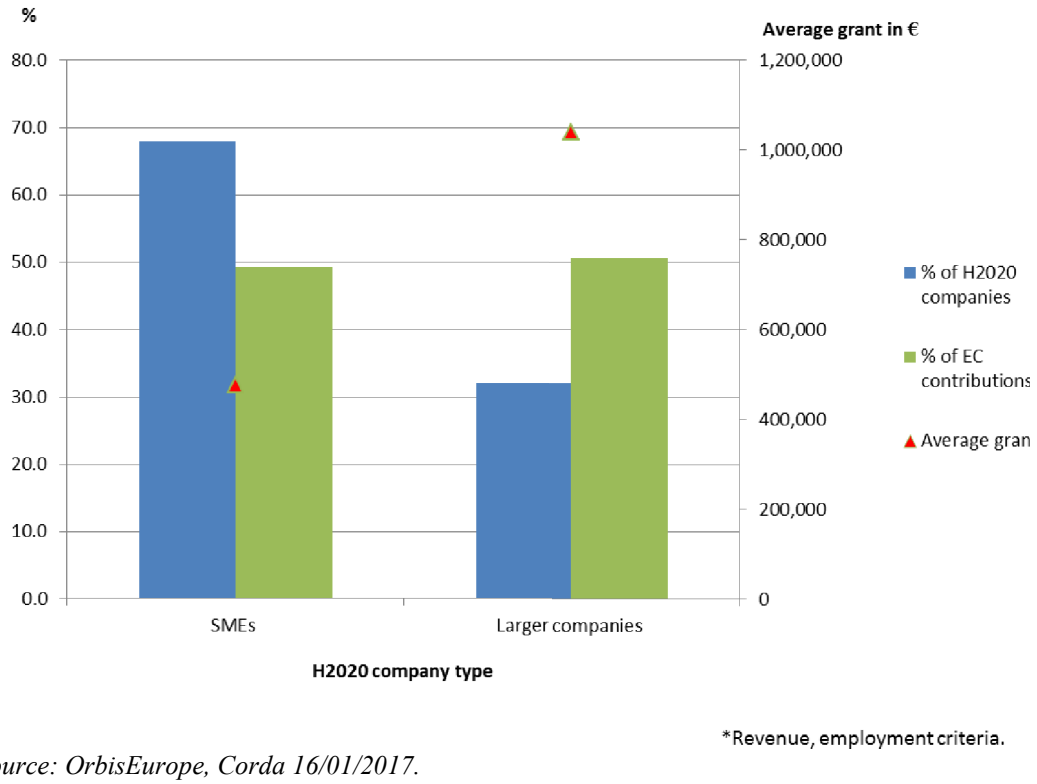
Many of the Horizon 2020 companies are young. On average, they have a smaller turnover than older companies (Figure 106).

Figure 106 Companies by decade of incorporation and turnover (N = 6,108 companies)



Source: OrbisEurope,Corda 16/01/2017.

Figure 107 EC contributions to SMEs and bigger companies (N = 5,276 companies)



Source: OrbisEurope, Corda 16/01/2017.

Taking into account both considered SME criteria, revenue and employment, 68% of all Horizon 2020 companies are SMEs based on 2014 data and receive 49% of all granted EC contributions to Horizon 2020 companies. Larger companies represent 32% of all Horizon 2020 companies and receive 51% of company contributions. However, if it was possible to apply the rest of the SME criteria, the SME proportion would likely decrease. The average

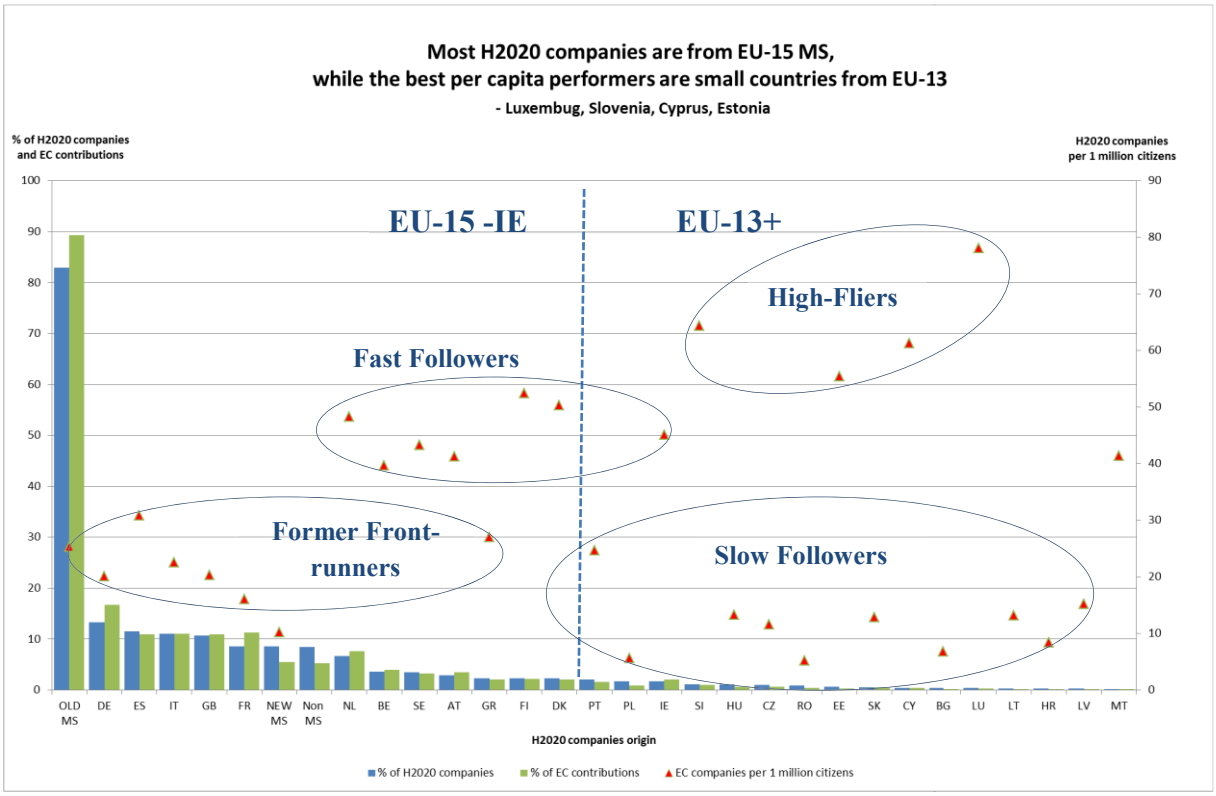
grant for larger companies is over EUR 1 million and more than twice of an average SME grant, which is below EUR 0.5 million.

O.5. Companies by Member State

More than half of the Horizon 2020 companies are based in five large countries: DE, ES, IT, GB and FR. Those countries have each more participant Horizon 2020 companies and receive greater shares of EC contributions than companies of new Member States put together. The shares of companies from 10 countries (CZ, RO, EE, SK, CY, BG, LU, LT, HR, LV and MT) are all lower than 1%. 83% of the Horizon 2020 companies come from EU15. They receive 89% of the total grant amounts. 9% of the Horizon 2020 companies come from the new Member States (EU13) and they receive 6% of the grants. 8 % of Horizon 2020 companies come from outside the EU and receive 5% of total grant amount. The average grant of the EU15 companies is higher than the average grant of the EU13 companies and companies from outside EU.

Per capita performance could be categorized in four groups (see circles in Figure 108). Although most Horizon 2020 companies come from EU15 countries, their per capita performance is rather low. Front-runners from DE, ES, IT, GB, FR and GR are followed by better per capita performance fast followers from the rest of the EU15 countries (NL, BE, SE, AT, GR, FI, DK, IE). The best per capita performers are High Fliers: LU (78 Horizon 2020 companies per million citizens) and SI (64), followed by CY (61) and EE (55). The lowest company participation per capita is in the group of Slow Followers: RO (5), PL (6), BG (7) and HR (8).

Figure 108 Companies and their grants by Member State (N = 12,410 companies)



Source: European Commission, based on Corda 10/02/2017, Eurostat 03/01/2017.

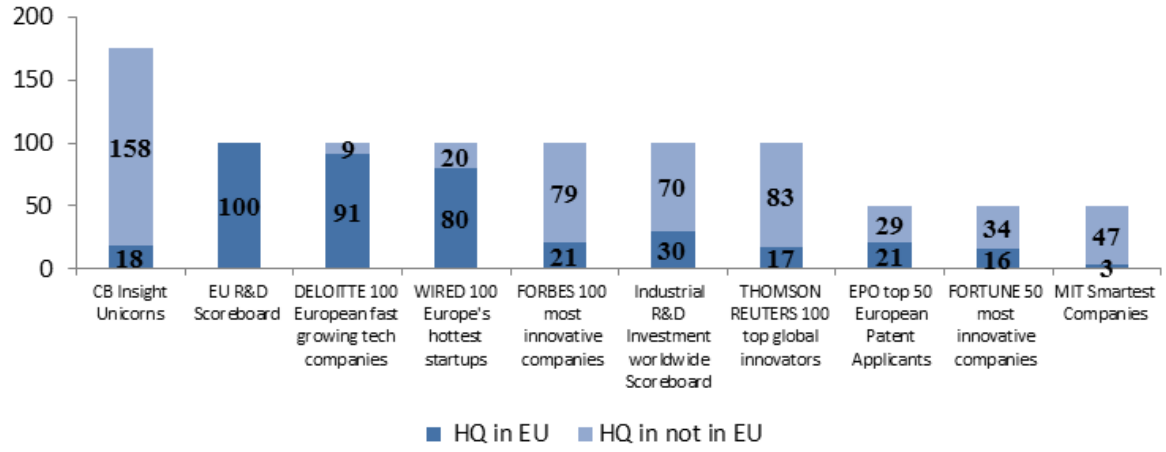
P. POSITION IN INTERNATIONAL RANKINGS

P.1. Companies

An analysis of 10 international rankings of top performing or innovating companies was undertaken in order to assess the percentage of those funded by Horizon 2020. The distinction between those which have headquarters in the EU and those with headquarters outside the EU was also considered.

The analysis revealed that the majority of the top companies have headquarters outside the EU, with those participating in Horizon 2020 usually doing so through their subsidiary units located in the EU.

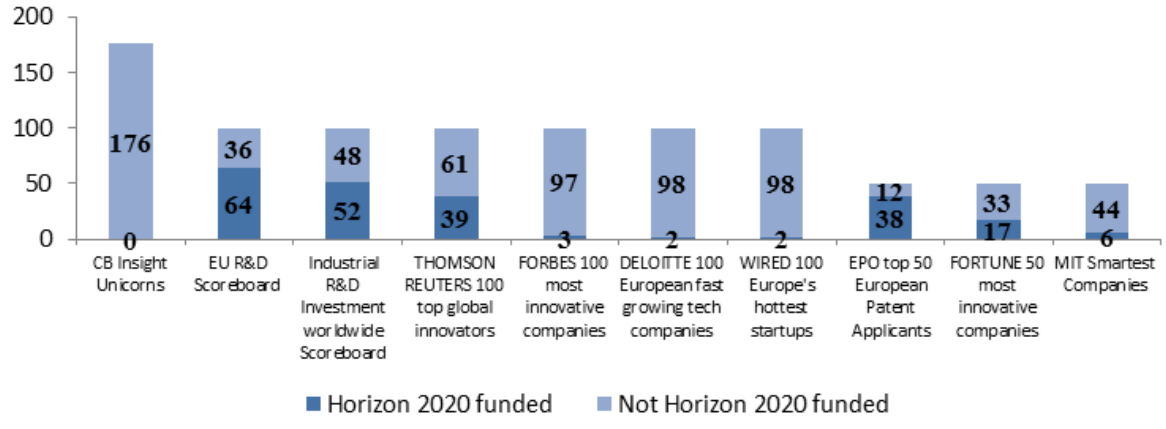
Figure 109 Best performing companies according to different international rankings, according to the location of their with headquarters (HQ) within or outside the EU



Source: European Commission services compilation based on published rankings

Concentrating on top companies that benefited from Horizon 2020 reveals a diverse picture as presented in the following figure.

Figure 110 Best performing companies according to different international rankings, according to whether they received Horizon 2020 support or not



Source: European Commission services compilation based on published rankings

Bigger companies and established innovators included in the European Patent Organisation (EPO), the R&D Scoreboards, and Thomson Reuters top global innovators rankings are greater beneficiaries of Horizon 2020 funds than younger innovators from the Wired Europe's hottest start-ups, Deloitte's fastest growing European tech companies, Forbes' most innovative companies, and CB Insights' Unicorns list.

The top-50 applicants for the European Patent Office often take part in Horizon 2020, with a large majority of those participating through their divisions inside the EU. For example, the Japanese Honda Motor participates in Horizon 2020 with its subsidiaries Honda Research Institute Europe and Honda R&D Europe, both based in Germany. This again shows that Horizon 2020 attracts frequent participation of non-EU based companies and organisations often through their EU based subsidiaries and evinces the open innovation nature of the programme.

As expected, most of the companies in the EU R&D Scoreboard take part in Horizon 2020, such as Volkswagen, Daimler, Bosch, Sanofi, BMW, Siemens or Philips. Out of those which are not participating in Horizon 2020, the banking and financial sector is the most significant.

Wired Europe's hottest start-ups and Deloitte's fastest growing European tech companies rankings reveal that these companies hardly take part in Horizon 2020. Out of the first ranking, only two benefited from Horizon 2020 funding thus far: Portugal's Beta-i and Unbabel. This is underlying the gap in reaching out to these young companies. Additionally, CB Insight's list of unicorns or young fast growing companies reaching a capitalisation of $1 billion indicates that 18 out of the 176 are EU-based, including names such as Spotify or Delivery Hero. Yet, no company in this list is currently benefiting from Horizon 2020.

In similar lines, only 12% of the MIT smartest companies and 3% of the Forbes most innovative companies rankings participate in Horizon 2020, with notable examples such as Huawei, Toyota, Oxford Nanopore, Movidius, Bosch, IBM, and Intel.

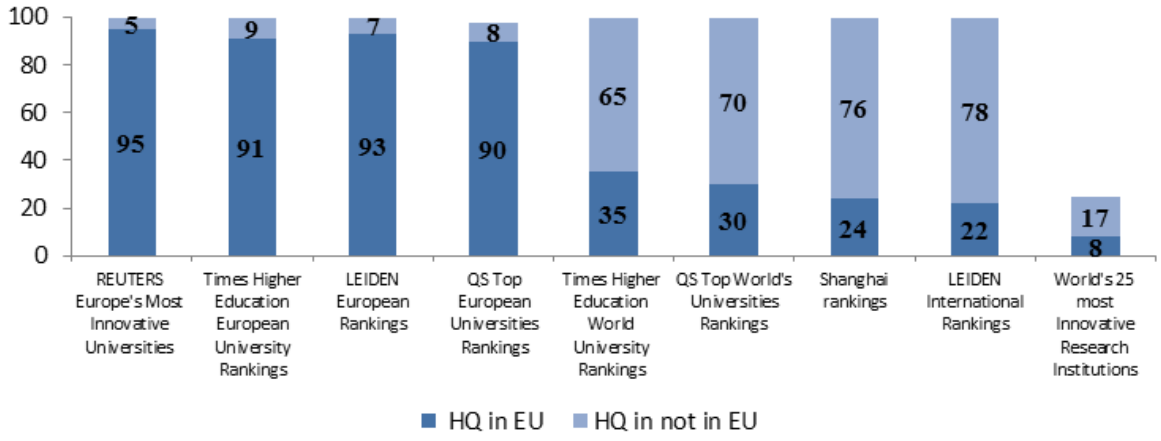
Several of the well-known companies are newcomers to Horizon 2020 and did not participate in FP7, including: Panasonic, Cisco, Mitsubishi Electric or Caterpillar. Attracting top performing companies (e.g. 3M Deutschland, Sumitomo, Unbabel, AlphaSense Oy, Bluelinea, Syngenta, Interdigital or Johnson Controls) demonstrates that Horizon 2020 manages to attract newcomers even from the top companies.

P.2. Universities and research institutions

An analysis of nine international rankings of the best universities and research institutions was undertaken in order to assess the percentage of those funded by Horizon 2020. The distinction between those that have headquarters in the EU and those outside was made.

The Shanghai, Leiden International Rankings, QS Top World's Universities and the Times Higher Education World University rankings show that around a quarter of the worlds' top universities are based in the EU.

Figure 111 Best performing universities according to different international rankings, according to the location of their with headquarters (HQ) within or outside the EU

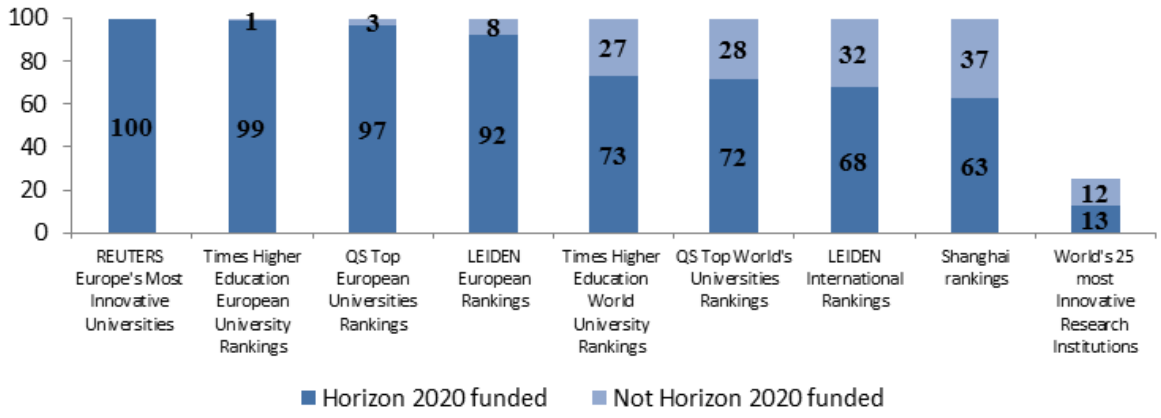


Source: European Commission services compilation based on published rankings, Cut-off date: 01/11/2016. All rankings represent their latest version by this date

As shown in the figure below, almost all of EU-based top universities participate in Horizon 2020. Among the top performing non-EU universities, more than half of them are also participating in Horizon 2020. Even though Horizon 2020 already includes a significant base of excellent universities worldwide, there are also newcomers to Horizon 2020, which did not participate in FP7, the most notable example being the New York University or the University of Utah.

Looking specifically at the participation in Horizon 2020 of the World's Most Innovative Research Institutions, 8 out of the 25 top research institutions (32%) are based in the EU, including the world's top 2: the Alternative Energies and Atomic Energy Commission in France and the Fraunhofer Society in Germany. Almost all European institutions ranked here take part in Horizon 2020, as do a third of the world's best research institutions which are not based in the EU, such as Korea's Institute of Science & Technology, RIKEN - Japan's largest comprehensive research institution and the Russian Academy of Science.

Figure 112 Best performing universities according to different international rankings, according to whether they received Horizon 2020 support or not



Source: European Commission services compilation based on published rankings; Cut-off date: 01/11/2016. All rankings represent their latest version by this date

Q. PARTICIPATION PATTERNS AND BALANCE BETWEEN LARGE AND SMALL PROJECTS

Q.1. Introduction and background

This Annex provides an overview of two methods developed by the Commission (DG RTD) to assess participation patterns in large versus small projects in Horizon 2020 and their findings.

This analysis is conducted as a result of the Regulation establishing Horizon 2020 (Recital 23) and the Council Decision establishing the Specific Programme implementing Horizon 2020 (Recital 13) stating that there should be an appropriate balance between small and large projects, notably within the priority "Societal challenges" and the specific objective "LEIT". However, the definitions of 'project size' as well as definition of 'appropriate balance' were not spelled out.

A previous study looking into the optimal project size conducted under FP7[14] concluded there is no optimal size for collaborative research projects to maximise their impact and "*finding an ideal number of participants, disciplines, sectors, NUTS 3 regions or countries is elusive*". The appropriate balance between large and small projects is also a continuous priority of the European Parliament[15]. Yet, based on their analysis[16], there are currently no bottlenecks in terms of programme implementation in relation to project size (a EUR 5 million threshold was used for the assessment).

However, based on results of the stakeholder consultation carried out for the interim evaluation of Horizon 2020, stakeholders seem to support the concept of the need for an appropriate balance within the programme. Respondents noted that the balance between small and large projects in calls for proposals is "good" or "very good" (57%), whereas 24% foundnd it poor or very poor. In their open comments, some respondents asked for more opportunities for small projects. Others commented in their position papers that a better balance between small, medium and large projects should be achieved. In particular it was mentioned that the effectiveness of very large size consortia should be reviewed while at the same time smaller projects were argued to allow for higher participation of SMEs and newcomers.

Given the complexity of the issue, two separate analysis were undertaken by Commission services (DG RTD) in the framework of the interim evaluation of Horizon 2020. The methods and results are presented in the sections below.

Q.2. Analysis 1 – Descriptive overview of participation in different-size projects based on budget data

Key finding: Entities from EU-13 countries participate more in larger projects (i.e. projects above EUR 5 million), but coordinate very small projects (i.e. project below EUR 200,000).

[14] European Commission, DG-RTD, Study on Network Analysis of the 7th Framework Programme Participation, 2015, p.118
https://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/network_analysis_of_fp7_participation_-_final_report.pdf
[15] European Parliament, Scrutiny in Horizon 2020 focusing on the European Parliament's priorities, 2016,
[16] Ibid, p. 17

The current funding going towards entities from EU-13 countries is spread between very large projects (i.e. above EUR 5 million) and very small projects (i.e. below EUR 200,000).

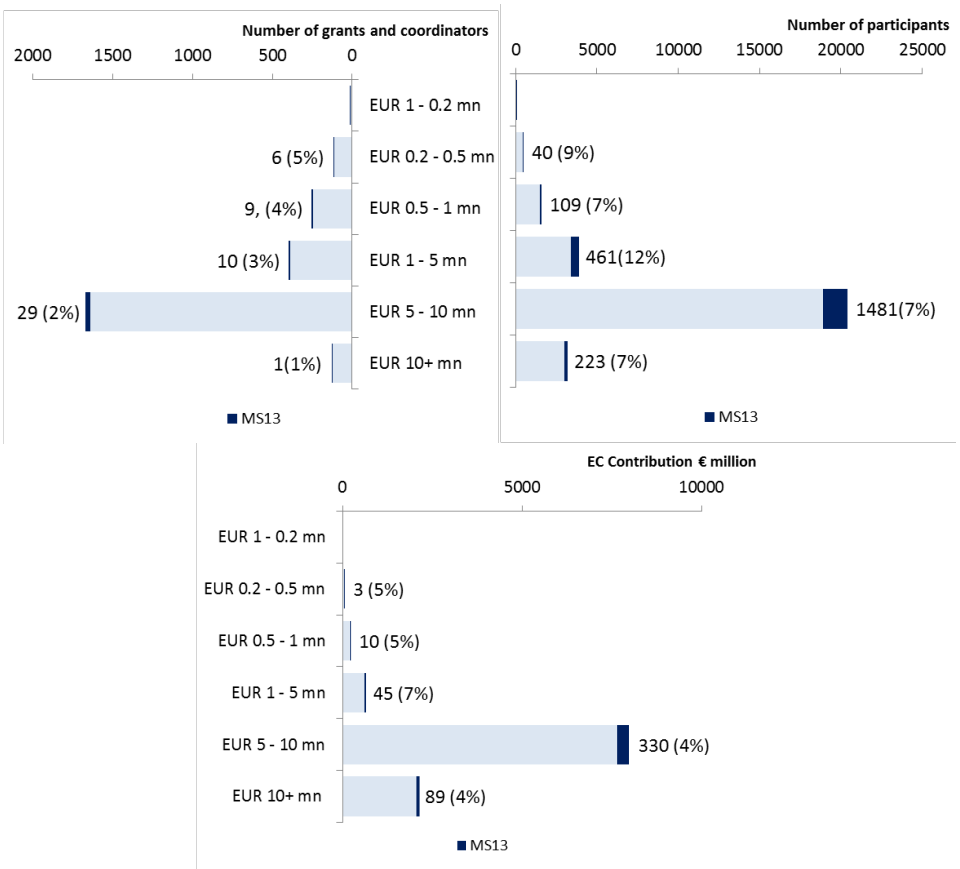
Scope of the analysis: The analysis was carried out on all actions related to "Societal challenges" and "LEIT". The analysis does not make a comparison with FP7.

Identification of threshold for large and small projects: A threshold was not identified. Instead, the project size was analysed based on six budget categories (from EUR 1 – 0.2 million to EUR 10+ million).

Analysis: In terms of budget, a disproportionate share of funding went to projects larger than EUR 5 million (92% of the total budget). The budget and grant allocation to projects below EUR 5 million is relatively low.

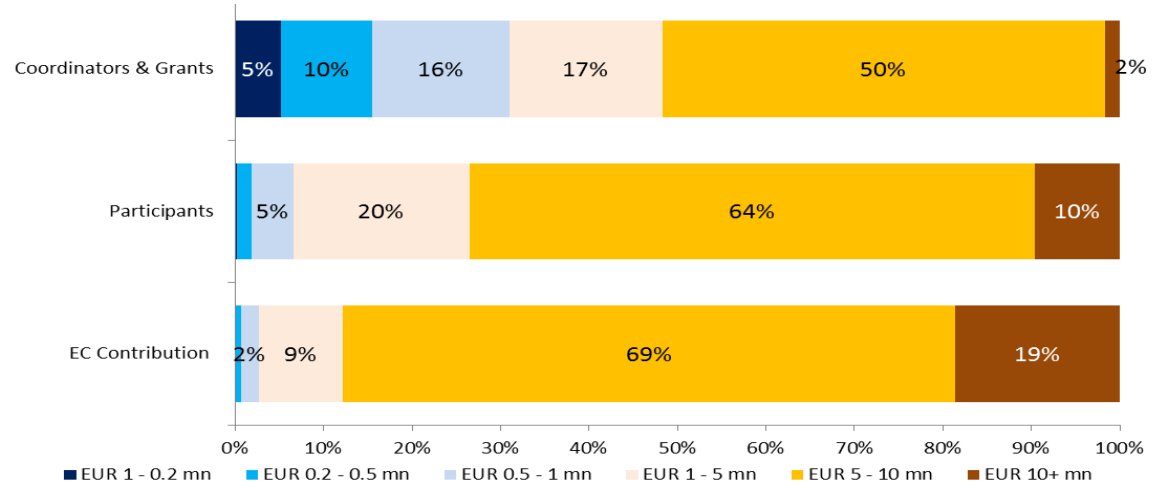
The highest share of entities from EU-13 countries participate and receive EC contribution from larger projects (projects above EUR 5 million). However, when looking at the participation of entities from EU-13 countries within different project sizes, these seem to coordinate and lead more if projects are smaller (but the current sample size is too low to draw conclusions). At the same time, EU-13 entities seem to participate best in the EUR 1 – 5 million bracket. The share of EU-13 participants is significantly higher than in other brackets and there is no significant differences between the share of participation in very small projects under EUR 1 million or very big projects above EUR 5 million.

Figure 113 Project size (budget) and participation of EU13 (%)



Source: European Commission, DG RTD/A5 based on CORDA data extracted on 1.1.17

Figure 114 Share of total EU13 coordinators, grants, participants and EC Contribution by project size



Source: European Commission, DG RTD/A5 based on CORDA data extracted on 1.1.17

Q.3. Analysis 2 – Composite threshold and comparison Horizon 2020 - FP7

Key finding: The share of participants from EU-13 countries and of newcomers is higher in large than in small projects. There is a more balanced situation between large and small projects in Horizon 2020 if compared to FP7 in terms of number of proposals, EC contribution and number of participants.

Scope of analysis: The analysis was carried out only on 'Research and Innovation Actions' and 'Innovation Actions' in LEIT and in three Societal Challenges of Horizon 2020. For FP7, only collaborative projects in any priority where included in the analysis.

Identification of threshold: The identification of small or large projects was based on the number of participants. The number of participants in each project was normalised by EUR million of EC contribution to allow for comparisons between types of action and with FP7. For each type of action or instrument, the average was estimated on the normalised number of participants. If the number in a project was below or equal to the average, the project was considered "small", if it was above the average, the project was considered "large".

Table 77 Ratio between large and small projects (1= perfect balance)

	Average number of participants by EUR million
Horizon 2020 - Innovation actions	3.1
Horizon 2020 - Research and Innovation actions	2.93
FP7 - Collaborative Projects	3.6

Source: European Commission, DG RTD/A5 based on CORDA data extracted on 11.8.16

Identification of an appropriate balance: Based on the definition of the thresholds, the method identified the appropriate balance both in terms of ratio between large and small projects[17] and in terms of ratio between the normalised number of participations in large and small projects[18]. A value that is close to 1 indicates that there is approximately the same number of projects or participations between large and small projects. The same reasoning was applied in other variables, such as a differentiation between different Societal Challenges and LEIT areas, differences among country groups, newcomer participations, etc.

Analysis: The situation in Horizon 2020 both at aggregated and disaggregated level per programme part takes into account that the overall average size of projects is 2.5 participants per EUR million. At aggregated level, the balance between large and small projects tends slightly towards a higher number of large projects compared to small projects: as a result, the number of participations in large projects is 40% higher than in small projects.

Table 78 Ratio between large and small projects (1= perfect balance)

Programme Part	Nr Large Projects	Nr of Small Projects	Ratio Large vs Small Projects	Nr of Participations in Large Projects	Nr of Participations in Small Projects	Ratio Participations in Large vs Small Projects
LEIT-ICT	280	261	1,1	3.087	2.689	1,1
LEIT-NMBP	86	142	0,6	1.393	1.673	0,8
LEI-SPACE	101	20	5,1	822	140	5,9
SC1	88	150	0,6	1.368	1.633	0,8
SC2	81	28	2,9	1.600	369	4,3
SC3	93	109	0,9	1.132	1.531	0,7
SC4	200	126	1,6	2.116	1.279	1,7
SC5	66	40	1,7	1.326	556	2,4
SC6	84	4	21,0	955	26	36,7
SC7	50	24	2,1	760	276	2,8
Total	**1.129**	**904**	**1,2**	**14.559**	**10.172**	**1,4**

Source: European Commission, DG RTD/A5 based on CORDA data extracted on 11.8.16

Nonetheless, it can be observed that certain programme parts have ratio values that deviate significantly from a perfect balance (value of 1). In LEIT-Space, for instance, large projects account for more than five times the number of small projects and for six times in terms of number of participations. In Societal Challenge 2, the number of large projects is almost three times as big as the number of small projects and the number of participations in large projects is more than four times higher than those in small projects.

In LEIT-Space, this deviation from the balance is explained by the fact that projects under this programme part tend to be carried out in relatively small consortia in term of participants (numerator) with high project costs (denominator). Despite the relative low number of small projects, these account for 60% of the LEIT-Space budget.

[17] A ratio above 1 implies that more large than small projects were financed; conversely a ratio below 1 indicate that more small projects than large were financed.

[18] If the ratio between the weighted number of participants is above 1, this implies that there is a predominance of participants in large projects; whilst the opposite (a ratio below 1) implies a predominance of participants in small projects.

Results show a more balanced situation between large and small projects in Horizon 2020 in case of Research and Innovation actions than in FP7 collaborative projects in terms of number of proposals, EC contribution and number of participants. The share of participants from EU-13 and newcomers is higher in large than in small projects. The following tables summarize the results in more details.

Table 79 Ratio between large and small projects (1= perfect balance)

	Number of proposals	EC contribution	Number of participants	Share of participants from EU-13	Share of participants which are newcomers
Horizon 2020 - Innovation actions	0.54	0.22	0.50	1.21	1.13
Horizon 2020 - Research and Innovation actions	0.59	0.38	0.77	1.73	1.20
FP7 - Collaborative Projects	0.58	0.31	0.68	1.46	N/A

Source: RTD/A5 based on CORDA data extracted on 11.8.16

Type of project	Category	Number of projects	Total EC contribution in EUR	Participants	EU 13	Share EU13	New comers	Share Newcomers
FP7 - Collaborative Projects	Large	2204	5,880,664,597	29056	2281	7.9%	N/A	
	Small	3794	18,776,147,693	42808	2295	5.4%	N/A	
Horizon 2020 - Research and Innovation actions	Large	527	1,943,476,742	7894	751	9.5%	1561	19.8%
	Small	899	5,120,568,745	10207	561.0	5.5%	1676	16.4%
Horizon 2020 - Innovation actions	Large	201	542,737,120	2290	181	7.9%	797	34.8%
	Small	371	2,420,000,653	4618	302	6.5%	1424	30.8%

Source: European Commission, DG RTD/A5 based on CORDA data extracted on 11.8.16