Council of the European Union

Brussels, 31 May 2017
(OR. en)

9787/17
ADD 12

RECH 211
COMPET 454
IND 142
MI 458
EDUC 272
TELECOM 148
ENER 255
ENV 551
REGIO 65
AGRI 289
TRANS 227
SAN 224

COVER NOTE

From:	Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director
date of receipt:	29 May 2017
To:	Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2017) 221 final - PART 13/16
Subject:	COMMISSION STAFF WORKING DOCUMENT INTERIM EVALUATION of HORIZON 2020 ANNEX 2

Delegations will find attached document SWD(2017) 221 final - PART 13/16.

Encl.: SWD(2017) 221 final - PART 13/16

EUROPEAN
COMMISSION

Brussels, 29.5.2017
SWD(2017) 221 final

PART 13/16

COMMISSION STAFF WORKING DOCUMENT

INTERIM EVALUATION
of
HORIZON 2020

ANNEX 2

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

G. LEADERSHIP IN ENABLING AND INDUSTRIAL TECHNOLOGIES – SPACE

G.1. INTRODUCTION

G.1.1. Context

In 2010, the European Union launched its growth strategy **Europe 2020**, one of the policy responses to the 2008 financial crisis that revealed certain structural weaknesses in the European economy. The Europe 2020 strategy established three priority areas covering seven flagships designed to help Europe "emerge from the crisis stronger", with targets in economic performance, innovation, sustainability and social inclusion. It has three main underpinning objectives:

- Smart Growth: to develop an economy based on knowledge and innovation, i.e. improving the EU's performance in education, research/innovation, and the digital society
- Sustainable Growth: to promote a more resource efficient, greener and more competitive economy, including the establishment of industry policy for the 'globalisation era'
- Inclusive Growth: to foster a high-employment economy delivering economic, social and territorial cohesion

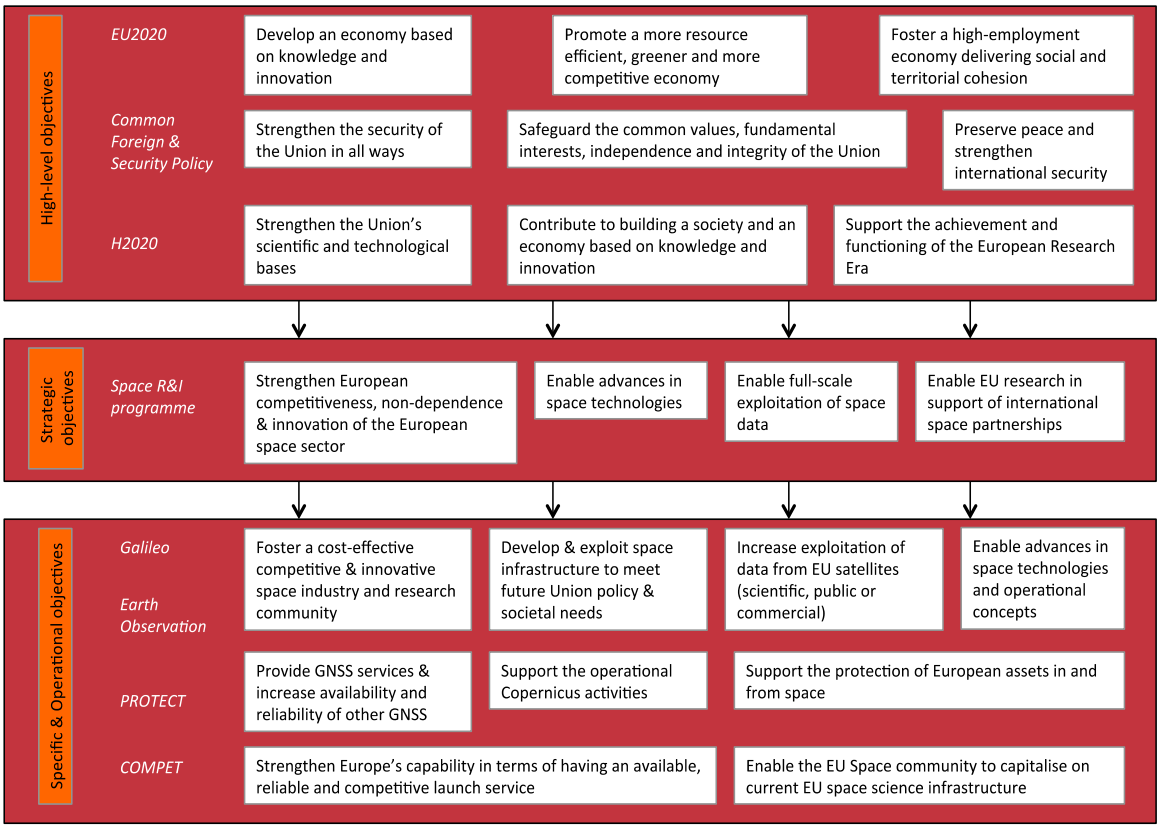
The **Space R&I programme** constitutes one of three areas in the Horizon 2020 Leadership in Enabling and Industrial Technologies – LEIT pillar. The key objective of this pillar is to speed up development of the technologies and innovations that will underpin tomorrow's businesses and help innovative European SMEs to grow into world-leading companies.

The Horizon 2020 LEIT-Space programme is an integral component of the European Space policy and its implementation. The European Union has been given for the first time a specific space competence in the 2009 Treaty of Lisbon. Article 189 of the Treaty on the Functioning of the European Union (TFEU) gives the EU the mandate to draw up a European space policy and "to this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space". To this end, "...Parliament and the Council shall establish the necessary measures, which may take the form of a European space programme".

The 2011 EC Communication 'Towards a space strategy for the European Union that benefits its citizens' acknowledged the important role of the space sector to help in addressing Europe's social, economic and strategic challenges. It set space policy firmly in the context of the Europe 2020 strategy, and more specifically as an integral part of the 'Industrial Policy' flagship initiative. The 2013 EC Communication 'EU Space Industrial Policy: Releasing the Potential for Growth in the Space Sector' (EC, 2013)(EC, 2013) established the flagship EGNSS and GMES projects, climate change, security, competitiveness and space exploration as the key priorities for the EU space policy. It also set out the priorities for the Horizon 2020 Space R&I programme.

G.1.2. Objectives and intervention logic

Figure 126 - Objectives hierarchy of the Horizon 2020 Space R&I programme



Source:Technopolis (2016).

The objectives of LEIT-SPACE and their relationships with Horizon 2020 general objectives as well as their implementation in lines of activities of LEIT-SPACE are demonstrated in Firgure 1 "Objectives hierarchy of the Horizon 2020 Space R&I programme".

These objectives have evolved over time to reflect the evolving priorities of the EU space programmes Copernicus and Galileo both as regards applications using data from these systems and for the evolution of technologies and services to prepare for the future. In addition, the Horizon 2020 Space needs to support the EU framework for Space Surveillance and Tracking.

A Space Strategy for Europe[1] was adopted by the Commission on 26 October 2016. The strategy outlines the general goals of Europe in the space sector and is the result of and extensive consultation exercise involving Member States and key stakeholders. Horizon 2020 LEIT-Space already supports, to a varying degree, the priorities outlined in the strategy but further aligning of LEIT-Space to the Space Strategy will be necessary, such as enhancing the support to start-ups and entrepreneurial space activities.

[1] *COM(2016)705 final*

The comparison with the objectives of the Seventh Framework Programme for Research and Technological Development (FP7) and its Specific Programme Cooperation – Space and Transport themes shows a degree of continuity in the following operational objectives of LEIT-SPACE:

- Competitiveness and non-dependence of the European Space sector and advances in Space technologies
- Exploitation of space data from EGNSS and Copernicus
- European research in support of international space partnerships.

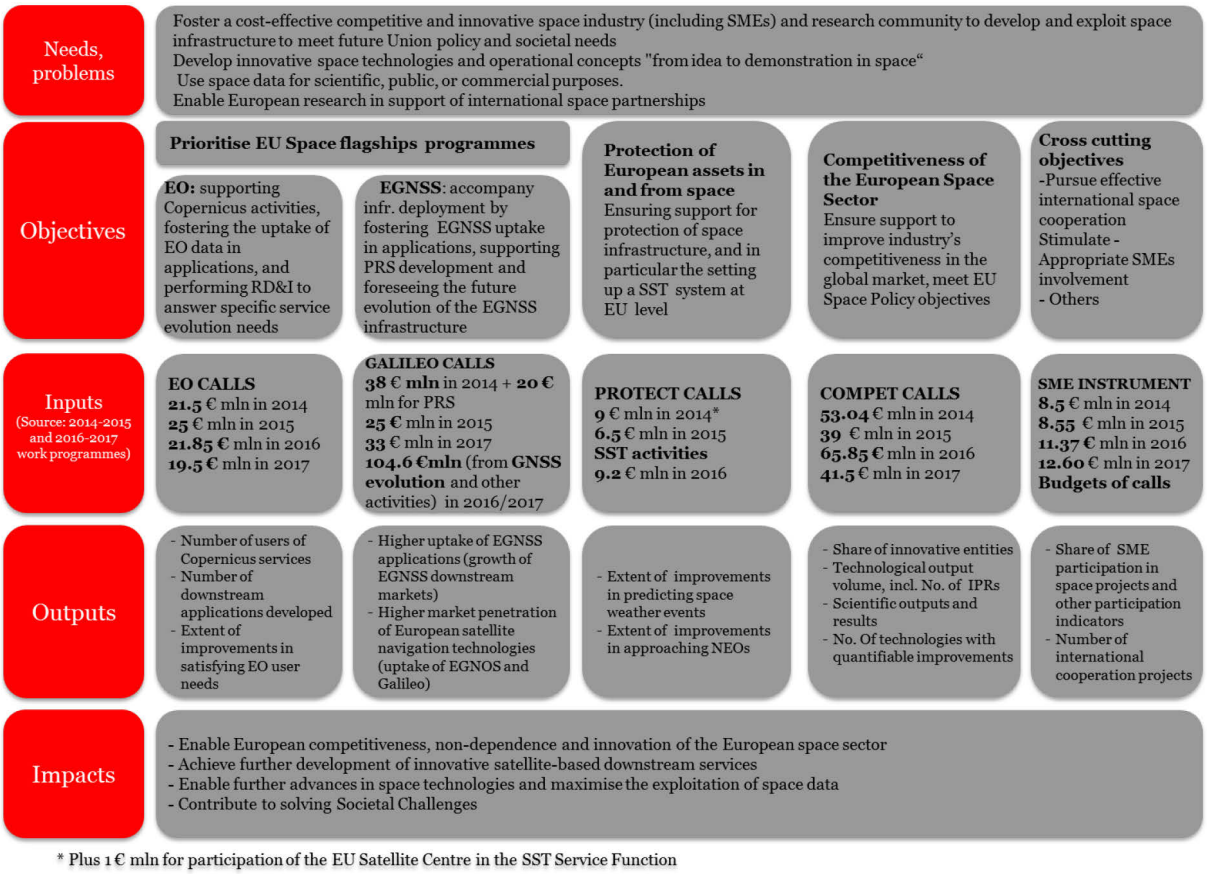
The following new areas emerged in Horizon 2020:

- The evolution of EGNSS infrastructure which includes research and development to assure the long-term international competitiveness of Galileo.
- Evolution of Copernicus technology and services
- Support to the development of a European framework for Space Surveillance and Tracking

The following area that was supported in FP7-Space are now to a large degree addressed within the Copernicus programme for Earth Observation: GMES (now Copernicus) pre-operational services and pilot services (monitoring of land, marine/ocean, atmosphere, emergency and security services).

To address the identified objectives, the thematic programme has adopted an intervention logic described in Figure 127.

Figure 127 - Intervention logic of Horizon 2020 Space



Source: Technopolis (2016).

G.2. IMPLEMENTATION STATE OF PLAY

G.2.1. Overview of programme inputs and activities

As of 1 January 2017, the EC contribution allocated to the implementation of the calls included in Work Programmes 2014-2016 and which have been closed EUR 356 million, about 25% of total expected budget allocated under Horizon 2020, which is EUR 1.4 billion for the period 2014-2020.

Through the Horizon 2020 Work Programmes 2014-2017, each line of activity of LEIT-SPACE was allocated a share of the overall budget of EUR 1.4 billion in Horizon 2020, as indicated in the table below.

A part of this budget was allocated through calls and other parts were implemented as "other actions", namely indirect management by ESA (EGNSS R&D), procurement and grants to identified beneficiaries (Copernicus pre-operational services and Space Surveillance and Tracking).

Table 69 - Activities and allocated share of budget dedicated to LEIT-SPACE for the programming period 2014 – 2017

Activities in the legal basis	Allocated share of thematic budget
Enable European competitiveness, non-dependence and innovation of the European space sector and to enable advances in space technologies (calls for proposals and other actions)	65%
Enable the exploitation of space data including from EU Space programmes EGNSS and Copernicus (calls for proposals and other actions)	30%
Enable European research in support of international space partnerships (i.e. space exploration)	5%

Source:Horizon 2020 Work programmes 2014-2017.

The budget was so far allocated through 38 topics included in 9 calls for proposals. The following table summarises the results of these calls.

Table 70 - Key data on proposals per type of action for "LEIT-Space": Number of eligible and retained proposals, EC contribution requested (in million Euros) and success rates (as % of proposals submitted, and as % of budget available)

Type of Action	Nr of Eligible Proposals	Nr of Retained Proposals	EC Contribution requested by Eligible Proposals (EUR million)	EC Contribution to Retained Proposals (EUR million)	Success Rate Proposals	Success Rate Funding
CSA	63	22	104,5	41,7	34,9%	39.9%
IA	223	44	396,5	93,1	19,7%	23.5%
RIA	511	68	1 181,6	175,0	13,3%	14.8%
SME-1	388	58	19,4	2,9	14,9%	14.9%
SME-2	147	19	185,9	25,7	12,9%	13.8%
PCP	2	1	7,4	4,4	50,0%	59.6%
TOTAL	**1 334**	**212**	**1 895,2**	**342,7**	**15,9%**	**18,1%**

Source: CORDA data, 1 January 2017, Success Rates by Type of Action (General).

Table 71 - Key data on signed grants per type of action for "LEIT-Space": number, EC contribution, time-to-grant, projects' total costs, % of EC contribution in projects

Type of Action	Nr of Signed Grants	EC Contribution to Signed Grants (EUR million)	Nr of Grants signed within 8 months (TTG)	Share of Grants Signed within TTG Benchmark (in all Signed Grants)	Project Total Cost in Signed Grants (EUR million)	Share of EC Contribution in Project Total Costs (Signed Grants)
CSA	24	52,1	18	70,8%	53,2	97,9%
IA	45	94,7	34	75,6%	128,1	73,9%
RIA	75	182,9	66	88,0%	189,1	96,7%
SME-1	51	2,6	51	100,0%	3,6	70,0%
SME-2	15	19,7	15	100,0%	28,1	70,0%
PCP	1	4,4	1	100,0%	4,9	90,0%
TOTAL	**211**	**356,3**	**184**	**87,2%**	**407,1**	**87,5%**

Source: CORDA data,1 January 2017, Selected Projects and Signed Grants by Type of Action

G.2.2. Participation patterns

A total number of 211 projects have been selected so far.

G.2.2.1. Participation per type of organisation

The selected proposals represent a total of 1079 participations, mobilising 733 distinct participants. The participant types are given in the following tables where the types are:

HES – Higher education
PRC – Private company
PUB – Public body
REC – Research organisation
OTH – other

Table 72 - Key data on participation per type of organisation for "LEIT-Space": number of participants, of project coordinators, of newcomers, of participations, and EC contribution to participations (in million Euros)

Legal Entity Type	Nr of Participants in Signed Grants	Nr of Projects Coordinators in Signed Grants	Nr of NewComers in Signed Grants	Nr of Participations in Signed Grants	Participant total cost	EC Contribution to Participations in Signed Grants (EUR million)
HES	156	15	1	240	57,9	53,6
OTH	34	6	11	39	6,2	5,7
PRC	460	148	205	641	234,5	190,1
PUB	43	3	14	63	20,8	20,1
REC	136	39	3	305	87,6	86,7
TOTAL	**829**	**211**	**234**	**1288**	**407,1**	**356,3**

Source: CORDA data,1 January 2017, Participants and Participations by Legal Entity.

Table 73 - Success rates (as % of proposals submitted, and as % of budget available) per country for "LEIT-Space"

Legal Entity Type of Applicant	Success Rate of Applicants	Success Rate of Applications	Success Rate of Funding (Applicants)
HES	31,7%	15,5%	13,1%
OTH	28,7%	23,5%	18,8%
PRC	27,0%	18,7%	19,6%
PUB	38,1%	33,7%	37,5%
REC	36,1%	19,3%	17,0%
TOTAL	**29,7%**	**18,7%**	**18,0%**

Source: CORDA data, 1 January 2017, Applicants and Applications by Type of Organisation (General).

G.2.2.2. Attraction of new participants / newcomers

The calls attracted 28% (234) of newcomers (excluding SME instrument). The distribution of new participants over countries and organisation types is given in Table 72 and Table 74.

G.2.2.3. Geographical participation patterns

The five EU Member States with significant national investments in the Space sector are also the most successful ones in LEIT-Space, they are France, Germany, Italy, Spain and the United Kingdom. A summary of the Member States' participation in LEIT-Space is presented in Table 74 and Table 75.

Table 74 - Key data on participation per country for "LEIT-Space": number of participants, of project coordinators, of newcomers, of participations, and EC contribution to participations (in million Euros)

Country	Nr of Participants in Signed Grants	Nr of Projects Coordinators in Signed Grants	Nr of Newcomers in Signed Grants	Nr of Participations in Signed Grants	EC Contribution to Participations in Signed Grants (EUR million)
Austria	21	2	6	24	5,1
Belgium	47	6	12	70	18,4
Bulgaria	3		1	3	0,1
Croatia	1	1	1	1	0,1
Cyprus	6	2	1	6	1,1
Czech Republic	14	1	7	15	1,9
Denmark	9			17	3,6
Estonia	5	1	1	7	1,0
Finland	9	2	1	16	5,1
France	96	37	31	187	71,1
Germany	87	28	16	173	59,3
Greece	28	10	6	41	7,6
Hungary	4	1	2	4	0,4
Ireland	9	1	3	10	3,1
Italy	103	37	32	171	50,5
Latvia	3	1	1	3	0,1

Country	Nr of Participants in Signed Grants	Nr of Projects Coordinators in Signed Grants	Nr of Newcomers in Signed Grants	Nr of Participations in Signed Grants	EC Contribution to Participations in Signed Grants (EUR million)
Lithuania	4	1	1	4	0,2
Luxembourg	3			3	0,8
Malta	2		1	2	0,2
Netherlands	34	8	11	47	11,3
Poland	20	2	8	21	3,4
Portugal	22	7	7	26	8,1
Romania	7		2	8	1,0
Slovakia	4		1	4	0,3
Slovenia	4	2	1	4	0,2
Spain	85	36	23	138	41,2
Sweden	17	2	5	23	7,5
United Kingdom	86	13	23	147	39,3
TOTAL	**733**	**201**	**204**	**1175**	**341,9**

Source: CORDA data, 1 January 2017, Participants and Participations by EU-28 Member State.

Table 75 - Success rates (as % of proposals submitted, and as % of budget available) per EU-28 country for "LEIT-Space"

Member States	Success Rate of Applicants	Success Rate of Applications	Success Rate of Funding (Applicants)
Austria	29,6%	13,9%	12,6%
Belgium	40,7%	22,4%	19,7%
Bulgaria	12,5%	9,7%	1,7%
Croatia	6,3%	5,0%	
Cyprus	33,3%	16,7%	14,1%
Czech Republic	25,9%	17,2%	12,2%
Denmark	39,1%	21,7%	17,8%
Estonia	27,8%	20,6%	12,6%
Finland	22,0%	10,6%	11,9%
France	36,7%	24,9%	30,7%
Germany	28,9%	19,7%	18,9%
Greece	28,0%	18,0%	13,6%
Hungary	12,9%	9,1%	4,3%
Ireland	29,0%	19,6%	28,1%
Italy	29,6%	16,2%	16,6%
Latvia	23,1%	11,5%	1,1%
Lithuania	33,3%	25,0%	6,8%
Luxembourg	33,3%	14,3%	16,6%
Malta	66,7%	50,0%	29,8%
Netherlands	30,4%	18,0%	13,7%
Poland	27,0%	14,8%	10,3%
Portugal	25,0%	14,9%	16,0%
Romania	20,0%	12,5%	7,2%
Slovakia	16,7%	14,3%	2,9%

Member States	Success Rate of Applicants	Success Rate of Applications	Success Rate of Funding (Applicants)
Slovenia	13,2%	7,4%	6,4%
Spain	31,2%	17,6%	15,6%
Sweden	28,8%	16,9%	15,0%
United Kingdom	33,2%	22,4%	20,8%
TOTAL	**29,9%**	**18,6%**	**18,2%**

Source: CORDA data, 1 January 2017, Applicants and Applications by EU-28 Member States (General).

G.2.2.4. International cooperation

A total of 136 entities from third countries applied to the programme. Proposals retained for funding, included 35 third country participants. The projects they are involved in relate primarily to cooperation in space science and exploration, awareness rising in EGNSS

Table 76 - Key data on participation per group of country EU28, EU-13, EU-15, Associated countries, Third Countries for "LEIT-Space": number of participants, of project coordinators, of newcomers, of participations, and EC contribution to participations (in million Euros)

Country Groups	Nr of Participants in Signed Grants	Nr of Projects Coordinators in Signed Grants	Nr of NewComers in Signed Grants	Nr of Participations in Signed Grants	EC Contribution to Participations in Signed Grants (EUR million)
Associated Countries	61	9	16	74	11,2
EU-13	77	12	28	82	10,0
EU-15	656	189	176	1093	331,9
Third Countries	35	1	14	39	3,1
TOTAL	**829**	**211**	**234**	**1288**	**356,3**

Source: CORDA data, 1 January 2017, Participants and Participations by Country group

Table 77 - Success rates (as % of proposals submitted, and as % of budget available) per group of country for "LEIT-Space"

Country Groups	Success Rate of Applicants	Success Rate of Applications	Success Rate of Funding (Applicants)
Associated Countries	29,5%	18,4%	13,6%
EU-13	21,7%	13,8%	7,6%
EU-15	31,4%	19,2%	19,1%
Third Countries	25,0%	22,2%	19,8%
TOTAL	29,7%	18,7%	18,0%

Source: CORDA data, 1 January 2017, Applicants and Applications by Country groups (General).

G.2.3. Cross-cutting issues

In LEIT-Space 42.3% (EUR 145.8 million) of the budget has been so far allocated to Sustainable development topics (the target for Horizon 2020 is at least 60%), 17.2 % (EUR 59.4 million) of the budget to Climate related topics (it should exceed 35% of the overall Horizon 2020 budget) and 5.4 % (€19.4 million) of the budget has been so far allocated to biodiversity. 7.5% (€26.6 million) of the EC contribution is ICT Research and Innovation related.

In terms of promotion of socio-economic sciences and humanities, it can be observed that none of partners are SSH partners.

In projects, there are 28.2% (665) female participants, 71.8% (1693) of men participate in the total workforce[2]of LEIT-Space projects, as well as 17.3% of women/men are coordinators; *52* % (12 out of 23) of the members of the EC advisory group Space are women.

Within the projects of LEIT-Space 26.6% (€94.7 million) of EC contribution is allocated to innovation actions. Within the innovation actions, 38.0% (€36.0 million) of EU financial contribution focus on demonstration and first-of-a-kind activities.

Over 25% of participants involved in LEIT-Space are SMEs, start-ups or individual entrepreneurs representing 26% of the total EU contribution.

LEIT-Space used the instruments of pre-commercial procurement once in 2016. It is yet too early to assess the level of success.

G.3. RELEVANCE

The Horizon 2020 LEIT-Space programme is set firmly in the context of the European Space Policy. The specific objectives of the programme directly address the challenges and needs set out in the 2013 Communication. In line with its mandate and the regulations establishing the division of labour, the Horizon 2020 LEIT-Space programme fully responds to the need and problems in the EU policy sphere and therefore indirectly, society. This is achieved through the focus of LEIT-Space on enhancing the EU strategic independence in Space and fostering security, on the pooling of financial and human resources and the coordination of space research in Europe, and on strengthening the competitiveness of the EU Space industry and research communities.

In terms of relevance for the stakeholders and the EU citizen, LEIT-Space shows a high and increasing relevance of its activities for the upstream industry sector and addresses also the various types of failures present in the downstream Earth Observation market. There is a high but decreasing level of relevance in relation to the needs of the downstream GNSS market. The relevance of LEIT-Space for the research stakeholders is high for the actors conducting technological research, but limited for Space science. The relevance for the EU citizen is high thanks to the programme's focus on fostering economic growth and the creation of employment opportunities, the availability of improved products and public and private services, and Europe's capacity to address the societal and grand challenges.

[2] *Workforce includes people actively participating in and paid by the EU project.*

G.3.1. Is leit-space tackling the right issues?

G.3.1.1. The relevance LEIT-SPACE given the challenges to address

Space is a critical sector for Europe's economic growth and competitiveness. Increasingly, society is dependent on space infrastructure and its applications for both civilian and military use.

Europe is recognized as an important space-faring region in the world; however, it finds itself as a crossroad facing increasing competition from newly emerging space-faring nations such as China and India. Europe therefore needs to boost its global competitiveness and safeguard its positioning.

For this purpose, a number of long-term and more recent failures need to be overcome. Summarising the policy needs and problems in Europe indicated in the 2013 Communication 'EU Space Industrial Policy: Releasing the Potential for Growth in the Space Sector' in relation to Europe's international competitiveness:

Security and strategic independence

- Security of critical European space infrastructure is not ensured. There is no full and accurate information about satellites and debris orbiting earth, which constitutes a risk to space infrastructure

- Technological non-dependence of this strategic sector is not guaranteed. In a number of critical technology areas European programmes are fully dependent on one supplier.

- Today there are not enough institutional launches in Europe to ensure the sustainability of the European launcher Ariane 5.

- Technological non-dependence, security of supply and independent access to space represent the basic conditions for a sustainable development of the European space industry

Pooling of resources and coordination

- Space endeavours are no longer a matter for individual nations alone and in many cases can only be efficiently achieved by pooling technological and financial capacities

- In the current context of financial crisis, there is a risk of discontinuity in the funding of activities in the European space sector

- Space policies and investments are decided at national/ intergovernmental level. There is a risk of overlaps and fragmentation of the space activities in Europe

Coordination for competitiveness

- The target for national space policies is the national industry, which may be detrimental to the competitive development of the European space industry

- The lack of a long-term strategy and critical mass for space exploration in Europe does not allow space exploration potential for innovation and competitiveness to materialize and could have negative effect on science and education

- Coordination of measures in the field of space policy between the EU, the Member States and the ESA still [2013] is not sufficient

The 2013 EU Space Industrial Policy Communication also mentions some specific failures upon which action is needed in order to maintain and strengthen European competitiveness, ie

- A lack of cooperation between space and non-space sectors

- A lack of awareness among possible users of the potential offered

- Lack of cooperation between data providers, service developers and end users

- Insufficient support to the creation of start-ups and the development of high-growth companies, and

- Insufficient knowledge and skills in the emerging sector of navigation and Earth observation technologies.

G.3.1.2. The relevance of LEIT-SPACE to address European objectives

The new **Space strategy for Europe** (COM(2016)705final) sets out four strategic goals in support the Juncker Commission's priorities.

- Maximising the benefits of space for society and the EU economy

- Fostering a globally competitive and innovative European space sector

- Reinforcing Europe's autonomy in accessing and using space in a secure and safe environment

- Strengthening Europe's role as a global actor and promoting international cooperation

In conjunction with EU's two Space flagship programmes Galileo and Copernicus, Space research in Horizon 2020 addresses all four goals.

"Open innovation", "open science" and "open to the world" are natural components of the Space R&I landscape. Earth observation data from the Copernicus programme are available on a "full, free and open" basis both for business and for scientific research as is most space science data. Here Horizon 2020 assists in making such data widely available and exploitable. International cooperation is a prerequisite in areas such as space science and space exploration.

G.3.2. Flexibility to adapt to new scientific and socio-economic developments

The new Space Policy for Europe outlines a number of challenges for the future addressing the evolving economic and political context. The main challenges to be addressed through Horizon 2020 are linked to new economy in Space as manifested by emerging "New Space" key players especially in the United States (e.g. Jeff Bezos, Elon Musk). The European space manufacturing industry is well placed to be part of this paradigm shift but well designed support from Horizon 2020 in coordination with ESA[3] and Member States is required. The new Space Policy for Europe points at areas to be addressed such as in-orbit demonstration and validation of technologies, development of critical technologies for European non-dependence, safeguarding independent European access to space both through traditional launch systems and low-cost launch opportunities for small satellites.

These are themes that have already been addressed to some extent in the first years of Horizon 2020, Horizon 2020 is thus well placed to concentrate the efforts on some of these issues in the 2018-2020 Work Programme.

G.3.3. Addressing specific stakeholder needs

Relevance for industry

Space involves a variety of industry sectors and supply chains that have very different market structures and needs. An assessment of the alignment between the Programme objectives and the industry needs therefore should be done at the level of the specific sectors targeted.

The upstream market

The upstream space manufacturing market refers to the industry focused on sending objects into space and space exploration. In terms of players, it encompasses commercial satellite operators and space agencies managing satellite and space missions who make use of service providers launching the satellites and the satellites themselves manufactured by a multi-tier industry. The latter consists in prime contractors who develop and construct the satellites and space launch vehicles and are responsible for the design and assembly of complete spacecraft systems; subsystem integrators, who design, assemble and manufacture the major sub-systems (eg the propulsion subsystems); equipment manufacturers and producers of components and sub-assemblies. The dynamics in the European market is towards a streamlining of the space manufacturing production, concentrating it in a few places in order to enhance efficiency and competition. This may impact incumbents over the next couple of year in terms of R&D and industrial employment.

It supports this market sector predominantly through its activities in the COMPET thematic area, focusing on the development of systems and sub-systems. This includes the R&D funded in the 'non-dependence' and 'independence' action lines as well as the two Strategic Research Clusters. The longer-term risky research conducted in these calls and topics (TRL 3-4) involving academia and research institutions is directly in line with the needs of this market sector. The increasing concentration on EU funding for these

[3] *The European Space Agency*

strands of research in the programme directly responds to the strong reliance of the sector on public funding for the conduct of research that can enhance their global competitiveness.

LEIT-Space shows a high and increasing level of support for the needs of this market sector.

The risk in the EU support delivery (i.e. the funding mechanisms available in Horizon 2020) is that the key players in the various segments of the market will be the primary beneficiaries of the support. This would imply that the EU fails to act as a platform to enhance the competences of incumbents or smaller players, thus setting limits to the value of the programme in strengthening Europe's critical mass in the upstream industry sector.

The Copernicus/Earth Observation market

The industry part of this value chain consists of enterprises that act as satellite data resellers, distributors and processors, with involvement of some big market players, and SMEs providing value-adding products and services.

LEIT-Space support for this market sector has initially been focused on improving the market potential of the services, directly responding to the market need for investment in the infrastructure needed in order to make the data available. It is currently shifting towards support for the development of the actual service delivery, which will involve support for the establishment of a more integrated (public) user market.

LEIT-Space shows a high level of support for the needs of this market sector addressing the various types of failures present in the market. So far the focus has been on investing in the infrastructure and actions allowing for the industrialization of the services.

The risk in the EU support delivery is the high expectation on the capacity of the programme to promote the services to the European (public) user market, reaching its reduced fragmentation, as well as to the international market through the creation of international partnerships, thus creating economies of scale for the services provided.

The GNSS market

The GNSS industry is composed of the downstream market and the upstream one. While the upstream market refers to entities building the space infrastructure and providing signal, the downstream segment covers component manufacturers, system integrators, and value-added service providers. The upstream segment is largely influenced by R&D policy decisions of national governments; the downstream one increasingly addresses the global market and is highly concentrated in its manufacturing part of the supply chain (component manufacturers and system integrators), while SMEs are the 'value added' service providers.

LEIT-Space supports R&D in the GNSS upstream market through the Evolution components; the application services part of the Galileo thematic area is geared towards strengthening the competitiveness of the sector by integrating the supply chain, ie establishing links between the manufacturers and system integrators and the service-providing SMEs. The decreasing focus in the

LEIT-Space supports the needs of the GNSS downstream market by involving a high number of SMEs in its application-focused activities, thus establishing a platform for the creation of more integrated supply chains, thus strengthening its global competitiveness. The trend towards more support for the manufacturing industry responds to the needs of a market largely relying on public customers.

LEIT-Space shows a high but decreasing level of support for a strengthening of the supply chain and creation of economies of scale for the value-added service providing SMEs.

The risk in the EU support delivery is a focus in the programme design towards the specific needs of each segment, thus lacking an integrated approach that should take into account and balance the overall needs (preferably on the basis of agreed technology roadmaps) This is needed for the longer-term creation of competitiveness through the inclusion and strengthened position of European SMEs in the global supply chains.

Relevance for research

One should make a distinction here between the technology-focused research organisations and the scientific ones.

The funding distribution over the thematic areas and their specific action lines show that LEIT-Space supports the needs in particular of the technology-oriented research actors. Support to the needs of the scientific sector is more limited, even though highly valuable.

The risk in the EU support delivery is a lack of integrated approach, thus under-exploiting the potential of Space science for the competitiveness of Europe in space exploration

Relevance for the EU citizen

LEIT-Space shows a strong focus on the enhancement of industry competitiveness and the development of close-to-market products and services as well as to speed up the R&D process in maturing technologies. The focus on the development and delivery of Galileo applications and Earth Observation services, as well as the research activities in the Space exploration and science strand of activities directly address also the need for improved products and services responding to societal needs and the societal challenges.

LEIT-Space therefore directly responds to the needs of the EU citizen for economic growth, the creation of employment opportunities, the availability of improved products and public and private services, and the Europe's capacity to address the societal and grand challenges.

The main risk in the EU support delivery is in a limited capacity to establish an optimal synergy and coherence with the other EU programmes addressing the challenges, limiting the focus to the most obvious areas of support (eg the environmental challenges).

G.3.4. Lessons learnt/Areas for improvement

Please refer to the boxes above (section 0).

G.4. EFFECTIVENESS

G.4.1. Short-term outputs from the programme

Scientific publications and patents

The Horizon 2020 Monitoring Report 2015 provides the data on publications and patents produced so far (Table 78, below), based on self-declarations of the project coordinators. The data suggest a level of output of scientific publications and patents in LEIT-Space that is similar to levels in the Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing, and Biotechnology (NMBP) programme, albeit with a slightly higher production of scientific publications.

When considering only the 36 projects that focused on R&I (ie RIA and IA) and that have *concluded or reached the 2nd half of their project activities*, these data suggest an average production of 1.7 scientific publications per project and one patent application for every four projects.

Compared to the FP7 Space average data, these seem to be disappointing results in terms of publications, while they are highly encouraging in relation to patent production: the FP7 final evaluation registered 5.6 publications per project and one patent application for every ten projects. However, these data need to be set in context. Both scientific publications and patents are research outputs that require an estimated average of two years to be produced. Seeing that nearly all of the projects are still ongoing (only 5% of the projects were concluded), one cannot but expect the production of these outputs to be limited.

Table 78 - Outputs produced as direct results of the projects – Horizon 2020 LEIT

	Publication in peer-reviewed journals			**Patent Applications**			**Patents Awarded**		
	2014	2015	Total	2014	2015	Total	2014	2015	Total
Leadership in Enabling and Industrial Technologies (LEIT)	397	7	404	40	7	47	11	2	13
Information and Communication Technologies	290	6	296	25	5	30	4	0	4
NMBP	46	1	47	9	0	9	5	0	5
Space	**61**	**0**	**60**	**6**	**2**	**8**	**2**	**2**	**4**

Source: Monitoring report 2015 (Corda, calls in 2014 and 2015, Signed Grants cut-off date by 1/09/2016 (including grants to named beneficiaries).

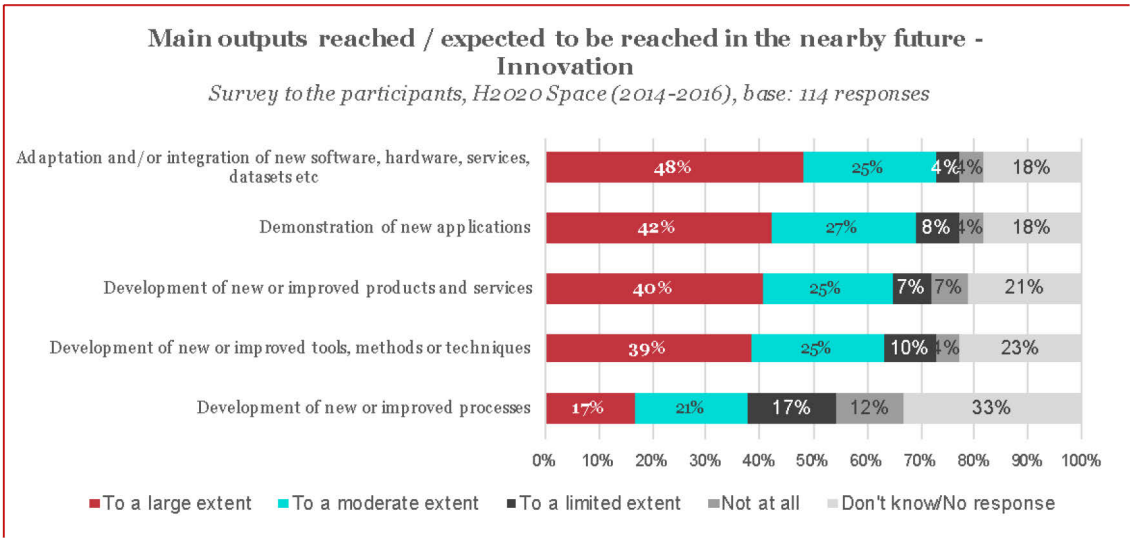
S&T and innovation-related outputs

Given the breadth of the Space R&I programme, the high level of variation in expected project outputs is not surprising: outputs range from ICT platforms aimed at data exploitation, proofs-of-concept, prototypes, pilot projects and demonstrations to datasets feeding into ESA archives, publications disseminating new scientific knowledge and insights in specific fields, and technology roadmaps. Most often, the projects are expected to aim at reaching higher TRLs.

Based on the responses to the participants' survey, the LEIT-Space programme is well on track to reach the desired results in the creation of close-to-market innovation. A high share of survey respondents (~65%) stated that they have achieved (or expect to achieve in the near future) the creation of new or improved products and services or methods,

tools or techniques (Figure 128). These innovations build upon project results such as demonstrations and the adaptation or integration of new software, hardware or already existing services and datasets– results that between 40% and 50% of the respondents indicate to have reached/expect to reach in a short time.

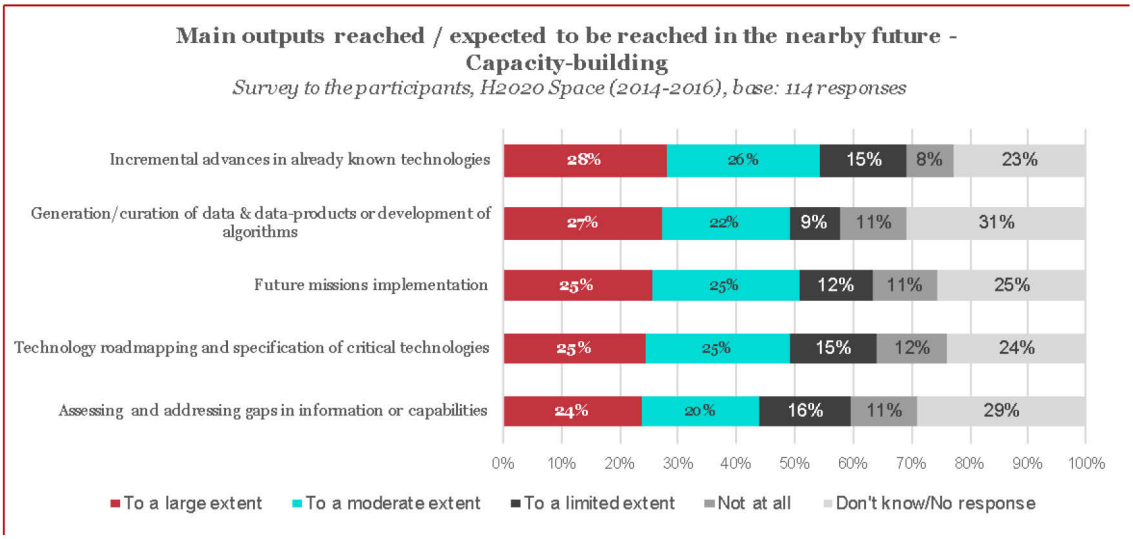
Figure 128 - Main outputs reached/expected to be reached in the nearby future – Innovation



Source: Technopolis, 2016.

The survey respondents indicate good progress also with regard to outputs enabling capacity building and technological developments allowing for future innovation (TRL3-4), - albeit at a lower extent (~35% of respondents) (Figure 129).

Figure 129 - Main outputs reached/expected to be reached in the nearby future – Capacity building



Source: Technopolis, 2016.

Other outputs that are likely to occur based upon the descriptions in the work programmes include:

- Technological advancements, eg in the sphere of in-space electrical propulsion and the critical technologies

- The delivery of time series and higher-level data products, eg in the field of EO
- Advances in knowledge, eg in space weather and its impacts
- The development of roadmaps, eg for space robotics or for the production of low cost, low end PRS products
- The investigation for future lines of research or activities, eg to the benefit of mission designers

An important achievement in this context is the progress made in the Strategic Research Clusters (SRC). Both of the 'Programme Support Actions' (PSA) for these SRCs that were launched in the 2014 calls reached sufficient progress to launch their first calls for specific projects in the 2016 calls based on the roadmaps they developed.

G.4.2. Expected longer-term results from the programme

The flow of knowledge between the relevant stakeholder communities, thanks to the creation of networks and partnerships, as well as the transfer of technology, data and information among the participants as well as with the broader community constitute key elements for the creation and diffusion of innovation.

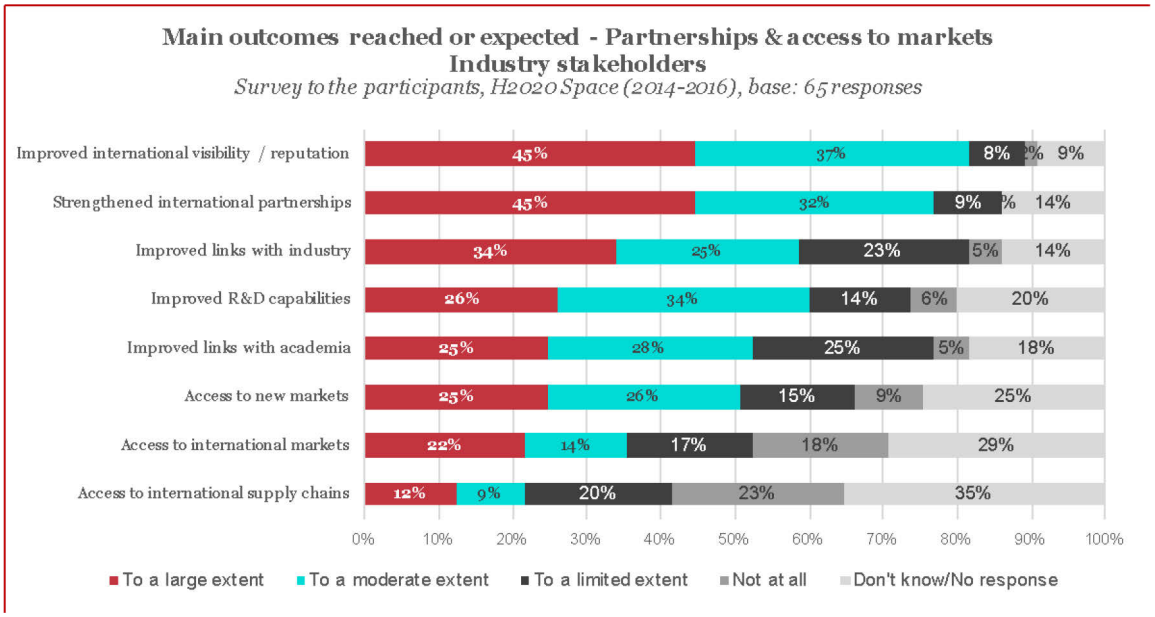
Creation of partnerships and networks

The partnerships and networks that are created, allowing for knowledge exchange and technology transfer, are considered critical success factors for future innovation and the achievement of critical mass or (in the case of market-related knowledge transfer) entry into new markets and the generation of economies of scale. This is fully recognised in the work programmes, which spell out explicit requirements in this regard, reflecting the needs in the different thematic areas and communities involved.

The stakeholder community indicates good progress from this perspective, in line with their specific needs. A general observation is that LEIT-Space is acting as a valuable platform for the creation of intra-industry and intra-research collaborations. Also the progress related to the strengthening of international partnerships is positive, but for the research stakeholders it has not lived up to expectations. Stakeholders indicated progress depending on their specific needs.

Industry stakeholders indicate positive progress especially in an improved positioning in the international community and a strengthening of their international partnerships (~45%) and improved links with industry (~35%) (Figure 130). One in four respondents also indicated positive effects on R&D capabilities, links with academia, and access to new markets. Effects on access to international markets and the respondents' inclusion in international supply chains are limited. All of these results are in line with the respondents' expectations when joining the project consortia.

Figure 130 - Main outcomes – Partnerships & access to markets (industry stakeholders)

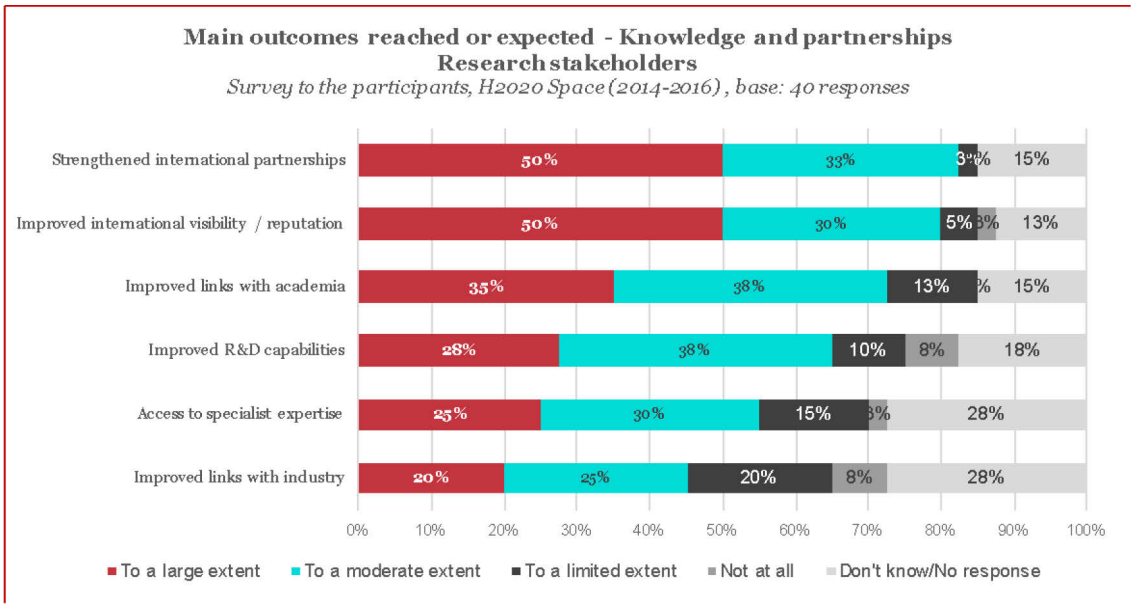


Source: Technopolis, 2016.

Research stakeholders indicate good progress especially for their international partnerships and positioning in the international environment (50%) as well as to a lesser extent in improved links within the research community and the enhancement of R&D capabilities (35%) (Figure 131). More than half of the respondents also indicated to have gained access to specialist expertise, which can be considered a result of the interdisciplinary research conducted in (some of) the projects. Close to half also indicated positive effects on their links with industry.

It should be noted that despite the high levels of achievement indicated, the benefits gained in relation to the *strengthening of the international partnerships are lower-than-expected***.** This potential outcome constituted a main driver for participation in the FP ('to a large extent') for 70% of the research stakeholders.

Figure 131 - Main outcomes – Knowledge & partnerships (research stakeholders)



Source: Technopolis, 2016.

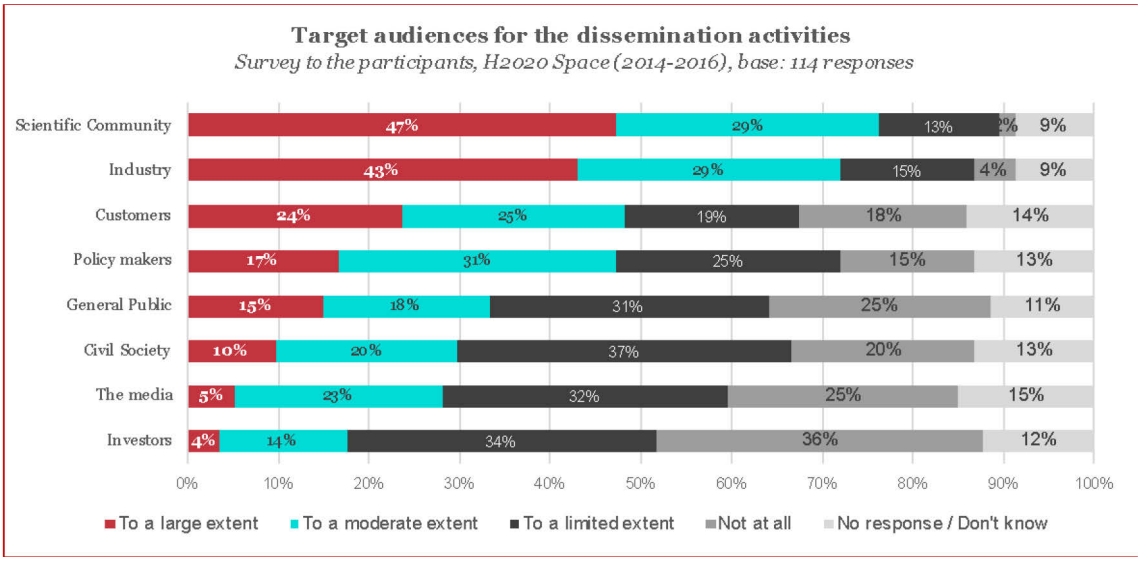
Outreach activities by the project participants

The responses from the stakeholders suggest that the project consortia are implementing a considerable amount of dissemination and communication activities, beyond the typical dissemination to the expert communities. The industry community is assuming a more active role than is usually the case, enhancing the outreach to potential users.

The work programmes for some specific topics in the EO and COMPET areas (Space exploration and science) explicitly require the production and active dissemination of publications to the scientific community as well as to other user communities 'as appropriate'. Topic descriptions in the EGNSS and EO thematic areas (also) emphasise the need to mobilise and raise awareness among the user communities. In the EGNSS area especially, projects are geared towards acting as platforms for a structured supplier-user knowledge exchange. Specific awareness-raising calls were launched in the EGNSS and EO thematic areas (EGNSS-4–2014 EGNSS awareness raising, capacity building and/or promotion activities, inside or outside of the European Union; EGNSS-4-2017 EGNSS Awareness raising and capacity building; EO-2-2015: Stimulating wider research use of Copernicus Sentinel Data).

As expected, the research communities are most active in this regard, the dissemination of the research results being an important feature of their activities. The scientific community is the primary target of the projects' outreach efforts (Figure 132). It is interesting to note, however, the prominent place that industry and the broader 'customer' communities take on as target audiences.

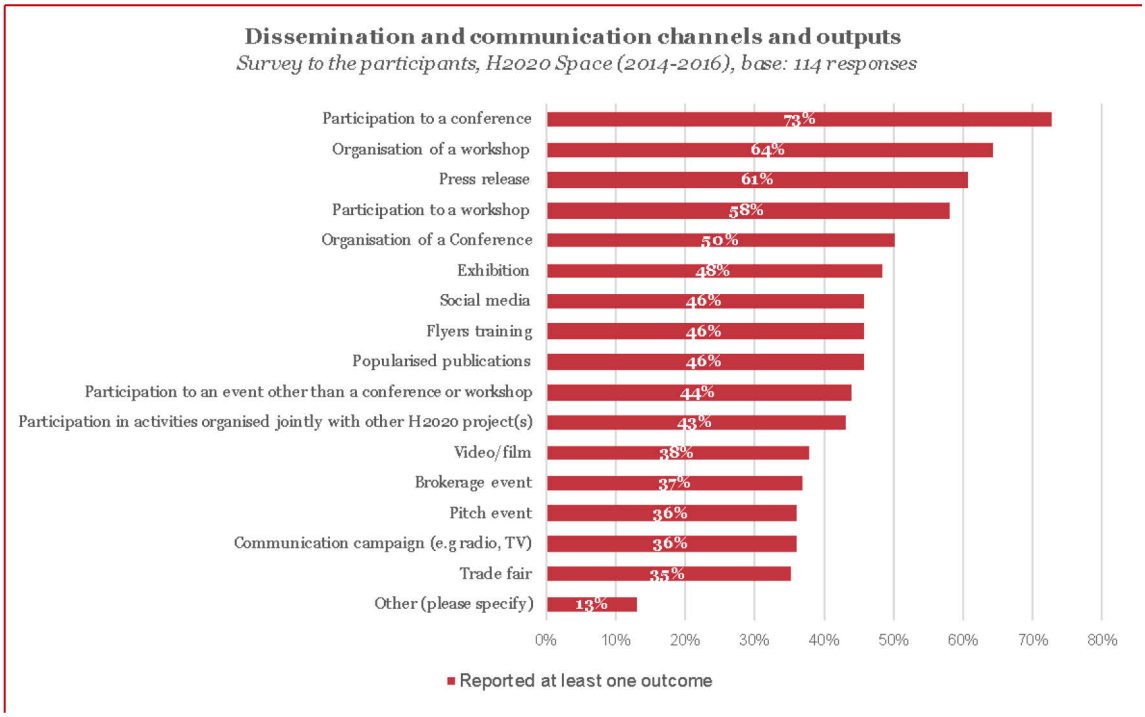
Figure 132 - Target groups for the outreach activities



Source: Technopolis, 2016.

Also the dissemination and communication outputs and channels that have been produced or used so far suggest a particularly high attention in the project consortia to achieving an outreach beyond the research communities (Figure 133). The production and organisation of press releases, workshops, exhibitions and publications aimed at a general public suggest a broader reach of the projects' activities, complemented with brokerage and pitch events, communication campaigns and participation in trade fairs. For these types of activities, research and industry respondents provided similar responses.

Figure 133 - Dissemination and communication channels and outputs



Source: Technopolis, 2016.

G.4.3. Progress towards attaining the specific objectives

In this conclusive section on the effectiveness of the LEIT-Space programme, a key facilitator for the attainment of the programme objectives is first covered, ie the capacity of the programme to involve the stakeholders needed to reach the desired impact. Based on main relevant findings of the analyses reported in this and the preceding chapters, conclusions are drawn on the potential for the desired impacts of the programme to occur.

Involvement of the appropriate stakeholder communities

The profile of the participants in the thematic areas reflected the areas of competence needed for the conduct of the research as well as the attainment of the expected impact (Table 79, below):

- COMPET saw a mixed research-industry involvement, guided by large enterprises and research organisations. Given the strong focus on technology development (rather than space exploration and science) in this thematic area, the profile of stakeholder participation is in line with the expectations. The breakdown at the topic level shows a majority of participations by research actors in the COMPET Space exploration and science topic.
- The EGNSS thematic area is characterised by a high level of participation of industry participants, accounting for ~70% of the EU funding, with similar shares for large enterprises and SMEs. This is appropriate for an area focusing on the development of applications, ie where the involvement of component manufacturers and system integrators (large enterprises) as well as value-added service providing SMEs is needed.

- Earth Observation saw a high level of participation of research stakeholders and especially research organisations. SMEs were involved as well, accounting for ~25% of the EU funding, ie at levels comparable to the higher education institutions. This seems in line with the EO activities in WP2014/15 focused on the development of tools for the access to space and on data integration and curation of data to improve the availability, quality, richness and robustness of the data, eg by integrating different datasets. It is to be noted, though, that the involvement of public bodies was limited to 12% of the funding
- PROTEC was also characterised by a high level of participation of research stakeholders, with a limited involvement of the industry sector. This seems appropriate, given the focus of the research

Table 79 - Share of EU funding for the stakeholders in the thematic areas and sub-programmes

Thematic area	Total EU funding (in m€)	HES	Research org.	Large Enterprise	SME	Public body	Other
COMPET	**163.03**	**13%**	**25%**	**41%**	**18%**	**2%**	**1%**
Competitiveness of European Space Technology	131.30	10%	23%	48%	18%	2%	0%
Space exploration and science	22.85	30%	36%	9%	22%	2%	1%
International Cooperation	2.81	2%	40%	38%	2%	0%	18%
Outreach and Communication	6.07	25%	33%	1%	10%	9%	21%
Earth Observation	**70.56**	**25%**	**27%**	**10%**	**26%**	**12%**	**1%**
Space enabled Applications	33.37	24%	28%	4%	27%	17%	0%
Tools for access to space data	37.18	26%	26%	15%	24%	8%	1%
EGNSS	**65.07**	**10%**	**17%**	**37%**	**32%**	**2%**	**3%**
PROTEC	**16.16**	**42%**	**23%**	**26%**	**8%**	**1%**	**0%**
Grand Total	314.82	17%	24%	32%	22%	4%	1%

Source: Technopolis (2016), 2014/15 calls based on eCorda, 2016 calls based on EC data.

Stakeholder involvement in the projects organised in terms of TRL level shows a profiling in line with the expertise required as well, especially for the TRL1-2 and TRL5-6 projects (Table 80, below). The involvement of the industry sector (large enterprises and SMEs combined) is high in TRL5-6 projects, accounting for ~65% of the EU funding for these projects, compared to ~30% for the research actors (higher education and research organisations combined). Striking is the involvement of the SMEs in projects at TRL1-2 where they accounted for ~20% of the EU funding, suggesting participation of high-tech SMEs.

Table 80 - Share of EU funding per stakeholder category in projects at TRL level

Stakeholder Type	TRL1-2	TRL3-4	TRL5-6	None	Overall
HES	54%	23%	12%	13%	17%
Research org.	27%	27%	20%	32%	24%
Large Enterprise	0%	22%	42%	17%	32%
SME	19%	21%	24%	16%	22%
Public body	0%	7%	1%	11%	4%
OTH	0%	0%	0%	11%	1%
Total EU funding (in m€)	**100%**	**100%**	**100%**	**100%**	**100%**

	4.29	**109.85**	**172.75**	**27.93**	**314.82**

Source: Technopolis (2016), 2014/15 calls based on eCorda, 2016 calls based on EC data.

Involvement of the industry sector

As mentioned in Section G.2.2 above, private enterprises constitute the core of the participant base in Horizon 2020 LEIT-Space Open Calls (excluding SME instruments), accounting for 53% of the total EU funding.

The important role of the industry actors in LEIT-Space is illustrated also in the fact that these stakeholders assumed the role of project coordinator in 15% of the participations in which they were involved, compared to 10% for the research stakeholders. This included SMEs, which took on the role of coordinator in a similar number of projects as the large enterprises. Private enterprises coordinated 76% of the projects in EGNSS (especially SMEs), more than half of the projects (53%) in the COMPET thematic area (mainly the large enterprises), and about half of the projects in the Earth Observation area (similar shares of SMEs and large enterprises).

Involvement of the key actors

The top 10 participants in the Horizon 2020 LEIT-Space Open Calls (excluding the SME instruments) are among the most important research networks and upstream industry players in Europe (Table 81, below). Six out of the ten most funded participants in Horizon 2020 LEIT-Space are large enterprises, three are research organisations, and one is a public body. Together these top 10 participants accounted for 17% of the EU funding.

Within their own stakeholder communities, however, the six large enterprises and three research organisations accounted for ~30% of the EU funding (Table 82). These data suggest a strong *concentration of the funding* for the largest stakeholder groups in the PROTEC and COMPET areas:

In the PROTEC area, the 'Top 10' large enterprises and research organisations account for ~50% of the EU funding for their stakeholder category

In the COMPET area the six 'Top 10' Large Enterprises account for ~40% of the EU funding for large enterprises (in total 73 LEs) and the three 'Top 10' research organisations for ~30% of EU funding for these stakeholders (in total 59 research organisations)

This concentration of EU funding may be explained partly by the characteristics of space research and by the structure of the Space upstream sector. There is no doubt that the involvement of these key players in the industry sectors constitutes a critical factor in the success of the programme. Nevertheless, it causes some concern about the diversity of actors in the sector that draw benefits from the programme and the capacity of the programme to act as a platform for the enhancement of the competences of incumbents or smaller players.

Table 81 - Share of EU funding for the top 10 participants – overall and in the thematic areas

Participant Legal Name	Stakeholder Type	COMPET	Earth Observation	EGNSS	PROTEC	Overall
DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV	Research org.	5%	2%	1%	4%	**3%**
THALES ALENIA SPACE FRANCE	Large Enterprise	3%	1%	4%	0%	**3%**
AIRBUS DS GMBH	Large Enterprise	4%			11%	**3%**
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Research org.	2%		1%	4%	**1%**
SNECMA SAS	Large Enterprise	3%				**1%**
E2V SEMICONDUCTORS SAS	Large Enterprise	2%				**1%**
CONSIGLIO NAZIONALE DELLE RICERCHE	Research org.		3%		4%	**1%**
DIRECAO-GERAL DE POLITICA DO MAR	Public body		5%		0%	**1%**
THALES ALENIA SPACE ITALIA SPA	Large Enterprise	2%				**1%**
GMV AEROSPACE AND DEFENCE SA UNIPERSONAL	Large Enterprise	2%			2%	**1%**
Top 10 total		**23%**	**11%**	**7%**	**25%**	**17%**
Total EU funding (in m€)		**100%**	**100%**	**100%**	**100%**	**100%**
		163.03	**70.56**	**65.07**	**16.16**	**314.82**

Source: Technopolis (2016), 2014/15 calls based on eCorda, 2016 calls based on EC data.

Table 82 - Share of the top 10 in the EU funding for large enterprise and research organisations

	COMPET	Earth Observation	EGNSS	PROTEC	Total
EU funding for large enterprises – in €m	66.05	6.71	24.12	4.16	101.04
Share of the top 10 large enterprises	39%	8%	14%	51%	31%
EU funding for research organisations – in €m	41.30	18.91	10.74	3.67	74.62
Share of top 10 research organisations	28%	21%	10%	54%	25%

Source: Technopolis (2016), 2014/15 calls based on eCorda, 2016 calls based on EC data.

Beyond these top 10 participants, LEIT-Space also succeeded in attracting numerous other key players in the different industry sectors, albeit at lower levels of participation.

The list of these key industry players shown in Table 83, below, is grouped around the Space industry market sectors and their value chains. It is based on information provided in the OECD classification (OECD, 2014) for the upstream market, the 2015 GNSS Market Report (GSA, 2015) for the GNSS downstream market, and various market intelligence sources for the Copernicus downstream market.

Table 83 - Key industry players involved in LEIT-Space

	Nr. of participations	EU Funding (in €m)		Nr. of participations	EU Funding (in €m)
Upstream space industry			**GNSS downstream**		
Prime			**Aviation**		
Airbus Space and Defence	32	€13.50	Thales	49	€19.80
Thales Alenia Space	13	€7.81	**Rail sector**		
OHB System	4	€0.55	Telespazio	10	€2.58
Surrey Satellite Technology Ltd	2	€0.19	Ansaldo STS	3	€1.89
Tier 1			Trenitalia	1	€0.25
Snecma	3	€4.60	**Maritime**		
Tier 2			Orolia	1	€2.36
Bradford Engineering B.V	1	€1.05	**PRS sector**		
Sodern	1	€0.60	QinetiQ	1	€2.06
Safran	1	€0.21	M3 Systems	3	€1.81
Copernicus downstream			Nottingham Scientific Ltd.	1	€0.28
Service provider			**Road sector**		
European Center for Medium-Range Weather	6	€3.02	Siemens	1	€0.46
Mercator Océan	1	€1.42	Magneti Marelli	1	€0.39
e-Geos	1	€0.41	Tomtom	1	€0.31
SMEs - value adding products & services			**Timing & synchronisations**		
Planetek	3	€0.58	ST Microel.	5	€2.76
Draxis	2	€0.53	Alstom	1	€0.11
GmbH Oberpfaffenhofen	1	€0.43			
Evenflow	1	€0.16			

Source: Technopolis (2016), 2014/15 calls based on eCorda, 2016 calls based on EC data.

Widening the participant base

The Horizon 2020 Monitoring Report 2015 indicates that in 2014 and 2015, **newcomers to the Framework Programme** accounted for 23% of participations in Horizon 2020 LEIT-Space. This is in line with the share of newcomers at the LEIT level overall, ie 24%.

Table 84, below, shows the breakdown of data on newcomers to FP Space research, ie participants in LEIT-Space open calls that had not participated in the FP7 Space programme. It highlights the important role of the EGNSS and Earth Observation thematic areas for the engagement of the Space programme with non-space actors.

Table 84 - Share in participations and EU funding for FP Space research newcomers - LEIT-Space Open calls (2014-2016 1st half)

Thematic area	Topic	FP Space research newcomers	
		Share in total participations	Share in total EU funding
COMPET	Competitiveness of European Space Technology	17%	13%
	Space exploration and science	17%	17%
	International Cooperation in Space matters	20%	14%
	Outreach and Communication	11%	5%
Earth Observation	Space enabled Applications	24%	26%
	Tools for access to space data	16%	11%
EGNSS	Applications in Satellite Navigation	32%	26%
PROTEC	Protection of European assets in and from space	14%	9%
Overall		22%	17%

Source: Technopolis (2016), 2014/15 calls based on eCorda, 2016 calls based on EC data.

Involvement of the best

The high scores reached by the proposals during the proposal evaluation process illustrates the capacity of the Horizon 2020 LEIT-Space programme to attract excellence, thus funding high-quality research.

The average score reached by proposals in the COMPET, EO and PROTEC open calls[4] all rank between "good" and "very good" on the scale defined by the European Commission (Table 85). The proposals were of high quality especially in the Space exploration and science and Competitiveness of European Space Technology.

Table 85 - Average proposal scoring per thematic area (calls 2014-2016)

Thematic area	Number of proposals	Average Score
COMPET	373	11.18
Competitiveness of European Space Technology	283	11.04
Space exploration and science	67	11.9
Outreach and Communication	16	10.85
International Cooperation in Space matters	7	10.72
Earth Observation	189	10.66
Space enabled Applications	106	10.52
Tools for access to space data	83	10.84
PROTEC - Protection of European assets in and from space	38	10.87
Grand Total	600	11

Notes: Detailed data on proposal scoring in EGNSS were not available. Source: Technopolis (2016), based on EC data (Calls from 2014, 2015 and the first two calls in 2016).

Under Horizon 2020, three evaluation criteria constitute the final project score:

- Excellence - the extent to which the proposed work has innovation potential, with reference to the corresponding section(s) in the call descriptions
- Impact - all aspects of impact receive attention, including the draft dissemination and communication plans
- Quality and efficiency of the implementation – quality of the management structure and workplan

Overall, the proposals received the highest score for the "Impact" criterion (3.73 on average), whilst they scored 3.63 on "Implementation" and 3.64 on "Excellence" (Table 86).

Proposals in the COMPET calls – and especially the Space exploration and science calls - scored the highest against the excellence and impact criteria, whereas proposals in the PROTEC calls scored highest against the implementation criterion.

[4] *Data on proposal scores in the EGNSS area was not available for this study*

Table 86 - Average proposal scoring per thematic area (calls 2014-2016)

Thematic area	Average score "Excellence"	Average score "Impact"	Average score "Implementation"
COMPET	3.68	3.85	3.65
Competitiveness of European Space Technology	3.63	3.80	3.61
Space exploration and science	3.90	4.10	3.90
Outreach and Communication	3.69	3.69	3.47
International Cooperation in Space matters	3.43	3.93	3.36
Earth Observation	3.59	3.49	3.58
Space enabled Applications	3.51	3.49	3.52
Tools for access to space data	3.69	3.50	3.65
PROTEC - Protection of European assets in and from space	3.47	3.72	3.68
Grand Total	3.64	3.73	3.63

Source: Technopolis (2016), based on EC data (REA).

Conclusions on the potential to reach the expected impacts

In line with the EU guidelines, all call descriptions in the Space work programmes include specific **expected impact statements**. The EU guidelines state that these impact indications should be SMART (Specific, Measurable, Achievable, Relevant and Time-bound) as to be understandable, concrete and measurable.

Overall, the impact indications in the Space WPs are well articulated and specific so that they are not ambiguous and applicants are clear about what the EU wishes to gain from each action. They are actionable and achievable and in line with the Horizon 2020 Space objectives, thus making them relevant. Overall, they are measurable with indicators that are also described in some cases. However, they are predominantly focused on specific achievements like establishing supply chains, developing technologies or improving competitiveness, and not about meeting numeric targets like the number of products to be developed. In addition, most of the impacts are time-bound. Some mention specific time periods by which impact is expected, for example, impact obtained by 2020 or growth in turnover and jobs three years after the end of funding. The nature of some of the desired impacts, eg establishing links or implementing solutions, implies that the impacts will be achieved by the end of the funding period.

Based upon the impact statements as listed in the WPs and taking into account the progress reached in outputs and outcomes as well as the programme performance against the other enabling factors, the following **conclusions on the potential** for the desired impacts to materialise can be drawn.

<u>EGNSS</u>

This thematic area is particularly oriented toward applied research, even though some research at TRL3-4 level has taken place with the aim of advancing towards the higher end of the TRL scale. Progress is on track in the creation of the new applications and services. The high level of participation of industry actors and especially SMEs, firmly in charge of the projects, as well as the high number of key players covering all targeted sectors (aviation, rail, maritime, transport, LBS), are the building blocks for the attainment of the desired results. The alignment with user requirements is an ongoing requirement set out in the WPs for these projects, with a strong emphasis on the mobilisation of potential users and the creation of supplier-user relationships. This is a requirement that one can presume was taken up in the projects' work plans. Another

positive enabling factor in this context is the active participation of industry in the outreach activities.

Based on these results, there is a good potential that the most important expected impacts of EGNSS, ie product and service innovation and the derived high societal benefits, will materialise.

Earth Observation

In this first phase of the programme, the activities in this thematic area were geared towards setting up the building blocks for the launch of the services from a technological and content perspective as well as in terms of the mobilisation of the user communities. There was also a strong focus on data integration and curation and data products, with a good progress indicated for the attainment of these objectives. The programme also succeeded in involving the appropriate research organisations and SMEs, the industry actors in this market providing value-added services. The requirements set out for the projects indicate that adequate attention must be focused on the alignment of the future services with the user needs. The explicit requirements for the active dissemination and communication of the results in some of the calls as well as the organisation of awareness raising actions should be the basis for the mobilisation of users for the services. The extent to which these activities have been successful is unclear at this stage of the programme.

On the one hand, there seems to be good progress towards setting the basis for an enhanced use of Earth Observation services among the public users in Europe. Also the level of involvement of SMEs reached in this thematic area suggests potential effects on a reduction of the fragmentation in this market and the creation of critical mass. However, given the limited involvement of the public sector, the programme seems not to have acted (yet) as a platform for the desired creation of supply chains and buyer groups for observation services.

The conclusion is therefore that while LEIT-Space has the potential to reach its impacts in the sphere of competence-building among the service providers, the potentials for effective growth of the market and the creation of economies of scale are more long-term than expected. The enhancement of the leadership of Europe's industry in this field still has some way to go.

PROTEC

The activities in the PROTEC area are geared towards the development of new services and instruments that are able to predict space weather events affecting the Earth and the Near-Earth space environment and that allow approaching and navigating in close vicinity and on the surface of asteroids and comets, including technologies that allow deflection of objects from their trajectories. This is a field of more fundamental research, where progress is visible, but results have been reached to a more limited extent.

Intra-research transnational cooperation is vital for the advancement of knowledge and competitiveness in this field, requiring the involvement of highly specialised private enterprises as well.

The positive progress that participants indicated with regard to both of these types of cooperation combined with the apparent adequate involvement of the needed stakeholders leads us to conclude that the basis is being set for the attainment of the

desired impact in a longer-term perspective, ie the strengthening of research competitiveness in the field and the improved protection of European space infrastructure.

COMPET

The two strands of research in this thematic area need to be considered separately as they have quite distinctive goals in terms of expected impacts.

The research strand aiming at **competitiveness-building for technology and science** has received the largest share of funding in this period. In this field the focus is on the development of critical technologies, advancements in systems and subsystems, innovation in space technology areas such as data transmission technologies etc. Research is both of a short- and longer-term nature, with the latter being complex and risky. Research-industry collaboration as well as international and intra-research collaboration are important factors here. This area of the programme sees a considerable involvement of key actors in Europe's upstream space industry extending throughout the entire supply chain, as well as the key actors in Europe's research community, setting the basis for cross-fertilisation. These are critical elements in the success of the programme in this field.

In conclusion, the potential for attainment of the desired impacts is high, thanks to the requirements set out in the WPs, the creation of strategic research clusters around key areas of European strength, the funding of research lines looking into the creation of spin-in/spin-off effects and most importantly, the stakeholders involved.

The picture is less positive for **Space exploration and science**. Focus of the research in this area is to further science in the context of space missions, i.e. preparing for space missions and deploying scientific activities in support of future or operational missions. Research in this area covered all TRL categories and focused on fields in which Europe has achieved global competitiveness in the Space science community. Several projects are also provide opportunities for the creation of spin-in/spin-off activities. The programme succeeded in attracting the best research groups in this field as seen in the high scores achieved by proposals in this area in the excellence and impact criteria. Funding for these research activities has been limited, though, and decreasing over time.

International and intra-research collaboration are critical enabling factors here, and while the programme performs well in the sphere of intra-research collaboration, it does less well in the creation of international partnerships.

A conclusion for this area is that there is potential for the programme to contribute to the desired impact of maintaining Europe's position in the global research community and programmes, but that the opportunities that research in this area can offer in terms of spill-over effects to other fields of research and/or industry seem to be under-exploited.

G.4.4. Progress towards the overall Horizon 2020 objectives

G.4.4.1. Fostering excellent science in scientific and technological research

S&T trends in the areas of LEIT-Space intervention

The prevailing opinion in the research community in different fields of research (Earth observation, space exploration, solar system research or astrophysics) is that research is becoming increasingly complicated and expensive, which means that international space research will be critical, also for economic reasons. In the light of this, Europe should try to position itself in the research arena as an appealing partner, especially since nowadays, new countries have started to be more active and invest in space. A few examples are China and India, besides the traditional, well-established countries such as the US, Russia and Japan (FP7 Space Advisory Group, 2012).

In relation to space explorations at European level, the European Academies' Science Advisory Council (EASAC), a council formed by the national science academies of the EU Member States, released a report in 2014 presenting their point of view on space research. The report looks at general aspects regarding space exploration and opens a dialogue regarding the issues for which robotic vehicles are more appropriate and those for which human space flight programmes are more suitable. The report also includes a strategic plan for cost sharing between robotic and manned missions in European space exploration, capitalising on technological advances and international cooperation, but without negatively impacting the future of pure scientific research (EASAC, 2014). According to the report, Europe finds itself at a crossroads in the domain of space exploration. Based on ministerial declarations, Europe wants to participate in space exploration, but the areas of focus have not been clearly and realistically articulated. An example in this regard is the Aurora programme, which was planned around two robotic missions, but after a cooperative agreement between ESA and NASA in 2009, the design of the first mission was modified from the original ESA plans. Bearing in mind the fact that ambitious space exploration programmes will develop under American, Russian or Chinese leadership, Europe would miss an important opportunity, should it not be part of such initiatives. In light of this, a clear European vision on the balance between robotic and manned space exploration should be formulated. The report also encourages increased scientific exploration of the solar system, mentioning that there are numerous bodies, ranging from the inner and outer planets and their moons, to asteroids and comets, whose more detailed investigation would substantially advance scientific understanding,. (EASAC, 2014).

Another aspect that has started to gain importance at the international level in recent years is climate change. According to ESA, climate change is arguably the greatest challenge facing mankind in the twenty-first century. In this regard, Europe is developing the Copernicus programme and Sentinel missions, as an unprecedented European commitment to Earth Observation (ESSC, 2015). The opinion of the scientific community is that Europe must continue to develop operational programmes, such as Copernicus, since they allow European scientists to monitor the accelerating climate change and its impact through the mapping of important indicators. The Sentinel satellites can provide European scientists, decision makers and citizens with updates of high quality and precision on the state of both climate and the environment. ESSC recommends that to make the most of these programmes, Europe should make sure that archived and near-real time data are easily accessible and their quality should be consistently monitored. Moreover, Europe also should continue to develop specific

scientific thematic platforms, such as the ESA Earth Explorer missions, that target topics helping us better understand the way in which the natural and human-driven processes are linked with greenhouse gas emissions and climate change. Another observation regards the mission planning, which should be transparent and systematic to ensure an optimal global usage of the limited system capacities with the needs of all stakeholders considered (ESSC, 2015).

The positioning of EU-funded research

Europe positions itself well worldwide in Space science and exploration. It has gained key competences in space technology (e.g., Spacelab, the Columbus Module of the International Space Station, the family of Automated Transfer Vehicles) and space life sciences (e.g. on the responses of the human body to the conditions of spaceflight and the development of countermeasures, which are key elements for safeguarding human presence in space, on the Moon and on Mars) (EC, 2013).

Europe can pride itself of having some specific niche strengths, such as basic and fundamental research, sentinels, navigation, particle and space measurement, solar observation, radar observation, satellite-based communications, electric propulsion and propellant. An important area where Europe is particularly strong is space weather research. Other examples of key competences that Europe has managed to develop over the years are:

- The development of habitats and research laboratories in space
- Capabilities of performing autonomous planetary missions
- An increasingly salient role in the exploration of our Galaxy and the Universe
- Advanced competences in human physiology and countermeasures, gravitation biology, and radiation health issues – as well as in advanced life support technologies. Developments in these subjects are useful for safeguarding human presence in space, on the Moon and ultimately on Mars

The Horizon 2020 LEIT-Space programme concentrates its support on the technological priorities that were defined and endorsed by the EU Council, ie automation and robotics, novel energy production and storage, advanced propulsion, and life support systems. These priority areas cover the whole spectrum of space exploration activities. EU support in these areas intend to further strengthen the position of European research in the global space research community. Various calls launched in the context of LEIT-Space covered topics in the space life sciences (habitat management, life sciences), space weather, electric propulsion etc.

Based on the interviews conducted, it can be inferred that in terms of topics the programme is broadly relevant to the stakeholders from both research and industry. Most of the interviewees stated that the current calls from the Horizon 2020 Work Programmes, together with the activities supported, are interesting and in line with international trends. In addition, open access to publications is a mandatory practice also in the LEIT-Space component of Horizon 2020 and stakeholder responses to the survey suggest that a considerable share of researchers involved also conduct open science. This practice will considerably enhance the outreach capacity of the research activities.

Positioning Europe on the global map of science and innovation

In its report providing recommendations for Space research in Horizon 2020 (2012), the Space Advisory Group (SAG) considers that for Europe to maintain its competitive

position worldwide, "it is essential that Europe should take up the challenge of increased worldwide competition."

The SAG lists a set of measures it thinks should help Europe in maintaining its global competitiveness. LEIT-Space has taken up this advice and fully integrated these measures into its programme. Table 87 reproduces the measures indicated by the SAG in 2012 and their rationale and indicate some of the key actions that LEIT- Space has launched in response to these requirements.

Table 87 - Examples of topics taking the required measures for Europe's global positioning

Long-term planning and funding of risky research	
Rationale	In order to mitigate the risks inherent in taking on such challenges, academia, and to an even greater extent, industry, require as much certainty as possible in order to underpin planning, ideally based upon assured medium and long term demand for the research they undertake and the products and services they develop.
Example of EU action	LEIT-Space funds two Strategic Research Clusters. A Strategic Research Cluster is a coordinated effort of individual research and development grants that aim at producing a significant demonstration of a specific technology. The subject of an SRC is a field where Europe has heritage in, where Europe can achieve a leading position or when the topic can be a European strong-hold in international partnerships.
Technologies taken to the level of maturity while reducing investment risks	
Rationale	There is a need for access to technologies that have been taken to a level of maturity where the risks associated with on-going availability and in-service performance have been reduced to an acceptable level.
Example of EU action	The In-Orbit demonstration/Validation (IOD/IOV) action intends to boost industry's competitiveness by eliminating the famous "valley of death". In-orbit demonstrations and/or validations are crucial to enable the competitiveness, non-dependence and innovation of the European space sector.
Adequate support to user communities and industry	
Rationale	Horizon 2020 can contribute to bringing about the required levels of confidence in the future by supporting • Europe's scientific communities to conduct top class research based on space missions and to propose new ground breaking concepts • Europe's space users to develop better systems, technologies, products and processes aggregating user needs and facilitating the development and adoption of new services using space based assets and space related capabilities • industry to develop and demonstrate new technologies, especially critical technologies, and to assess the risks it can afford to take while implementing innovative solutions
Examples of EU action	The International Space Station (ISS) is the current cornerstone of European activities in human spaceflight. The Space exploration – Life support action funds proposals in the area of life support suitable for research on-board ISS. It aims to use ISS to the fullest extent for optimizing and broadening the scientific, technological and operational return of Europeans investments. The Small and Medium Enterprise (SME) based EGNSS Applications action aims at fostering the development of highly innovative and adaptive applications taking advantage of the EGNSS and EGNOS. The funded projects are led by an SME and have a clear intention to commercialise the products and services developed, including a business plan. The Technologies for European non-dependence and competitiveness action funds projects addressing technologies identified on the list of Urgent Actions as part of the Joint EC-ESA-EDA task force on Critical Technologies. Technological spin in and/or bilateral collaborations are enhanced between European non-space and space industries and the projects are expected to provide advanced critical technologies that are of common interest to different space application domains (e.g. telecom, Earth-observation, science, etc.), or even with applicability to terrestrial domains.

Source: 'Space Research in Horizon 2020: Recommendations of the FP7 Space Advisory Group' (SAG, 2012).

International cooperation is recognised in the space communities as another crucial enabling factor for Europe to maintain its global competitiveness. Ever more technically complicated - and therefore expensive - research will require further strengthening of cooperation at all levels. International collaboration is crucial for keeping abreast of scientific trends as it enables Europe through its researchers to keep up with other regions of the world, remain competitive and work on top-notch topics and new technologies. No doubt also European industry would benefit highly from more international exposure. Strategic partnerships with a fair amount of work-sharing open the door to knowledge-sharing that otherwise would have been more difficult to acquire. For some missions (eg ExoMars), external support is crucial. Regarding transatlantic cooperation in particular, if it were to be enhanced it could increase jobs, spur growth and answer to humanitarian interests. It also could play a role in improving border and maritime surveillance.

The EU is actively involved in international discussions on cooperating in space exploration, especially with the USA, Russia and China. Europe is also participating in the International Space Exploration Forum (ISEF), a series of ministerial-level meetings with the mission to become an international mechanism for coordination and cooperation in space exploration and enable international dialogue on space exploration. The European Commission is responsible for the preparation of common European positions.

However, some hurdles exist.

- It appears that currently the US does not deem the cooperation relationship with Europe as a priority, taking into consideration their pulling out of ExoMars, partly since it is more focused on space transportation issues (ASD, 2016)
- As far as the relationship with China is concerned, although there is a cooperation agreement in place, the negotiations concerning the cooperation on manned-exploration programmes, for instance, have so far stagnated, The potential for cooperation in technology development seems limited due to concerns regarding IPR.

Both research and industry interviewees were unanimous in highlighting the crucial role of international collaboration in maintaining Europe's competitive position and in the acquisition of knowledge and expertise on new technologies.

The LEIT-Space programme provides opportunities to take advantage of international collaborations. The WPs provide a scope for the involvement of international partners and/or explicitly encourage these cooperations in the following four calls: COMPET-9-2014: Technology "demonstrator projects" for exploration; PROTEC-1-2014: Space Weather; COMPET-4-2017: Scientific data exploitation; and COMPET-5-2017: Space Weather.

While the support for international cooperation in the Horizon 2020 Space R&I programme is highly appreciated, there is room for improvement to maximise the benefits of these collaborations. Stakeholders pointed to the need to **increase openness** towards international cooperation in EC projects, especially when it comes to basic and fundamental research, and indicated barriers from an administrative point of view that are still present when carrying out joint projects with extra-EU space agencies.

In the context of the global market, the development and/or compliance with international standards is a critical factor for competitiveness. Standardisation of upstream components is deemed to become increasingly relevant within Horizon 2020 Space. Where the Horizon 2020 Space Programme has been built in such a way to cover

the full TRL span of various technologies, it is expected that the objectives in terms of TRL will gradually increase. This trend increases the need for standardisation, which to date has not been taken fully into account. At the moment, the question of whether or not to cover standardisation aspects is a choice left to the applicant, eg with regards to the qualification with standardisation systems such as the ESCC - European Space Components Coordination or the ECSS – European Cooperation for Space Standardisation.

Within the relevant COMPET topics (the ones with higher TRL), it would be advisable to include either a recommendation or the requirement to foresee the compliance of the developed technologies with the relevant standards. For this to happen, in-depth knowledge of the standardisation framework and requirements is necessary, since the indication of which standards and standardisation systems to be complied with should be accurate. Two options could be considered by the Commission:

- Developing the required knowledge internally, also by involving experts in the Commission itself who are not currently involved in Horizon 2020 Space work programme drafting
- Relying on external consultations and advice, through dedicated working groups, in which also ESA would ideally participate

G.4.4.2. Boosting innovation, European industrial leadership, growth, competitiveness and job creation

In the sections below, an overview is provided of the approach used in the design of the Horizon 2020 LEIT-Space programme and work programmes to support the European space industry, both over the short and long term. LEIT-Space hereby provides a platform for the sustainable creation of economic growth and employment opportunities – in line with the ten priorities of the 'Juncker Commission'.

Alignment with market trends and developments

Trends in the *upstream market* evolve according to improvements in performance and innovations in the market. The following can be considered as key trends:

- Electric propulsion (EP) technologies use electrical power to trigger a change in the velocity of the spacecraft. Private companies prefer this technology because it is expected that the next commercial, scientific, and earth observation missions will use electric propulsion rather than chemical propulsion (Airbus Defence and Space). Amongst the advantages of using EP instead of conventional propulsion systems is low propellant consumption (which means greater payload, longer missions, cheaper launches), and low, highly controllable thrust, allowing precise steering (ESA, 2015). Electric propulsion is already in use in several spacecraft and has been selected for a few missions. In 2015, the world's first all-electric propulsion satellite, the ABS-3A, having a life span of 15 years, became operational (Science Alert, 2015). EP can equally be used in smaller missions, thanks to a decrease in costs and miniaturisation (ASD Eurospace, 2012)
- Broadband applications, according to the EU Space Industrial Policy, are a key element for the space industry, recognised as being "instrumental in sustaining Europe's entire space industry" (Eurospace, 2013). Since the 'Broadband for All' objective, namely the Digital Agenda for Europe (DAE) objective, has been achieved, attention has shifted toward services, the main objective being the delivery of very high-speed satellite services. High-speed broadband satellites

will become progressively important for the upcoming activation of the 5G ecosystem. Future disruptive satellite solutions are also in the pipeline (ASD Eurospace, 2015)

The key trends related to *GNSS devices* in recent years include the following (GSA, 2015):

- Technology is moving towards very small devices. The miniaturisation of technology means that devices are becoming smaller and smaller, and can be attached to high value and sensitive goods. This is in line with the advent of flexible electronics, which allow GNSS receivers to be included in clothing and other personal items
- Receivers are becoming connected. This trend solves one of the weaknesses of GNSS, namely the time needed for a receiver to acquire the satellite signal. The supporting data provided over mobile networks regarding satellite access enable devices to find a faster location fix
- Multipurpose devices with new software applications are replacing dedicated hardware devices in the consumer electronics sector. The capacity of devices to deliver applications through software rather than through dedicated hardware might counteract the proliferation of micro-receivers

The current trends in *Earth Observation* include:

- Big Data in Earth Observation. This refers to technological breakthroughs in Earth Observation, which generate large volumes of diverse types of data. These data also generate new business opportunities in terms of data acquisition, data analysis, data curation, data storage or data usage, and implicitly contribute to economic development (DG GROW)
- The Earth Observation market is projected to grow significantly in the next decade. It is considered an emerging market at the global level, and is currently driven by a rise in demand for data, technological improvements, high-resolution data, and an increase in consumer-targeting products such as Google Earth. (PRNewswire, 2015)
- A focus on applications used to derive societal benefits such as adaptation to climate change and resulting extreme events, disaster risk assessment, risk reduction strategies as well as sustained action to develop natural resources assets for future generations. A long-term strategy requires an internationally coordinated effort in order to collect high quality EO information on a regular basis. Over the short term, the information collected can improve the quality of life in fields such as agricultural production, fresh water availability, land degradation, land-use management, atmospheric emissions control, etc. (Jayaraman, 2014)

The Horizon 2020 LEIT-Space programme is acting upon most of these trends, to the extent that they are in line with its responsibilities and the division of labour with the other institutional actors. It funds a longer-term study that focuses on Electrical Propulsion (COMPET), has funded multiple topics that address the Big Data challenge (EO and COMPET), and centred its activities in EO on achieving the availability and quality of data so as to optimise the use of Earth Observation data in dealing with the societal challenges.

Table 88 provides some examples of specific topics that address these trends while keeping EU research attuned to ongoing developments.

Table 88 - Examples of topics responding to market trends

Electric propulsion	
In-Space electrical propulsion and station keeping	The challenge of this Strategic Research Cluster (SRC) is to enable major advances in Electric Propulsion (EP) for in-space operations and transportation in order to contribute to ensuring leadership through competitiveness and non-dependence of European capabilities in electric propulsion at the world level within the 2020-2030 timeframe, maintaining coherence with the existing and planned developments at national, commercial and ESA levels.
Broadband applications and Miniaturisation of technology	
COMPET-2-2016: Maturing satellite communication technologies	The aim of this topic is to demonstrate, in a relevant environment, technologies, systems and sub-systems for satellite communications. The proposed work should address and demonstrate significant improvements in miniaturisation, power reduction, efficiency, performance, flexibility, resilience, versatility, security and/or increased functionality and should demonstrate complementarity to activities already funded by Member States and the European Space Agency (e.g. the ARTES programme).
Big Data in Earth Observation	
EO-2-2017: EO Big Data Shift	Two main strands of activities are expected to be addressed: (i) the evolution of the Copernicus data infrastructure; and (ii) the adaptation of big data technologies to Copernicus user scenarios (i.e. data discovery and analytics to store and extract information).
Addressing climate change	
EO-2-2014: Climate Change relevant space-based Data reprocessing and Calibration	Research areas such as Climate Change use data records covering long time periods, in which historical data are essential in identifying reliable trends and anomalies. The data from past remote sensing missions available either from European and non-European missions must be made accessible in a way to establish seamless time series of similar observations, contributing to the generation of Climate Data Records across sensors and technologies over two decades and more. At the same time, the relevance of space derived variables and products needs to be critically examined, and enhanced to optimally fit the requirements arising from current policy issues in a variety of EU sectors. This includes the needs for assessment of impact of climate change, as well as mitigation and adaptation strategies in different societal benefit areas.

Source: WP2014/15 and WP2016/17.

Interviewed stakeholders considered the European Space industry to be increasingly competitive, especially in areas such as robotics and Earth Observation. Europe has quite a strong position also in satellite-based communications, for instance when it comes to dealing with wide-band applications. According to the interviewees, the EU is not lagging behind in the field of (upstream) research, but it appears to be lagging behind the US and China in terms of industrial applications.

The interviewees had mixed opinions on Horizon 2020's contribution to an increased industrial competitiveness. While some interviewees said that Horizon 2020 Space projects properly respond to the needs of industry, others suggested that space topics in Horizon 2020 were limited in funding, scope and trends. Some interviewees perceived a lack of market-driven decision-making at the European level and criticised the persistent focus on technology-driven growth. In this context, instruments such as the SME Instruments and the Fast Track to Innovation were overall regarded as highly positive interventions.

Especially actors in the upstream space market expressed a more critical view. They considered that the programme supports innovation especially in older projects such as EGNSS and Copernicus. They see insufficient attention paid to industry needs in the COMPET area, expressed also in a perceived absence of projects at the 'intermediate' levels of TRL – a comment that needs to be regarded within the context of the importance of science-industry knowledge transfer for this market sector. Finally, they criticised the limited attention to the issue of standardisation of products and services, despite the fact that interoperability is considered overall as the key to success as the space industry is now global.

A few strategic issues emerged during the interviews, all deemed important in allowing Europe to maintain its strong position in the international context.

The interviewees pointed out the importance of priority funding lines. They stressed the importance of the research conducted in the two Strategic Research Clusters (SRC).

- Europe's role in autonomous robotic manipulation should be strengthened further. Space robotic technologies are needed for future missions if Europe is to be at the level of the US and Japan, according to one of the interviewees involved in the Space Robotics Technologies cluster. In Space Robotics capabilities, Europe is positioned behind the US, but headway is being made with missions such as ExoMars and an increase in the interest in Orbital Servicing
- Electric propulsion is a very promising technology at the engineering level and can have a large economic impact. One of the interviewees stated that there was a risk that Europe probably will be late again in developing significant innovations, which is why the area of EPIC needs to be further funded if Europe wants to remain competitive

A similar reflection was made in relation to the research focusing on critical technologies. Research in this field was considered highly relevant for Europe in order to reduce the risks for future system development and to strengthen the EU industrial base. European space projects are now less dependent on critical components controlled by nations outside of Europe, which could jeopardise space missions if access would not be given.

Interviewees also appreciated the focus of the research lines in the EO calls. They considered that, in general, the right topics were covered. A few interviewees suggested additional focus lines, such as the creation of an "industry accelerator" instrument to support growth in the EO downstream market and the inclusion of the topic of small satellites.

They also considered that Horizon 2020 provides valuable support for bottom-up ideas by launching calls that are very open. One of the interviewees mentioned that there is no other place in Europe or in national programmes besides Horizon 2020 to obtain the type of support needed for bottom-up ideas, which is why Horizon 2020 funding is crucial. The limited level of budget available for new developments, however, implies a risk that part of the advantage spurred by the flexibility of ideas might get lost.

Some interviewees identified gaps in the funding and in areas that in their opinion were not sufficiently covered, mostly applicable to industry. Topics mentioned were: access to space with regard to new launcher concepts, propellants, propulsion systems, alternative fuels, the serial production of Space technologies for constellations, the components

needed for spacecraft and payloads, such as on-board processing and flexible radiofrequency stages, and microgravity, etc.

Alignment with market dynamics

As mentioned in Section G.4.1, above, the Horizon 2020 LEIT-Space programme has put a high emphasis in the design of its programme on creating the opportunities for knowledge transfer among the relevant communities.

In many cases, research-industry collaboration was an explicit requirement in the calls. Academia can play a more important role in supporting the private sector in product innovation. The ability to use the knowledge that results from research for product innovation can be a major asset for companies, which is why knowledge transfer can be a strategic growth enabler. The transfer of know-how to the manufacturer for the finalisation of the product saves on the initial investment costs (Yuen). In other words, research-industry cooperation is a means to reduce the time to market as well as the risks for new products and services. In this context, survey respondents particularly appreciated the platform that the programme provided for the creation of *stable* research-industry partnerships.

Calls in which research-industry collaborations were explicitly requested include, for example, COMPET-2-2016: Maturing satellite communication technologies and COMPET-3-2017: High speed data chain calls. The intent was to ensure the industrial relevance of the research actions and outputs.

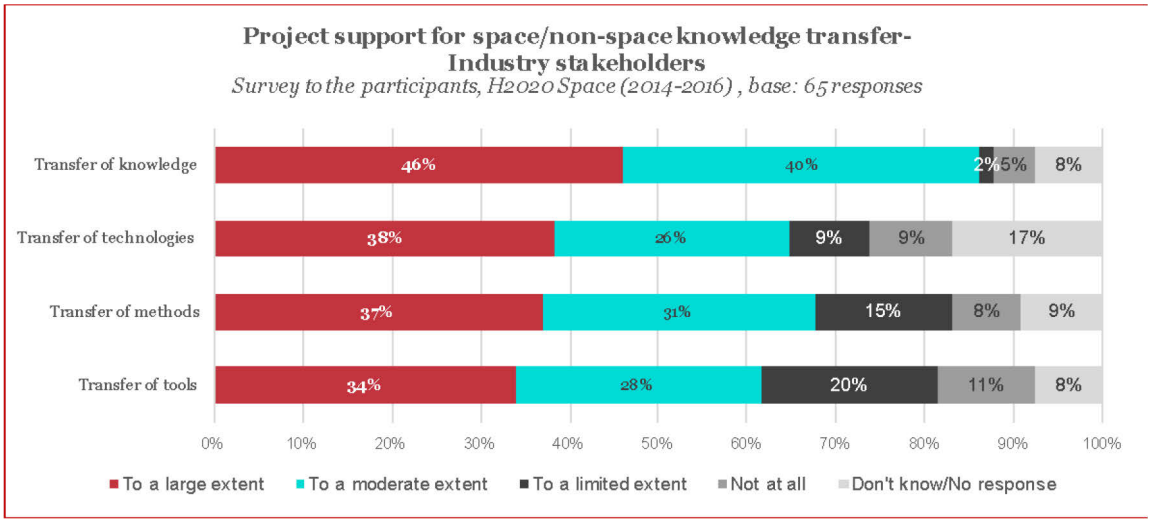
Cross-fertilisation in terms of spin-in/spin-out between space and non-space applications is regarded as an important aspect for the space industry. 'Common R&D', ie applied research that addresses both significant space exploration and non-space challenges using both space and non-space competence and know-how, may act to accelerate innovation in both space exploration and non-space sectors and has the potential to stimulate and accelerate innovation in technological areas that are vital to solving key global challenges faced on Earth (Technopolis Group, M3Systems, 2010).

Various calls funded in the WPs aim at creating positive effects of such cross-sectoral cooperation in research. Spinning-in of new Enabling Technologies to space systems, for example, was the scope of two COMPET calls, while spin-in/spin-out effects between space/non-space technologies were the desired results of COMPET calls for space exploration, scientific instrumentation, and bottom-up space technologies at low TRL.

Several interviewees provided evidence of such spin-in/spin-out cases; examples include mirrors for scientific mission, photonics and optical applications. Other interviewees highlighted the synergies between the space sector and aeronautics, civil applications and the defence sector. In EO synergies seem to be particularly high.

The emphasis that LEIT-Space places on cross-sectoral cooperation is expressed also in the response of the stakeholders to the question to what extent and how their projects support space/non-space knowledge transfer. Close to half of the respondents indicated transfer of knowledge and ~40% the transfer of technologies (Figure 134).

Figure 134 - Support in the projects for space/non-space knowledge transfer



Source: Technopolis (2016).

The development of supplier-user cooperation within the project consortia is an approach adopted in EGNSS in the context of its strategy to achieve market uptake. Another related element was the launch of a survey to collect strategic market intelligence on the needs in the potential markets for the services.

In the case of Earth Observation, this involved ensuring the availability, richness and accuracy of the data, including its integration. Calls were launched, on the one hand, to advance technological capacities, and, on the other hand, to mobilise the potential users and raise their awareness on the potential benefits. Data integration is considered a key facilitator of market penetration and therefore constituted a key focus of the programme.

Open access to data and services is another important factor that is intended to facilitate market take-up as well as to boost innovation, both in Earth Observation and EGNSS. In line with the European data and information policy, the Copernicus programme provides users with free, full and open access to environmental data. Also in the case of EGNSS, the basic navigation signal provided by EGNOS is an open and free service available to everyone. It provides Europeans with unprecedented positioning precision by improving the accuracy of the USA's Global Positioning System (GPS).

G.4.4.3. Providing space-based solutions for addressing EU societal challenges

The Space sector is an important contributor to the Horizon 2020 objectives for societal impact. Earth Observation allows for improved monitoring and capacity for dealing with climate change, management of the environment and natural resources, crisis response and natural disaster management, improving healthcare in remote areas, etc. In the field of Space services, Europe has some of the major global operators, for example in satellite telecommunications, satellite-based remote sensing and meteorological applications of satellite observations. These applications are strategically important and have high economic value, as well as being essential to the smooth running of our daily lives. Spin-offs from space research, both technological and scientific, find application in a broad spectrum of different areas. Space exploration and science provide an invaluable tool for extending knowledge of the universe and the planet Earth and are also instrumental in addressing societal challenges, such as climate change.

The development of solutions addressing EU societal challenges, directly or indirectly, is therefore at the **core** of the activities in Horizon 2020 LEIT-Space. Specific requirements for addressing and creating impacts related to the societal challenges abound in the work programmes. In Section G.6.1, below, evidence is also provided on how Horizon 2020 LEIT-Space cooperates with the relevant Societal Challenges pillars under Horizon 2020 in order to create complementarities and synergies.

The vast majority of interviewees agreed that Horizon 2020 Space contributes (or at least tries to contribute) to addressing societal challenges, even though it is sometimes considered as an indirect contribution. For instance, topics focussing on EGNSS, Copernicus, critical technologies and even fundamental research (e.g. on microgravity) were believed to address societal challenges. They tend to underline the importance of the space research and application for citizens and societies (e.g. EO calls addressing the environmental challenge).

Some interviewees considered, however, that the Space Programme (and Horizon 2020 as such) could be more ambitious in this regard. Some challenges, such as climate actions, environmental health, water purification, air pollution, desertification and land erosion etc., are addressed more than others and there still is untapped potential for space research to address societal challenges. There may be room for improvement for supporting space research in developing applications for other sectors like agriculture, health, security, etc. On the other hand, identification of such challenges can be difficult and some update might be needed.

G.4.5. Lessons learnt/Areas for improvement

Summarising the findings set out above, this section responds to the evaluation question "Are there any aspects that are more or less effective than others, and, if so what lessons can be drawn from this?"

A major finding from this analysis is the effectiveness of the attention dedicated in the programme development and the call descriptions to the creation of **knowledge-transfer opportunities**, tailored to the specific scope of the calls as well as market structures, needs and dynamics.

This has led to the strengthening of research-industry relationships, intra-industry collaborations and most importantly, opportunities for the creation of spin-in/spin-off effects between space and non-space sectors. It facilitates an exchange of knowledge and transfer of technologies that will strengthen the competitiveness on the global market of all actors involved and create new market opportunities. The option for more intensive development of spin-in/spin-off opportunities should be explored.

The limited effect of the programme in terms of the creation of international links, in the context of research partnerships, needs remediation. Both for research and industry, international cooperation is a critical factor for the enhancement of competitiveness.

The strong **alignment** of the programme **with the trends and needs** in the industry and research communities allowed it to attract the desired types of stakeholders, many of which are key players in the sector (both in industry and research), with industry (including SMEs) assuming the lead role in the consortia. Ultimately, this should be considered evidence of successful implementation of the stakeholder consultations.

There is a strong focus on **technological innovation** in the programme, which is fully in line with the needs in the EU space industry, the mandate of the programme in the context of the EU Space policy, and the objectives of Horizon 2020. The risk exists, though, that this will lead to an under-exploitation of the potential that space science offers for longer-term innovation as well as for addressing the societal challenges. It seems also to have led to a limited use of the more demand-driven funding instruments that Horizon 2020 foresees in its policy mix.

One of the most appreciated programme design decisions was the introduction of the Strategic Research Clusters initiative, allowing for the conduct of structured, risky, longer-term research. Amongst other aspects, the roadmap-based 'top-down' approach in this initiative is considered a welcome contribution to reaching an improved **balance in the mix of open 'bottom-up' versus 'top-down' calls**.

The strongest limitation of the programme is its budget and, in this context, a balance needs to be found between the breadth of the scope for funding and the need for continuity in research as well as the appropriate project budget size.

G.5. EFFICIENCY

The cost-efficiency criterion refers to the relationship between the resources used by an intervention and the changes generated by the intervention (which may be positive or negative). Therefore, this section assesses whether the administrative and management costs of Horizon 2020 LEIT-Space are proportionate to the benefits.

The output statistics in Section G.4.1 above, show that LEIT-Space is performing broadly in line with the other two LEIT programmes in terms of the number of outputs per million Euros of Commission Funding. In this limited perspective, LEIT-Space is cost-efficient.

At this stage in the lifecycle of LEIT-Space, only a minority of projects has been concluded and, therefore only a fraction of all expected programme outputs have been realised and reported. Moreover, and as expected, there are almost no programme results at this point in time and even less evidence of wider impact. In light of this, the study team invited beneficiaries to judge the balance of costs and benefits related to their individual participations, either realised or expected.

Section G.5.1 investigates the question from an EC management perspective; in Section G.5.2 the matter is looked up from the participating stakeholder perspective.

G.5.1. Cost-efficiency of the activities in Horizon 2020 LEIT-Space

Success rates and competition

In 2014 and 2015, competition for the LEIT-Space calls was lower than in other parts of Horizon 2020.

Indeed, the ratio of (number of proposals awarded)/(number of eligible proposals) was 18% for LEIT-Space, compared to 12% for Horizon 2020 overall and 9% in the LEIT pillar (Table 89, below). The ratio of (number of proposals awarded)/(number of proposals above threshold) was 27% for LEIT-Space compared to 25% for Horizon 2020 overall and 13% in the LEIT pillar.

Yet the lower competition as compared to LEIT and overall Horizon 2020 does not imply support for low quality proposals. Funded proposals in LEIT-Space received an average score of 13.49 points on a maximum scale of 15. The higher success rates therefore translated into the possibility for LEIT-Space to provide funding to a higher share of high-potential proposals.

Table 89 - Success rates at programme level

Programme/Call/Topic	Success rate	
	awarded / eligible	awarded / above threshold
Horizon 2020*	12%	25%
LEIT*	9%	13%
LEIT-Space**	17.88%	26.79%

*Notes: * Average over 2014 and 2015; ** Average across COMPET 2014, COMPET 2015, COMPET 2016, EO 2014, EO 2015, EO 2016, EGNSS 2014, EGNSS 2015, PROTEC 2014, PROTEC 2015 – Open Calls only. Source: VVA (2016), based on eCORDA and European Commission, Horizon 2020 Implementation Reports 2014 and 2015*

However, success rates for Space calls **varied greatly across topics and calls**. Table 90 below, shows that COMPET-2015, EO-2014 and EGNSS-2015 had a particularly high level of competition. In COMPET-2015 the number of proposals increased compared to 2014 even though a decrease in the planned budget for the call reduced the financial opportunity for participants. In EO the number of proposals and the budget remained constant over the years, but this budget was spread over a larger number of successful proposals, thus increasing the success rate in 2015 and 2016. In the case of EGNSS-2015 the number of proposals remained constant but the success rates dropped due to a reduced budget.

Table 90 - Success rates at the thematic area level, per call

Call	Nr. of proposals	Planned Budget (M€)	Success rates	
			awarded / eligible	awarded / above threshold
COMPET-2014	120	53.04	23.53%	35.44%
COMPET-2015	158	39	12.99%	18.35%
COMPET-2016	101	65.85	19.00%	27.94%
EO-2014	64	21.5	11.11%	16.67%
EO-2015	66	25	16.67%	28.21%
EO-2016	60	21.85	18.33%	32.35%
EGNSS-2014	105	48	25.71%	42.19%
EGNSS-2015	90	30	14.61%	18.84%
Protec-2014	27	9	14.81%	20.00%
Protec-2015	11	6.5	18.18%	33.33%
Overall	**802**	**319.74**	**17.88%**	**26.79%**

Source: VVA (2016), based on eCORDA.

Different levels of competition can also be found at **topic level**. Table 91 below highlights some of the most competitive (in dark grey) and least competitive (in light grey) topics within the 2014 and 2015 COMPET, EO, EGNSS and PROTEC calls[5]. Intra-topic variation can be seen especially in COMPET 2015, with success rates for proposals above threshold ranging from 11% (COMPET-4-2015) to 100% (COMPET-1-2015). A very high level of competition can be observed for COMPET-4-2015, EO-1-2014, EO-2-2015, EGNSS-2-2015 and PROTEC-2-2014 calls.

Table 91 - Success rates for specific calls with very low and very high rates

Programme/Call/ Topic	Nr. of proposals	Call Planned budget (M€)	Average awarded project size (M€)	% of proposals with score above thresholds	Success rates	
					awarded / eligible)	awarded / above threshold
Compet- 1-2015	9	14	7	22%	33.33%	100.00%
Compet- 4-2015	12	6	6	75%	9.09%	11.11%
EO-1-2014	57	10	2	61%	8.93%	14.29%
EO-1-2015	20	9	1.8	50%	25.00%	50.00%
EO-2-2015	33	11	2.75	70%	12.12%	17.39%
EGNSS-4-2014	22	10	1.43	45%	31.82%	70.00%
EGNSS-2-2015	31	10	3.33	77%	10.00%	12.50%
Protec-2-2014	10	4.5	4.5	80%	10.00%	12.50%

Source: VVA (2016), based on eCORDA.

The variation in success rates depends on many factors.

Topics with a high success rate tend to have a lower share of proposals that meet the minimum threshold, which might signal that these calls are technically more demanding and less 'accessible' than other calls, hence reducing the level of competition.

The feeling that less accessible topics tend to have better success rates as opposed to more "open" calls is confirmed also by the feedback received during the interviews.

Participants in the most popular calls (e.g. EO-1-2014) perceived a high level of competition and low chances of success. During the consultations carried out as part of this study, they indicated that they take alternative sources of funding into consideration, given the difficulty in accessing Horizon 2020 funding.

Further evidence of the potentially discouraging effect of oversubscription is the fact that, in some cases, low success rates in one year were followed by a reduction in the number of proposals in the following year. A case in point is PROTEC, which has shown the most significant year-to-year change. Following oversubscription/underfunding in the 2014 call (in which not even one in 10 submitted proposals was awarded funding), the number of proposals submitted decreased by 59% (from 27 to 11 proposals), even though the budget available under PROTEC was only reduced by 27% (from EUR 9 million to EUR 6.5 million). At the same time, it should be noted that PROTEC also had one of the

[5] *Excluding the calls achieving 100% success rates for which less than 5 proposals were received.*

highest ratios of excellent proposals, with only 12.50% of the submissions above the threshold to be considered for an award actually receiving funding.

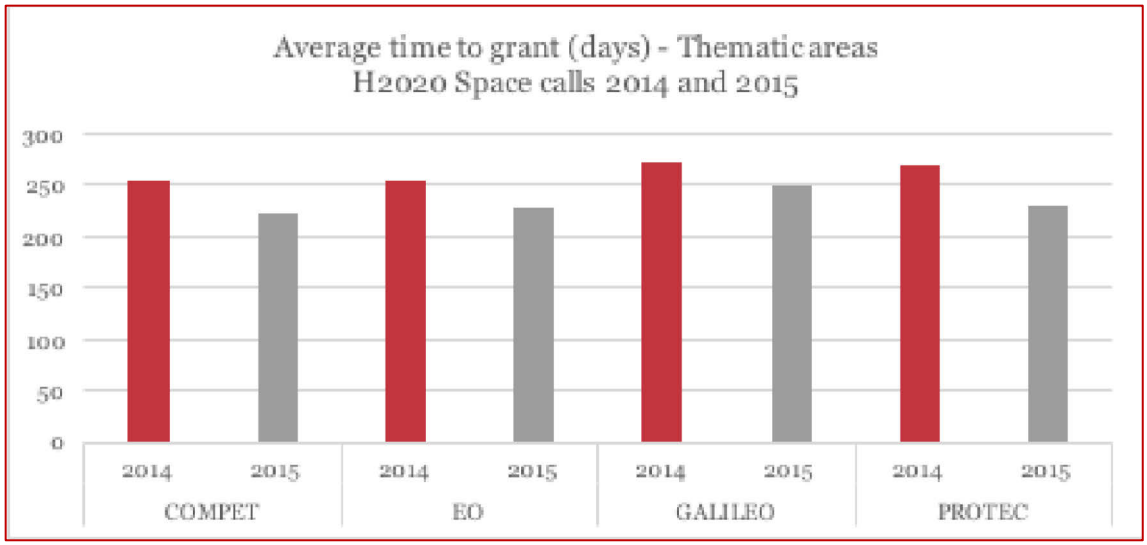
Results from the interviews also confirm that the success rate is correlated to the perception of the burden of proposal writing and the proposal process overall. Many interviewees specified that the expected success rate is the main driver in evaluating the investment they are willing to make to participate in a topic.

Time-to-grant

In the Horizon 2020 monitoring reports, Time-to-Grant (TTG) is defined as the time elapsed between the deadline of the call for submission of proposals and the signature of the grant agreement.

The average time-to-grant (TTG) for the programme for 2014 and 2015 was 251 days. This is above the 245 day target to which the EC committed itself for Horizon 2020. However, while for 2014 all thematic areas were above target, for 2015 LEIT-Space hit the target in all thematic areas, with the exception of EGNSS where TTG was reduced but remained slightly above target at 249 days in 2015 (Figure 135, below).

Figure 135 - Average Time to Grant by call



Source: VVA (2016), based on eCORDA.

Overall quality of the programme administration and management procedures

Horizon 2020 introduced some simplifications and changes in the management procedures in order to improve the administrative processes adopted under FP7 and reduce the burden to the FP participants. With the intention of simplifying access to Framework Programme funding (especially for SMEs), the EC introduced the following changes under Horizon 2020:

The rules regarding funding and co-funding rates were simplified. In contrast to FP7, a single funding rate was established for all participants in the same type of funding instrument/scheme. The EC hereby intended to offer potential participants simplified and clearer rules for participation and therefore promote better understanding of the expected funding and remaining costs for each project

Reflecting the emphasis on innovation, Horizon 2020 work programmes were designed to provide more flexibility and a more pronounced bottom-up approach than was the case in FP7, allowing more scope for applicants to propose innovative solutions of their own choice

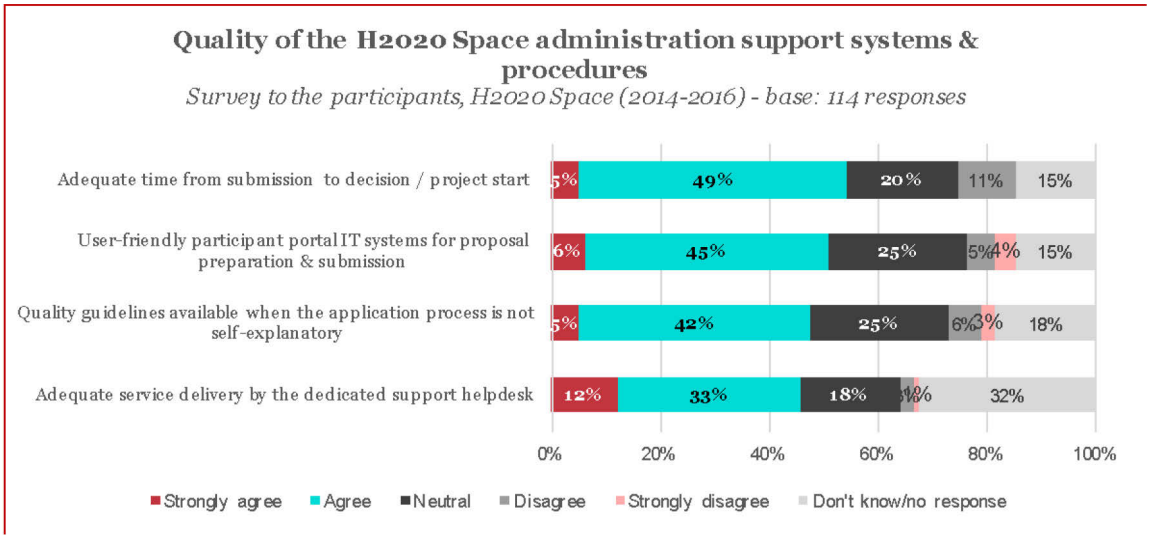
To simplify procedures, new participant guidelines were developed and a new online participant portal was launched by the European Commission

These changes were regarded as positive by most interviewees and survey participants alike and no major administrative bottlenecks were identified. The only area where stakeholders expressed some concern regarded the transparency and fairness of the evaluation process, illustrating a need for more extensive feedback to unsuccessful applicants.

The figure below shows the survey results related to the quality of programme administration and procedures. The heading 'administration support system and procedures' includes time to project start, user-friendliness of the participant portal, quality of guidelines for proposal submissions, and the support helpdesk.

Survey respondents overall gave positive feedback on administration support and procedures, with more than 50% either agreeing or strongly agreeing that the time to project start was "adequate", and that the participant portal was "user-friendly". Furthermore, 47% (strongly) agreed that guidelines throughout the application process were of good quality, and 45% appreciated the services delivered by the helpdesk. For each one of these categories, only about 10% of respondents expressed a negative view (Figure 136).

Figure 136 - Quality of the Horizon 2020 Space administration support systems & procedures



Source: Technopolis (2016).

Even though improvements have been made regarding participation rules and mechanisms, interviews conducted for this study demonstrate that industry still finds it difficult to participate effectively in the programme. These stakeholders often lack the needed expertise in proposal writing and the rules for participation are still perceived as being rather complex, particularly for SMEs. Especially, the fact that Horizon 2020 funding rules do not cover all operating costs is considered a major hurdle for smaller companies to participate in Horizon 2020 projects.

In relation to the **application and reporting processes**, the survey asked for participants' views on the clarity and level of detail in the proposal-writing instructions and guidance materials as well as in the documents related to the calls for proposal. In addition, the survey asked respondents to assess clarity, transparency and fairness of the proposal evaluation process.

As seem for the administration support systems and procedures, stakeholder opinions were very positive overall. Between 60% and 70% of the respondents regarded the quality of the guidelines and information positively, even though some respondents (9%) would have liked more details provided in the calls for proposals.

The **evaluation process** was the issue toward which respondents voiced some concerns. While the evaluation process is clear to most, the transparency and fairness of the evaluation process was considered positive 'only' by about half of the respondents and criticised by some (8%). These reflections emerged also in some of the interviews and in the literature:

The concern about 'fairness' is (especially in scientific topics) partly related to the fact that excellence is only one of three criteria and it is not weighted more highly. Some interviewees considered that this constituted a risk that projects with poor science but with good management and speculative impact could to be selected at the expense of better quality research projects.

In relation to the transparency of the process, the ESSC recommended in its input to the WP2018-2020 consultation to allow for more interactions and feedback mechanisms between applicants and evaluators during the evaluation and selection process. The ESSC also asked for an increase in the level of detail in feedback provided in the evaluation summary reports to allow unsuccessful applicants to strengthen their concepts

G.5.2. Cost-efficiency for the participating stakeholders

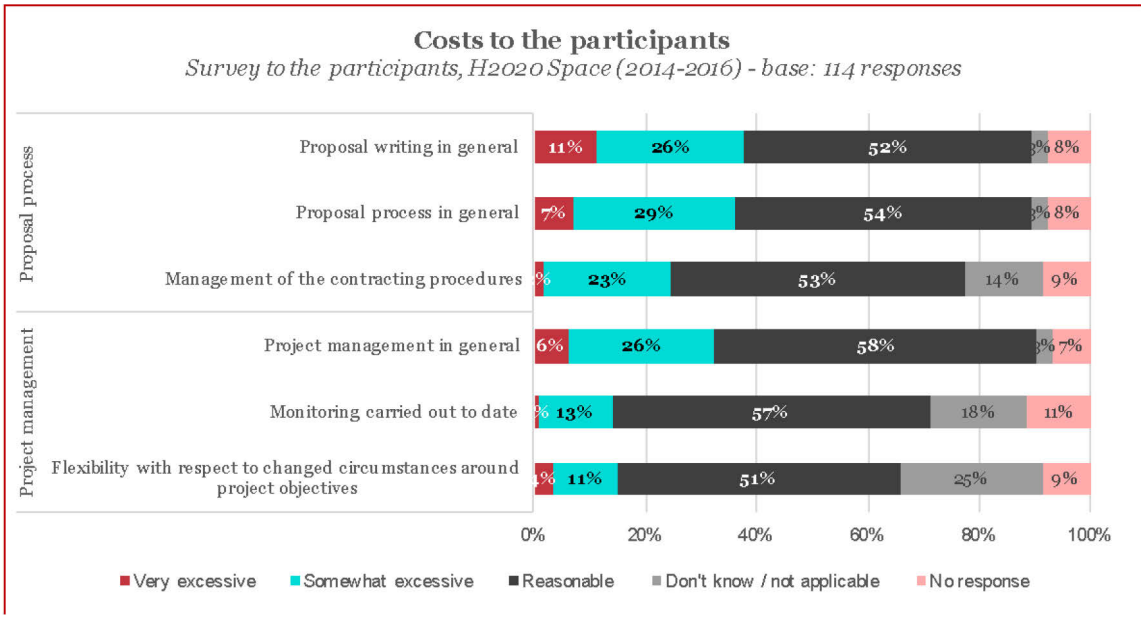
Burden of proposal writing and project management activities

Both the proposal process and project management entail reasonable costs, although one in three stakeholders finds the proposal process and project management excessively burdensome.

Figure 137, below, indicates the perceived burden of each activity carried out as part of the proposal process and project management based on feedback from the survey.

More than half of respondents consider costs related to the proposal and project management processes to be reasonable, which is a positive result, especially given the relatively low success rates in some calls (as described above). Regarding the proposal process, between 36% and 38% of respondents perceive excessive burdens in relation to proposal writing and the general process of application. Management of contracting procedures is only considered excessive by one in four respondents.

Figure 137 - Stakeholder perceptions on cost of proposal writing and project management



Source: Technopolis (2016).

Despite these strong results, interviews highlighted that the investment needed to write proposals is considered quite high, especially when success rates (and therefore return on investment) are low. Several interviewees also stressed the importance of producing high quality writing to win projects which, according to them, does not necessarily reflect high quality research capabilities.

Regarding the project management process, the results are even more striking, with the share of respondents indicating excessive burden below one-third (for general project management process), and below one in five (for monitoring and changing circumstances and project objectives). This is confirmed by interviews in which project management costs (including administrative burdens, complexity and reporting needs) are found to be reasonable and proportionate. Overall these results indicate a high level of satisfaction with proposal and project management burdens.

At the same time, it is important to point out that there are large discrepancies behind these average percentages. More specifically, SMEs have a far more positive opinion on the burden associated with proposal and project management processes:

- 62% and 76% of SME respondents consider the burden associated with proposal writing and process, respectively, to be reasonable, compared with only 54% and 43% of large companies and only 43% and 45% of research institutes and universities
- Likewise, 70% of SMEs believe that costs related to project management are reasonable, whereas only 54% of large companies and 53% of research institutes and universities have the same opinion

This difference can be partly explained by the fact that large companies and research institutes coordinate more projects (as a share of their participations) than SMEs (19% for large companies against 15% for SMEs), and they therefore assume a more prominent role in the proposal and project management process.

G.6. COHERENCE

G.6.1. Internal coherence

G.6.1.1. Internal coherence of the actions implemented for

The internal coherence refers on the one hand to the extent to which different activities in Horizon 2020 Space work in synergy, complement or overlap, as well as to the identification of areas where there might be gaps in the topics addressed by Horizon 2020 Space. On the other hand, it also refers to the extent to which, across the whole Horizon 2020 programme, there is a linkage between space related activities and they complement each other.

Coherence within the LEIT-Space programme

The consultation with stakeholders through interviews and the surveys shows that there is consensus regarding the coherence within the Horizon 2020 Space R&I programme.

The following conclusions can be drawn from the crosscut analysis:

- There has been an improvement in coherence and synergy in Horizon 2020 Space R&I in comparison to FP7
- Actions within Horizon 2020 Space are mostly complementary, displaying a limited amount of overlapping
- There are a few gaps in coverage, but the programme covers overall all the relevant topics

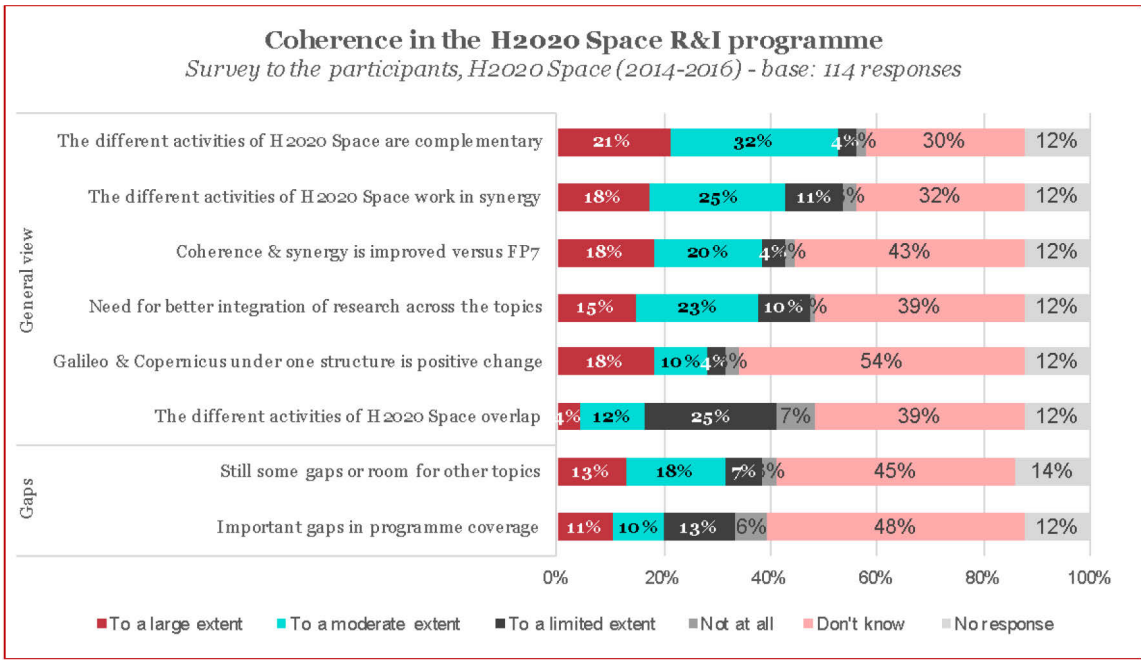
Horizon 2020 Space R&I represents a step forward in terms of coherence in comparison to FP7, in what is perceived as an incremental process of change (understood as a shift towards more coherence) starting with FP5/6. These conclusions are the result of interview-based data gathering and surveys. The results of the survey show that almost half of the respondents deem that there is more coherence and synergy of space-related activities in comparison to FP7.

At a formal level, the improvements are perceived as tributary to the higher strategic relevance that is currently attributed to space research. At a concrete level, this is explained partly by the convergence in a single programme of the different strands in space research, such as Galileo and Copernicus, the combination of activities of Galileo and Copernicus under the same structure being perceived as positive.

Regarding synergies, while they are present throughout the programme, there is more room for improvement. An example of a newly created synergy within Horizon 2020 Space consists of the fact that Galileo downstream activities have been included into the space group, which was much appreciated by stakeholders.

In the survey, 43% of the participants deemed that there are synergies in a moderate to a large extent, while 11% of the people considered that there is synergy to a limited extent (Figure 30). In line with these findings, only a minority of survey respondents identify overlaps to a large or moderate extent (16%).

Figure 138 - Coherence in Horizon 2020 Space (survey results)



Source: Technopolis (2016).

The actions of the programmes are deemed to be to a moderate extent complementary, according to both the survey, and the interview performed. Referring to the survey, more than half of the responds stated that there is complementarity in a moderate or large extent.

As for the coverage, there appear to be a modest number of gaps within an overall positive picture, according to the interviews and surveys. The survey reveals that 48% of the stakeholders consider that there are no important gaps in the coverage of the programme, while only 11% of the respondents considering that there are gaps to a large extent.

There are indeed some topics that could be included under the Space Programme, such as space weather, space physiology and space radiation as suggested by interviewed stakeholders, within the space research part. With particular respect to space weather, stakeholders stressed the need for greater focus on gathering new insights into the detailed processes that generate space weather, in order to be able to predict space weather events, with a significantly higher precision than today.

G.6.1.2. Internal coherence with other Horizon 2020 intervention areas

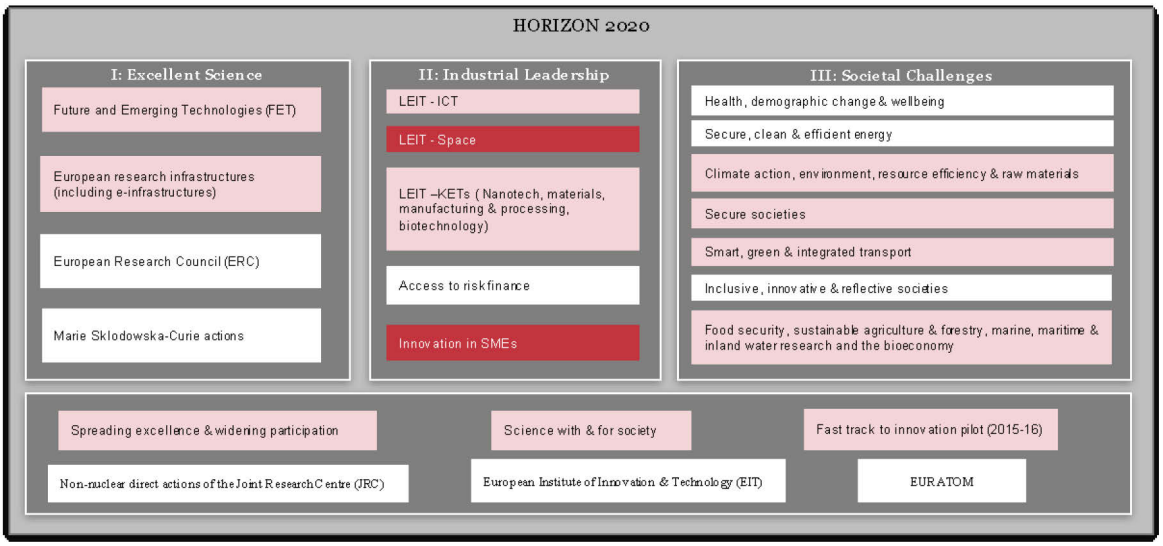
The Horizon 2020 Space R&I programme contributes to several other contiguous policy domains and Horizon 2020 programmes.

Space R&I Programme is not the only part of Horizon 2020 in which space topics are addressed, which is why the maintenance of coherence in Horizon 2020 overall is important. As Horizon 2020 tackles a number of societal challenges and cross-cutting issues, space-related topics can be found in some other calls of different strands of Horizon 2020 (under responsibility of the other Directorates-General of the European Commission), such as the Food Security societal challenge where space-enabled applications are particularly important, or the Blue Growth call that requires coordination with monitoring activities from the Earth Observation calls.

Based upon the programme documents and the scoping interviews conducted in this study, Horizon 2020 domains that are of particular importance for Space R&I are:

- The FET and Research Infrastructures programmes in the Excellent Science pillar (eg related to research in robotics and data infrastructure technologies)
- The ICT and KETs programmes in the Industrial Leadership pillar (eg related to research in robotics and advanced materials)
- The Climate/Environment, Secure societies, Smart, green and integrated Transport, and Food security, sustainable agriculture & forestry, encompassing potential applications and services based on research in any of the Space R&I areas

Figure 139 - Space R&I in the Horizon 2020 framework and its contingencies



Source: Technopolis (2016).

More in detail, concerning the coherence in Horizon 2020 overall, the following conclusions can be drawn:

- There is a stronger linkage between the different programmes in the Horizon 2020 Framework Programme compared with FP7;
- There is room for improvement regarding coordination, and the linkage of space with other themes;
- There are some solutions for improvements already identified that were presented during the interviews.

The space community acknowledges the fact that Horizon 2020 is better as a programme at linking different programmes in comparison to FP7. The European Commission's inter-service coordination activities help to make sure that various initiatives at European level are complementary. In addition, in the latest Work Programme, the calls indicate where participants can find relevant opportunities in other Horizon 2020 non-space work programmes. (Table 92, below).

Having acknowledged the increased connection between different programmes in comparison with FP7, the stakeholder community retains that there is additional room for improvement regarding coordination, and the link between space and other themes (other parts of Horizon 2020).

With regard to the improvements that the space community would like to witness, during the interviews some have been suggested:

- The first consists of a procedure that could be established in calls concerning topics crosscutting with space, in terms of pinpointing the space dimension of the call. Continuing on the previous reflection, it can be mentioned that such a practice started to happen in the latest Space Work Programme, with reference to other WPs, such as Blue Growth, Sustainable Food Security, Climate Action, Environment, Resource Efficiency and Raw Materials. The cross referencing is provided also in non-Space WPs, such as "Climate action, environment, resource efficiency and raw materials", which provides a clear overview of the split of EO related topics between LEIT and Societal Challenges, as well as a cross-link to the relevant calls within the Space WP.
- The second regards the coordination and technology exploitation between the Space and ICT programmes under Horizon 2020, which could be enhanced, especially in light of the impact that ICT has on key European programme such as Galileo and Copernicus as well as on sectors where Europe is lagging behind such as computer manufacturing.

Table 92 - Complementary calls in LEIT-Space and other Horizon 2020 programmes

LEIT/space	SC5/GEO
Earth Observation (Horizon 2020-EO-2016 and Horizon 2020-EO-2017) EO-1-2016 and EO-1-2017: Downstream applications EO-2-2016: Downstream applications for public sector users EO-3-2016: Evolution of Copernicus services EO-2-2017: EO Big Data Shift	SC2: Blue Growth – demonstrating an ocean of opportunities (Horizon 2020-BG-2016-2017): BG-9-2016: An integrated Arctic observing system BG-12-2016: Towards an integrated Mediterranean Sea Observing System
LEIT/space: Competitiveness of the European Space Sector: Technology and Science (Horizon 2020- COMPET-2017) COMPET-2-2017: Competitiveness in Earth observation mission technologies	SC2: Sustainable Food Security – resilient agri-food chains (Horizon 2020-SFS-2016-2017): SFS-43-2017: Earth Observation services for the monitoring of agricultural production in Africa
SME Instrument (Horizon 2020-SMEInst-2016-2017) SMEInst-04-2016-2017: Engaging SMEs in space research and development SMEInst-12-2016-2017: Boosting the potential of small businesses	SC5: Earth Observation (Horizon 2020-SC5-2016-2017): SC5-18-2017 - Novel in-situ observation systems SC5-19-2017 - Coordination of citizens' observatories initiatives SC5-20-2016 - European data hub of the GEOSS information system

Source:Horizon 2020 Work Programmes 2016-2017.

As indicated in Table 92, there are strong synergies between the Earth Observation calls and in particular the activities under societal challenges 2 and 5.

G.6.2. External coherence

G.6.2.1. Coherence with other EU funding programmes

Galileo

The European Commission is responsible for the political dimension and the high-level mission requirements. Its role is the management of the GNSS programmes and the funding. Horizon 2020 specifically is dedicated to the applications in satellite navigations and has several calls on this topic.

Through these calls, Horizon 2020 Space brings its contribution to:
- The adoption of Galileo, EGNOS or EDAS
- Strengthening the community of GNSS developers
- The development of end-to-end applications and trial
- The development of E-GNSS applications within international context and related standards with high international impact
- The implementation of applications benefiting from multiple constellations, including Galileo (GSA)
- EGNSS awareness raising and capacity building

The GSA, a European Union Agency, as mentioned in section 2.2.3, is currently responsible for the European GNSS programmes (Galileo and EGNOS), more specifically activities including:
- Preparing for the successful commercialization and exploitation of the systems, with a view to smooth functioning, seamless service provision and high market penetration;
- Ensuring the security accreditation of the system and the establishment and operation of the Galileo Security Monitoring Centres (GSMC);
- Accomplishing other tasks entrusted to it by the European Commission, such as, managing EU GNSS Framework Programme Research, the promotion of satellite navigation applications and services, and ensuring the certification of the systems' components

The definition phase and the development and In-Orbit Validation phase of the Galileo programme were carried out by ESA and co-funded by ESA and the European Union. ESA's responsibility covers the definition, development, and in-orbit validation of the space segment and related ground element. Work on the new technologies needed for the satellite constellation and the ground segment has been continuing at ESA's European Space Research and Technology Centre (ESTEC), at Noordwijk, in the Netherlands for a number of years. These critical technologies include the high precision clocks to be carried on-board the satellites (rubidium and passive hydrogen maser frequency standards), on-board timing units for synchronizing the individual clocks to a common Galileo system time, signal generators to produce the positioning signals that the Galileo spacecraft will broadcast etc.

Copernicus

Copernicus is implemented by the European Commission (EC) with the support from the European Space Agency (ESA) for the Space component and the European Environment Agency (EEA) for the in situ component.

The European Commission, acting on behalf of the European Union, is responsible for the overall initiative, setting requirements and managing the services. Being part of this, Horizon 2020 Earth observation (EO) activities are considered an essential element to accompany the investments made by the Union in Copernicus, the Union Earth observation and monitoring programme.

Through the Earth Observation calls, Horizon 2020 Space brings its contribution to Copernicus in the following manner:

- The support of Competitiveness in Earth observation mission technologies
- The evolution of Copernicus services, the promotion of the development of innovative products and services based on remote sensing, geo-positioning or other types of satellite enabled data
- The development of comprehensive and sustained global environmental observation and information systems that stimulate the smart use of strategic resources, support the development of evidence-based policies, foster new environmental and climate services

ESA deals with the infrastructure and develops a new family of satellites, called Sentinels, specifically for the operational needs of the Copernicus programme. The Sentinels will provide a unique set of observations, starting with the all-weather, day and night radar images from Sentinel-1A, launched in April 2014. It equally coordinates the delivery of data from upwards of 30 satellites.

Conclusion

The conclusions regarding the coherence between EU initiatives and Galileo and Copernicus are:

- Horizon 2020 Space, Galileo and Copernicus actions are overall coherent;
- Having Horizon 2020 focused on Galileo applications is the right piece of the puzzle
- Having ESA dealing with the infrastructure and the EC dealing with the service component was a good choice

The interviews performed during this study reinforce our conclusions. Horizon 2020 supports Copernicus and the calls are relevant for stakeholders.

No overlaps were mentioned, but in terms of improvements the following suggestion was made: provide more funding for further development of Copernicus, being a flagship programme of the EU (for issues such as: further development of Copernicus Services, development of quality assurance/metrics for services, critical technologies for next generation sensors, development/stimulation of innovative downstream services for special and mass markets, new data mining concepts, new signal processing approaches).

Synergies with the European Structural and investment Funds

ESIF and Horizon 2020 are both part of the same long term strategy of the Commission, Europe 2020. In light of this, there is awareness concerning the mutual synergies that should exist between the two activities.

Several complementarities where ESIF can support Horizon 2020 were identified on this matter, according to the guidance for policy makers and for implementing bodies that aims at enabling synergies between Horizon 2020 and ESIF, which was published by the European Commission (Enabling Synergies between European Structural and Investment

Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes, Directorate-General for Regional and Urban Policy):

- The possibility to focus on improving the innovation eco-systems, but also on increasing the capacity of regions and Member States to participate in Horizon 2020 through programmes such as Stairway to Excellence and via smart specialisation in general
- ESIF programmes can take up good practices and project formats that were tested under Horizon 2020, e.g public procurement of innovative solutions, pre-commercial public procurement, stage gating for projects like in the SME instrument, knowledge triangle settings like in the EIT-KICs
- Combining funding from the Framework Programme/Horizon 2020 and the ESIF (and/or from other sources) for coordinated parallel actions that complement each other
- The transfer of knowledge and technologies resulting from Horizon 2020 projects to companies that can, thanks to ESIF support, develop it further, test, prototype, etc. towards innovations fit for market take-up;
- Bringing together funding from Horizon 2020 and the ESIF in an integrated research and innovation project that could be a single action or a group of inter-dependent actions or operations
- Funding actions that capitalise on already implemented Framework Programme/Horizon 2020 research and innovation actions aimed at market up-take (sequential - downstream)
- Funding actions that build research and innovation capacities of actors aimed at participating in the Framework Programme/Horizon 2020 or other internationally competitive research and innovation programmes (sequential - upstream)
- Providing funding from alternative sources for positively evaluated Framework Programme/Horizon 2020 proposals but not funded due to insufficient Call budgets.

G.6.2.2. Coherence with other public support initiatives at regional, national and international level

In this section the question "To what extent are the actions of the programme complementary to other public support initiatives at international, national and regional level, including ESA and Member States' programmes?" is covered. The issues of complementarity with Member States and ESA is covered separately.

The Member States' initiatives

The conclusions that can be drawn regarding the complementarity between the Commission's initiatives and Member States' initiatives are the following:

- The focus of national funding can vary in different Member States, which means that the perception that Member States have regarding Horizon 2020 funding might not be similar, since the programme answers to a major or minor extent to the needs of researchers
- National funding is overall complementary to Horizon 2020 funding, with a limited number of overlaps having been identified

National support is specific to very country, and the focus can change from upstream to downstream, depending on the policy of each Member State. The perception of the scientific community is that Horizon 2020 Space R&I tends to be more academic in nature, which means that it is easier to work on upstream projects.

In most countries, national funding is complementary to Horizon 2020, since Member States make an effort in this regard. According to the results of the survey, 25% of the respondents consider that nationally funded space programmes and Horizon 2020 Space are complementary, with 46% of the respondents not in a position to provide an opinion on this matter. While the focus of Member States is on very specific issues, Horizon 2020 covers a wider range of areas and is more open. In case there are overlaps, they might be because national programmes prepare European ones, and sometimes can be "mirror programmes", focusing therefore on similar topics. An example from one of the interviews regards the case of Italy, where national programmes tend to be similar to European ones; this can be positive, since it renders candidates more competitive at a European level, but it can also have a negative impact, since ideas who are different form the mainstream might be disregarded. The underlying idea is that by participating in these programmes national entities can become more competitive and hence succeed more in European programmes afterwards. In the stakeholder consultation conducted in the context of the "New Space Strategy for Europe" (2016), Some Member States also pointed out the risk of overlap between Horizon 2020, ESA and Member States' own activities.

ESA's initiatives

The conclusions that can be drawn regarding the complementarity of between EC's initiatives and ESA's initiatives are the following:

- The Commission and ESA are different in various ways, ranging from target groups to work practices
- Cooperation between the EC and ESA is deemed to have improved over the years
- EC's and ESA's initiatives are mostly complementary, with a few overlaps having been identified

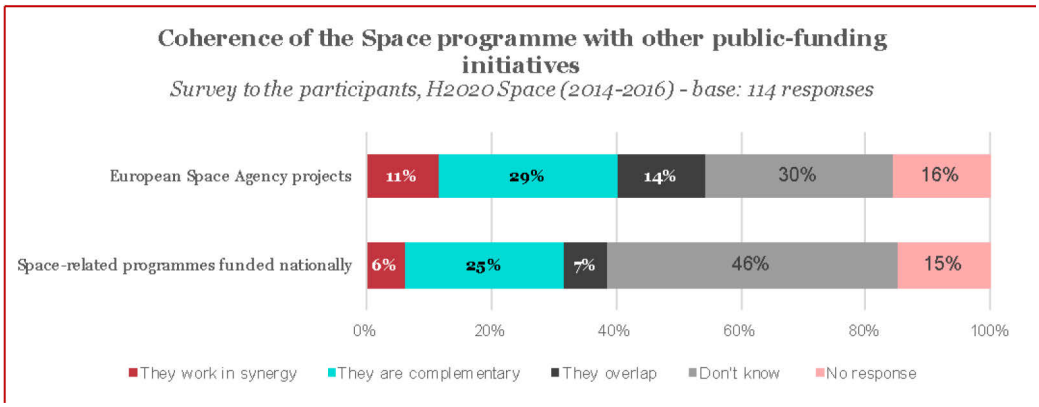
While they often work on the same topics, ESA and the Commission are different in many ways. Firstly, their target groups are not the same. While ESA is focused more on industrial development, the EC is centered on the broader research community. Horizon 2020 equally displays some advantages for stakeholders. The perception is that Horizon 2020 allows more room for innovative ideas thanks to its openness, while ESA activities, being more industrially-focused, are less flexible on prescriptions, and have a rather top-down approach.

Cooperation between ESA and the Commission has generally improved over the years, since both parts make efforts in this regard. This means that their initiatives, and participation and funding have become increasingly complementary, with ESA delivering space missions and operational activities and Horizon 2020 being more open to innovation and adopting a bottom-up approach. Moreover, the implementation of Copernicus and Galileo, with ESA being responsible for the infrastructure, for which it has the relevant expertise. According to the results of the survey, 40% of the respondents consider that the projects financed by ESA and the ones financed by Horizon 2020 space are either complementary or work in synergy; 30% of the respondents considered they were not in a position to express an opinion on the matter (Figure 140, below).

Regarding the aspects where more coordination is needed, it is the case of the objectives for research funding, where priorities could be set up between the two organizations in order to gain in efficiency. Moreover, more coordination is needed (through a stronger mechanism) to make sure that projects from ESA and the EC do not overlap with each

other, and are complementary. An example of such project is constituted by ARTES20, with Galileo and Copernicus calls.

Figure 140 - Coherence of LEIT-Space with other public-funding initiatives (survey results)



Source: Technopolis (2016).

G.6.3. Lessons learnt/Areas for improvement

The conclusions reached from the interviews and the surveys are generally positive. There is clearly an improvement in terms of coherence in comparison to FP7, which has been underlined particularly concerning the internal coherence of Horizon 2020 Space and Horizon 2020 overall.

- A few highlights in terms of conclusions include:
- The internal coherence of Horizon 2020 Space is ensured by the harmonization of most space topics and a moderated level of overlaps
- The internal coherence of Horizon 2020 is made possible by the stronger linkage between different actions in the Horizon 2020 Framework Programme
- There are aspects that can be furthermore improved in terms of both coherence of actions in Horizon 2020 Space and coherence within Horizon 2020 overall:
  a. have topics that are missing included under the Space Programme, such as space physiology and space radiation
  b. establish clear links between space WP and other WPs in order to make the most of potential synergies
  c. establish a better coordination system and explore more (in the WP) the synergies between Space and ICT programmes under Horizon 2020
- Horizon 2020 Space acts in synergy with Copernicus and Galileo, providing reasonable support to these programmes through its calls
- The potential synergies between Horizon 2020 Space and the European Structural and investment Funds are manifold, but they need additional promotion, since there appears to be a lack of awareness on this matter
- The initiatives of the EC regarding space and those of Member States are mainly complementary and where overlaps in terms of Programmes' topics exist, their role is to enhance the competitiveness of Member States for future European programmes

The EC and ESA cooperate in many areas, since their competences tend to complement themselves well; that being said, there are still some overlaps between the actions of the two organizations that need to be tackled. An example consists of the Integrated applications programmes from ESA, which is similar to the calls of Horizon 2020 in GNSS applications.

G.7. EU ADDED VALUE

The sixth evaluation question aims to demonstrate and assess the value resulting from EU intervention that is additional to the value that could result from interventions which would be carried out at regional or national levels.

We analyse the EU added value against three criteria:

- *Effectiveness*: where EU action is the only way to get results to create missing links, avoid fragmentation, and realise the potential of a border-free Europe
- *Efficiency*: where the EU offers better value for money, because externalities can be addressed, resources or expertise can be pooled, an action can be better coordinated
- *Synergy*: where EU action is necessary to complement, stimulate, and leverage action to reduce disparities, raise standards, and create synergies

G.7.1. Related to effectiveness

LEIT-Space has shown considerable added value in its key area for subsidiarity, ie offering a platform for (coordinated) transnational cooperation in research. This constitutes a key facilitator for both the research and industry sector in the enhancement of their global competitiveness.

The need for intra-EU transnational cooperation, both between the Member States and between Member States and the EU, in order to efficiently develop and exploit the outcomes of space programmes, such as EGNSS and EGNOS, was already highlighted by the FP7 Space Advisory Group: "Europe traditionally relies on cooperation in space research. The success of the European space programmes lies in their cooperative nature, combining the efforts and scientific and technical expertise of different ESA Member States" (FP7 Space Advisory Group, 2012).

The rationale behind the creation of both European GNSS programmes, ie EGNSS and EGNOS, was largely based on the acknowledgement that no single European country could develop such systems on its own. In its recent position paper, in 2015 EGNSS Services calls for a European industrial strategy that would support "coordination between existing National or European initiatives to maximise synergy and efficiency, and minimise duplication". Especially, the "federation of regional and national needs and coordination of procurement plans for European GNSS products and services at the European level" is thought to support the creation of trans-national markets in Europe and therefore achieve economies of scale.

However, the industry active in the Earth Observation sector tends to be a fragmented at the European level, because each Member State has its own national companies. Partnerships and collaborative initiatives could help overcome the inherent fragmentation of the market. Europe displays a variety of untapped skills and innovative ideas that jointly have the potential to strengthen the European EO market and create access to other markets beyond national borders and outside of Europe.

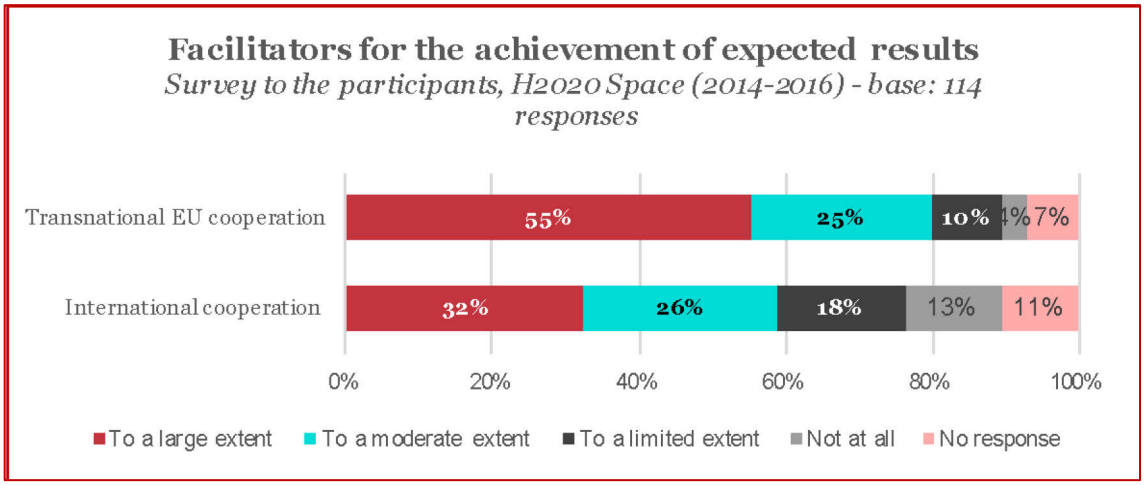
Transnational cooperation is a key element in a few of the calls in the Work Programme 2016-2017, including EO-1-2016: Downstream applications, EO-2-2016: Downstream services for public authorities, and EO-1-2017: Downstream applications.

- The first call mentioned refers to downstream applications stemming from Earth Observation and their smart integration with other related technologies. In this case Copernicus can be considered as part of the solution, which may include other space or non-space inputs. It is considered that within this call there is a need for transnational cooperation, since application providers could benefit from having access to the afore-mentioned knowledge available on other markets as well as the technical expertise of other European partners
- The second call cited refers to demand-driven innovation actions by public authorities aiming at customising Copernicus information as part of the solution (i.e. possibly alongside other space or non-space data sources) for their needs. In this specific context, it is also expected that transnational cooperation would play a crucial role, since it can facilitate the transfer of knowledge, as well as the optimisation of resources for public authorities. Service providers also are likely to benefit from a strengthened digital single market and from working alongside the public sector
- The third call is similar to the one from the preceding year (EC Decision, WP2016-17, 2015)

The interviewees fully subscribed to the importance placed on transnational collaboration in the EC policy. Even though some industry actors questioned the value of a forced collaboration with actors in other countries, the overall perception is that transnational collaboration and the knowledge transfer it enables allows achieving results that could not have been reached at the national level. It was suggested that none of the countries in Europe has all of the needed expertise; no one country has sufficient capabilities to conduct state of the art research in this field of research on its own. Technology leaders are distributed throughout Europe and collaboration in R&D with and among these actors is key in advancing technologies and acquiring new ideas. Collaboration rather than competition is regarded as positive and beneficial even in competitive areas such as electric propulsion, though in such cases it constitutes a challenging endeavour. Interviewees suggested that collaborations always lead to win-win situations.

The interviewees considered that EC funding has been pivotal in creating a more collaborative culture in Europe. They also suggested that the exchange of information and knowledge within the European teams is efficient and definitely a driver of success. More than half of the survey respondents fully agreed (Figure 141) with this view.

Figure 141 - Facilitators for the achievement of expected results



Source: Technopolis (2016).

G.7.2. Related to efficiency

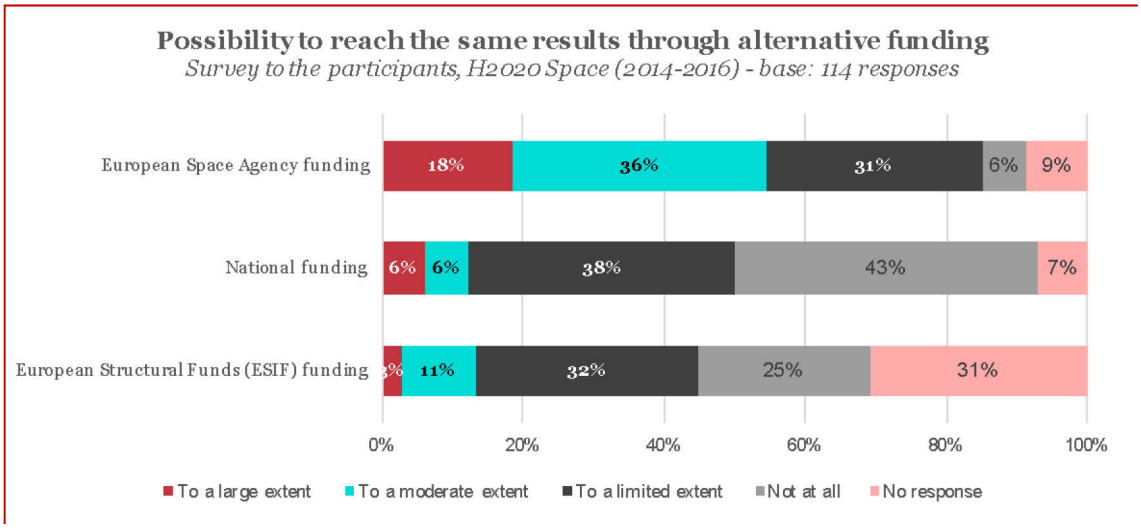
EU funding in LEIT-Space has a high level of additionality.

The Space sector is a global sector of excellence, and thanks to the work of the European Space Agency, researchers and industry located in ESA member countries have the opportunity to conduct research across borders and even internationally.

Nevertheless, less than 20% of the survey respondents believed that it would be possible to reach the same results they envisage for their projects through funding from ESA (the response was similar among respondents who actually participate in ESA projects) (Figure 142). The reasons for this positive response may be various, depending on the need and the type of research conducted. The most important are:

- EU research facilitates the conduct of high-risk research in partnership with the best researchers in Europe, allowing for a higher efficiency in the creation of technological advances and therefore risk reduction. The high level of participation of large enterprises and SMEs in TRL3-4 research suggests that this is one of the core values of LEIT-Space.
- The unique platform that the FP provides for the creation of networks, within the structure of the FP itself, and the opportunity for knowledge acquisition and exchange with key experts in other sectors, eventually leading to spin-in/spin-out effects.

Figure 142 - Possibility to reach the same results through alternative funding



Source: Technopolis (2016).

G.7.3. Related to synergy

A major development in the European space environment was the formulation of the EU Space Policy, creating synergy in the support to research and innovation in Europe, enhancing the effectiveness and efficiency of public investments. LEIT-Space has been a key player in this context, effectively fostering this development and implementing the decisions taken and agreed upon by the Council, ESA and the Member States.

The interviewees largely applauded the presentation of the EU Space Policy. They felt that this was a positive change, crucial for Europe's competitiveness. They appreciated

the enhanced collaboration and coordination of space research at the European level, even though they see a need for further strengthening the coordination, especially between the EC and ESA. Interviewees indicated also the highly positive results of the cooperation between ESA, the EC and the defence community with regard to critical technologies and the positive impact it has generated in terms of pushing the technology forward.

G.8. SUCCESS STORIES FROM PREVIOUS FRAMEWORK PROGRAMMES

G.8.1. SCUTUM [6]

The SCUTUM project (SeCUring the EU GNSS adopTion in the dangeroUs Material transport), launched the European best practice for the operational adoption of commercial services based on EGNOS. Compared to GPS, EGNOS's added value relies on the ability to provide enhanced accuracy and confidence in the positioning.

The SCUTUM project expanded on the findings from the FP6 project MENTORE and led to the development of EGNOS Data Access Service (EDAS) products and services for the commercial market. It also proved the benefits of EGNOS for road applications and the value for tracking & tracing of dangerous goods. On top of this, SCUTUM also specified the standard for the implementation of EDAS in Intelligent Transport Systems and mobility applications through a CEN Workshop Agreement. It equally contributed to advancement in the capacity of the Italian Ministry of Transport in the field of EGNOS/Galileo-use as mandatory for the tracking & tracing of dangerous goods and to other related initiatives by the Ministry.

Besides the successful implementation of EGNOS in a real-life business case, and the defining of the CWA 16390:2012 standard on the use of EDAS in road applications across Europe, the leading partner of SCUTUM, Telespazio S.p.A., managed to commercialise the LoCation Service (LCS) produc. The LCS is a "plug-in" solution that retrofits Off-the-Shelf GPS tracking & tracing systems allowing the use of EDAS to augment the GPS signal. The product is used to monitor the road transport of dangerous goods. Information from 2015 indicates that the product is used on about 1,200 tankers in Italy and extended to vehicles in other EU Member States (MS).

G.8.2. Geoland 2[7]

The rationale behind the Geoland 2 project was to achieve substantive progress towards the implementation of operational land monitoring services under the Global Monitoring for Environment and Security (GMES) programme.

The GMES programme was initiated following the Baveno Manifesto in 1998 and initially launched as a flagship programme co-funded by the EU and the ESA. Geoland 2, which was carried out between 2008 and 2012, was therefore running alongside the GMES Preparatory Actions and GMES Initial Operations.

Considering the scope and scale of Geoland 2, and in particular the various Core Mapping Services and Core Information Services developed during the project, a wide

[6] http://www.gsa.europa.eu/securing-eu-gnss-adoption-dangerous-material-transport
[7] http://www.copernicus.eu/projects/geoland2

range of short-to-long-term impacts have been identified. Those impacts have materialised as valuable contributions - e.g. in terms of developed methodologies for handling EO data - to European land monitoring initiatives, and in particular the Copernicus land monitoring service. Wider impacts of this FP7 project have benefitted not only the industry and research community, but also European institutions and, to a lesser extent, local and national agencies, as well as European citizens, thanks to the potential applications of land monitoring capabilities.

Although Geoland 2 products have not been exploited as such in further development work, the contribution of Geoland 2 to future land monitoring activities, especially in terms of further defining land cover typology, developing processing methods and building experience with multi-sensor data as well as time series, has been widely acknowledged. In particular, Geoland 2 is recognised as a precursor to the GMES Initial Operations (GIO) and as a contribution to the subsequent Copernicus Land Monitoring Service. In a nutshell, Geoland 2 has successfully given "some feeling of what kind of information we can have from Earth Observation data" and provided a good basis for further data investigation

G.8.3. AGAPAC[8]

The 'Advanced GaN packaging' (hereinafter 'AGAPAC') project started in 2008 and designed, developed and tested 25 high-power amplifier micro-packages over the course of three years. These micro-packages allow the transistors to become 65% more power efficient thanks to a newly developed diamond-based material. At the same time, the technology has been tested to show the robustness of the AGAPAC micromicro-package versus space environment according to ESA standards. The project has enabled developing a supply chain for the product and creating stronger links between smaller and larger high-tech companies, therefore laying the groundwork for promising further developments. However, the technology has not yet been tested in space.

The AGAPAC project aimed to address this critical challenge for space satellite applications by producing a space-compliant micro-package able to dissipate up to 100 W of power with a maximum junction temperature of 200°C. This new micro-package technology based on innovative high thermal conductivity diamond or nano-composites has been developed and produced through an industrial supply chain created during the project. The GaN based high-power amplifiers do not only meet the space applications demand, but have also been designed to be applied in other sectors such as base stations.

Unlike for the advanced packaging, the development of GaN power transistor technology was initiated through an ESA contract, and the complementary nature of ESA funding and FP7 Space funding was systematically acknowledged. Overall, the AGAPAC project allowed to establish a European supply chain for high-power amplifiers, improving its independence in the space sector.

[8] http://cordis.europa.eu/project/rcn/88438_en.html

G.9. LESSONS LEARNT/CONCLUSIONS

G.9.1. Relevance

The Horizon 2020 LEIT-Space programme is set firmly within the context of the European Space Policy. The original objectives for LEIT-Space remain entirely relevant and its specific objectives directly address the challenges and needs set out in the 2013 Communication. In line with its mandate and the regulations establishing the division of labour, the Horizon 2020 LEIT-Space programme fully responds to the need and problems in the EU policy sphere. LEIT-Space is of relevance to Europe's space industries, providing support for the development of various next-generation technologies. It is also of importance to the EU's public research organisations, both universities and research institutes. The relevance for the EU citizen is high, thanks to the programme's focus on fostering economic growth and the creation of employment opportunities, the availability of improved products and public and private services, and Europe's capacity to address societal and grand challenges. There is a clear and continuing need for an EU-funded space research and innovation programme.

The **strength** of the programme lies in its focus on enhancing the EU's strategic independence in Space and on fostering security, on the pooling of financial and human resources and the coordination of space research in Europe, as well as on strengthening the competitiveness of the EU Space industry and research communities. LEIT-Space addresses also the various types of shortcomings and needs present in both the upstream and downstream industry markets.

The **main weakness** identified is the more limited level of relevance of the programme for Space science due to the explicit focus of the programme on supporting technological research. A more integrated approach to supporting Space research and innovation would be beneficial, adopting a longer-term perspective and enhancing the exploitation of potential space science capacities for longer-term innovation as well as for addressing the societal challenges.

G.9.2. Effectiveness

The first wave of completed projects produced 60 or so scientific publications and eight patent applications, which equal or exceed the numbers reported by LEIT-ICT and LEIT NMBP, in proportionate terms. To date, the programme is performing more strongly than FP7 on IP and less strongly on publications.

The alignment with the market dynamics is high, creating opportunities for (and requiring) knowledge transfer among the relevant communities and contributing to cross-fertilisation. Around 40% of survey respondents expect their participation in LEIT-Space to lead to the development of new or improved products, or services or methodologies.

There is a broadly similar view of effectiveness across the main thematic areas, except for some particularly positive views about the COMPET strand's technology support. We see potential for LEIT-Space to deliver on each of its specific objectives, with good to reasonable progress evident across each of its thematic areas. The major exception is Earth Observation. There is a general sense that the development of novel EO applications and the widening of usage and users continues to lag behind ambition levels.

The Horizon 2020 LEIT-Space programme strongly supports the promotion of innovation, European industrial leadership, growth, competitiveness and job creation by acting in alignment with the market trends and developments, even though some stakeholders perceived a lack of market-driven decision-making at the European level and criticised the persistent focus on technology-driven growth.

In terms of size and scale of the projects, the vast majority of stakeholders agreed with the number of partners present in each project, the scale of activity, the duration of the project and the amount of funding. However, they perceived a trend towards smaller projects, spreading the available budget thinly over multiple research lines. This fragmentation of the funding hinders large projects and/or continuity in research, an issue especially for risky, long-term research where research should be based on the development and implementation of roadmaps.

The **strength** of the programme lies especially in its capacity to attract the relevant stakeholder communities. It achieved an appropriate mix of expertise in the different thematic areas and a good level of involvement of industry actors, both large enterprises and SMEs, which assumed project leadership and conducted research even at the lower levels of TRL (TRL3-4). LEIT-Space was successful also in attracting the key players in the research community.

The stakeholder communities and interviewees alike applauded the SRC initiative and considered it to be of fundamental importance in strengthening the research base and the overall competitiveness of EU Space R&I at the global level. The roadmap-based 'top-down' approach in this initiative is also considered a welcome contribution to achieving an improved balance in the mix of open 'bottom-up' versus 'top-down' calls.

The strongest **constraint** on LEIT-Space is its budget. A balance needs to be found between the breadth of the programme's scope, on the one hand, and the need for continuity in research as well as an appropriate project budget size, on the other. The budget allocations also do not allow for a full exploitation of Europe's strengths in space exploration and science, and more attention to the use of spin-in/spin-out research and international collaboration would be beneficial. The important topic of space weather received only limited funding throughout the programme.

In the context of the global market, the development and/or compliance with international standards is a critical factor in competitiveness. So far, the programme has been building upon the standardisation work performed in the context of ESA. The progressive evolution of the focus of the programme towards higher TRL technologies makes increased attention to the development of standards and/or stronger requirements for compliance with existing standards even more important in the second part of the programme.

While LEIT-Space is performing well in terms of the share of participations linked to newcomers, its efforts to widen participation in new sectors and new geographies have not yet met with great success. The budget is concentrated geographically on the major space-faring nations, and the Top 10 participants, including Europe's two space primes and its three largest national space laboratories, play a more dominant role than is the case in other thematic programmes. This causes some concern about the potential of the programme to enhance competitiveness also among the smaller players and regions, thus strengthening the critical mass in Europe overall.

There also is space for a more ambitious approach to the development of solutions addressing EU societal challenges; there is untapped potential for space research developing applications for example for the fields of agriculture, health, security etc.

There may be merit in carrying out further work to develop more comprehensive service and technology roadmaps, taking a longer-term perspective and including more fundamental research, as well as looking to engage a wider audience in a more creative programme of design and development than might be achieved through a classic FP collaborative-research project. Looking forward, LEIT-Space might consider experimenting with new development models to provide a stronger platform / laboratory for conceiving and developing new space-enabled applications and new space businesses.

A small number of commentators argued that the LEIT-Space programme is rather complex in its design, with numerous opportunities for confusion. There are programme elements that focus on themes (PROTEC) alongside elements that focus on types of participants (SMEs), while other parts target strategic goals (international competitiveness) and yet others are research programmes for the Commission's own operational space services (Copernicus). The inclusion of space science within an area that largely funds space technology appears to be somewhat anomalous, especially as the programme name would suggest it is concerned primarily with competitiveness.

This structural complexity may constitute a small barrier to entry for newcomers, and it would be worth considering further, but any taxonomic clarification would be best addressed in the transition from Horizon 2020 to its successor programme. The current structure is now familiar to most, and it would be unnecessarily disruptive to begin reorganising or renaming elements to ensure greater coherence.

G.9.3. Efficiency

The output statistics show that LEIT-Space is performing broadly in line with the other two LEIT programmes in terms of the number of outputs per million Euros of Commission Funding. From this limited perspective, LEIT-Space is cost-efficient.

Regarding the overall cost-efficiency, the great majority of stakeholders consider that participation in Horizon 2020 space projects demonstrates a good cost-benefit ratio. This opinion was shared across the whole spectrum of participants. Both the proposal process and project management entail reasonable costs, although large companies and research institutes are reportedly facing a higher burden than SMEs.

The **main strength** of the programme is in the simplification and changes in management processes introduced under Horizon 2020 which were regarded as positive and no major administrative bottlenecks were identified. Overall the quality of programme management was reported as positive. Proposal writing guidelines and the calls for proposals are generally considered to be sufficiently clear and detailed. Time to grant has improved over time, and now tends to meet the target, with only EGNSS remaining a few days above target. While the direction of travel is therefore positive, there is further room for improvement in reducing TTG.

Competition in the LEIT-Space calls was lower compared to the overall Horizon 2020 programme; however, success rates for Space calls vary greatly across specific calls and topics. The number of proposals, budget allocated to each call, as well as the nature of the topic in terms of its "accessibility" and technical requirements partially explain these

differences. The LEIT-Space project portfolio included a mix of more targeted, highly technical projects for which the number of potential applicants that possess the relevant expertise is limited, and projects covering more exploratory topics that elicited a more heterogeneous interest, but also potentially very innovative responses. In the case of the latter, the limits of budget available implied a larger number of disappointed applicants and lower returns on investment.

Weaknesses were identified in the insufficient attention paid to the likely number of proposals to be presented when defining the budget allocation, based on the openness of the topics and their level of technicality. A detailed analysis of the patterns in success rates of past calls and topics, as well as surveys and events with stakeholders should allow for a better understanding of the likely interest and expertise in different call topics.

The major area where stakeholders expressed concern regarded the transparency and fairness of the proposal evaluation process. This echoes concerns elsewhere in Horizon 2020, and reflects a programme-wide decision to generalise feedback to non-successful applicants in order to streamline the assessment process and widen the involvement of different sectors and countries within the evaluation pool. Stakeholders also suggested a higher weighting of the excellence or impact evaluation criteria for calls focusing on scientific or innovation topics, respectively.

As for the coverage, there appear to be a modest number of gaps within an overall positive picture. Some topics could be included or further covered under the Space Programme, such as space physiology, space radiation and space weather within the space science part of COMPET.

G.9.4. Coherence

Internal coherence

LEIT-Space shows high degree of coherence within the programme and between the programme and other space activities, internationally and nationally. A large majority (c. 75%) of the respondents to the interviews and participant survey judged the LEIT-Space programme to be broadly coherent in terms of the complementarity of its individual elements one to another. Grouping together all space-related activities under one programme certainly allowed for an improved coherence and synergy within Horizon 2020 Space. However, within this framework stronger coordination between Horizon 2020 Space and other parts of the Horizon 2020 Programme (especially Societal Challenges) becomes more important, so as to align R&I on GNSS with the needs of the sectors of application.

Although there is a stronger linkage between the different work programmes in the Horizon 2020 Framework Programme compared with FP7, there is further room for improvement regarding internal coordination between the Commission services responsible for the various parts of Horizon 2020. Space infrastructure and services are of considerable value to the policy makers and operational agencies of many DGs, ranging from Connect to home affairs to transport. Improved coordination could strengthen synergies and reduce any unnecessary duplication, producing better value for money for funders and relatively more socio-economic impact as well.

It could be useful for the Space policy team to consider new ways through which it might generate greater interest and strengthen communication and coordination with other DGs.

That might be handled in part through the development of internal marketing platforms, which could include a technology and space-applications roadmap linked to a given area (e.g. smart cities) alongside an overview of the space programme's past work (and impacts) as well as its plans for service and infrastructure development.

External coherence

LEIT-Space operates in a busy landscape of national, European and international space initiatives, and has had to be designed with care in order to ensure that it prioritises major EU challenges that are not being addressed (sufficiently or at all) by other policies or programmes. The Space Advisory Group is concerned precisely with this issue of added value and complementarity. There are several other groups (e.g. European Space Science Committee) that contribute to LEIT-Space consultations and help to ensure the programme's fit within the wider landscape.

A major achievement is the delegation agreement between the EC and ESA, allowing for an efficient allocation of roles and responsibilities. Substantial efforts for coordination of research activities with ESA have been made, besides the continuation of the Joint Task Force for non-dependence of critical technologies involving ESA, EU and EDA. The Strategic Research Clusters financed under Horizon 2020 Space, coordinated by major EU national space agencies and ESA, and based on roadmaps agreed by the Member States, represent another positive example.

There are inevitable overlaps between LEIT-Space and larger national space programmes and even ESA. However, the areas of coincidence are limited, and where themes are the same, projects are not necessarily duplicative and in many cases they support capacity development at the national level, enhancing the overall quality of capabilities for future European activities.

An area that could be exploited more involves the many potential synergies between Horizon 2020 Space and the European Structural and Investment Funds (ESIF). These may be especially relevant to investments in new space applications centres or even spaceports, and the ambition to both expand Europe's space economy and widen participation in LEIT-Space. Cataloguing past ESIF investments in space projects (and even proposals that ultimately remained unfunded) could provide the basis for a briefing paper on synergies as well as constitute a platform for a promotional campaign to raise awareness on this matter

G.9.5. EU Added Value

There is clear EU added value in all elements of the programme, whether this relates to critical technologies or satellite surveillance. The continuing need to support research to improve and extend Europe's two flagship projects is similarly clear cut.

LEIT-Space has shown considerable added value in its key area for subsidiarity, ie offering a platform for (coordinated) transnational cooperation in research. LEIT-Space is open to space-related businesses and research organisations based in EU Member States that are either not members of ESA or are among the smaller Member States, providing improved prospects for engaging in space research and innovation. This openness and transnational nature constitutes a real bonus for both the research and industry sectors' global competitiveness.

In terms of its added value for efficiency, EU funding in LEIT-Space shows a high level of additionality; most stakeholders consider that equivalent alternative funding would not be available, and that smaller, national grants would not allow them to reach the same expected results.

In relation to its added value for synergy, LEIT-Space has been a key player in the creation of the EU Space policy, creating synergy in the support to research and innovation in Europe and enhancing the effectiveness and efficiency of public investments in Space. It directly implements the decisions taken and agreed upon by the Council, ESA and the Member States.

H. ACCESS TO RISK FINANCE

H.1. INTRODUCTION

H.1.1. Context

This document presents the midterm (interim) evaluation of the InnovFin financial instruments from the Access to Risk Finance Work Programme of Horizon 2020, the EU Framework Programme for Research and Innovation.

The contractor started their evaluation in November 2016[9].

H.1.2. Objectives and intervention logic

The specific objectives of 'Access to Risk Finance' are to:

- increase private investment in R&I;
- provide a range of debt and equity financing products and facilities in line with the variety of potential final beneficiaries at different developmental stages seeking access to risk finance on reasonable terms;
- increase the debt and equity financing of R&I in terms of the number of firms and other entities funded and the volume of funding mobilised;
- strengthen the EU VC industry in terms of its ability to attract institutional and other investors and to operate on a pan-European basis;
- increase the involvement of business angels in funding R&I;
- increase investments in technology transfer.

The specific objectives contribute to the Horizon 2020 general objectives by leveraging additional funding for R&I and by contributing to attaining R&D targets, including the target of 3%.

The lines of activities of 'Access to Risk Finance' comprise:

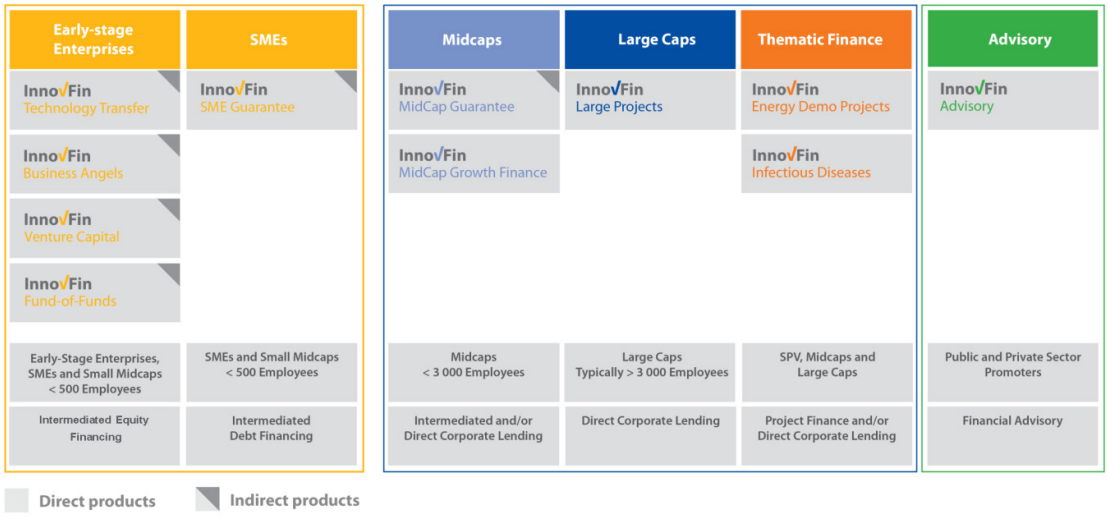
- The Debt facility providing, loans to single beneficiaries for investment in research and innovation; guarantees to financial intermediaries making loans to beneficiaries; combinations of loans and guarantees, and guarantees or counter- guarantees for national, regional and local debt-financing schemes. It will include a SME window targeting research and innovation (R&I) driven SMEs with loan amounts that complement finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and small and medium-sized enterprises (COSME).

[9] CSES/ Oxford research - Interim Evaluation of Horizon 2020's Financial Instruments, contribution to the evaluation of Horizon 2020, forthcoming.

- The Equity facility, providing venture and/or mezzanine capital to individual enterprises in the early stage (start-up window). This facility can make expansion and growth-stage investments in conjunction with the Equity Facility for Growth under COSME, including in funds-of-funds.

The main products under these two facilities are as follows.

Figure 143 - Main products of the InnovFin facilities



Source: European Commissiom/EIB Group.

The objectives of 'Access to Risk Finance' have evolved over time to reflect a stronger emphasis on thematic finance.

The comparison with the objectives of Risk-Sharing Finance Facility (RSFF, the predecessor financial instrument) in the Seventh Framework Programme for Research and Technological Development (FP7) shows a degree of continuity in the following operational objectives:

- increase the supply of direct loans to larger firms and other entities in terms of the number of operations and the volume of funding mobilised;
- increase the supply of intermediated loans to SMEs, small midcaps and other midcaps in terms of the number of agreements reached with financial intermediaries and the volume of funding mobilised;

The following new operational objectives emerged in Horizon 2020:

- increase the supply of 'formal' early-stage equity financing available to innovative SMEs and small midcaps in terms of the number of agreements reached with VC funds and the volume of funding mobilised;
- increase the supply of 'less formal' early-stage equity financing available to innovative SMEs and small midcaps in terms of the number of agreements reached with business angel groups and other less institutionalised groups and the volume of funding mobilised;
- increase the supply of TT financing in terms of the number of agreements reached with TT funds and vehicles and the volume of funding provided.

No areas covered in FP7 were not pursued.

To address the identified objectives, 'Access to Risk Finance' adopted the following intervention logic:

- **Inputs:** financial support to indirect actions (financial instruments).
- **Activities:** 'Access to Risk Finance' financial instrument facilities implemnted by EIB and EIF.
- **Outputs expected:** New or improved research infrastructures — Early outputs for subsequent innovation (new, altered or improved ideas, products, designs, processes, services and business models) — Outputs for research or market integration (joint databases, platforms, test-beds, deployment of advanced ICT in manufacturing sector) — Closer to market outputs (demonstrators of innovative solutions, new context-adapted solutions, innovative processes, products and service delivery systems, projects having sought additional of follow-up funding).
- **Results expected:** Strengthened R&I capacities (reinforced innovation potential of European research infrastructures) — Strengthened framework conditions for R&I (leveraged private and public investments in R&I) — Diffusion of innovation in products, services and processes (solutions brought closer to market, improved cost-effectiveness and sustainability of solutions, improved manufacturing processes and equipment of European industry, improved time-to-market for European manufacturers and service providers, increased digitalisation of industry and economy, new and better product service offerings)— Economic outcomes (enhanced innovation capability and competitiveness of European enterprises in global markets for innovative solutions, new business entities created or improved performance of existing businesses, opening up of new markets for participants, development, growth and internationalisation of participating SMEs).
- **Impacts expected:** Emergence of new technologies in the EU — EU technological leadership and competitiveness in areas related to societal challenges — Better contribution of R&I to tackling societal challenges — Better innovation capability of EU firms — Strengthened competitive position of European industry — Diffusion of innovation in the economy.

The **critical external factors** are socio-economic conditions affecting the availability of funding and the demand for funding.

H.2. IMPLEMENTATION STATE OF PLAY

H.2.1. Overview of programme inputs and activities

As of 31/12/2016 with regards to the EU contribution and to operations, the state of play is the following:

InnovFin Debt – EIB

- EU contribution: EUR 796 million (including EUR 482 million of revenues and repayments from FP7 RSFF and Horizon 2020)

- 28 loans granted to Large Corporates for EUR 2515 million
- 24 loans granted to Large Mid Caps for EUR 1504 million
- 6 loans granted to Small Mid Caps for EUR 147 million
- 22 loans granted to SMEs for EUR 330 million
- 5 loans granted to R&I infrastructures for EUR 527 million
- 6 guarantee agreements signed for a guarantee amount of EUR 744 million
- Operations in 19 Member States and 4 Associated Country

InnovFin Debt – EIF – SME guarantee and SIUGI

- EU contribution: EUR 534 million (including EUR 66 million of revenues and repayments from CIP GIF1and Horizon 2020)
- 109 InnovFin SME guarantee agreements signed with financial intermediaries for a maximum portfolio volume of EUR 8649 million
- 30 InnovFin SIUGI agreements signed in Spain, 10 in Bulgaria and 2 in Malta with financial intermediaries for a maximum portfolio volume of EUR 279 million
- Guarantee agreements signed in 26 Member States and 9 Associated Countries
- EUR 2196 million committed by financial intermediaries to 4604 SMEs and 1078 Small Midcaps in 17 Member States and 7 Associated Countries

InnovFin Equity – EIF – IFE

- EU contribution: EUR 256.05 million (including EUR 6 million from EaSI programme)
- 10 IFE Operations signed in 6 Member States including 7 early stage and 3 multi stage for an amount of EUR 164.5 million with a target intermediary size of EUR 842 million
- 5 investments made into Eligible IFE Final Recipients for EUR 15 million in 4 Member States

H.3. RELEVANCE

H.3.1. Overview

In this section, an analysis is performed on the extent to which the InnovFin financial instruments correspond to the identified needs of the different target groups, i.e.:

- **Financial intermediaries** such as commercial and promotional banks;
- **Final beneficiaries** including start-ups, SMEs accessing InnovFin support through to intermediaries and Midcaps and large firms accessing loans directly from the EIB.

Innovative enterprises have differing types of financing needs at different stages in their development, starting with the need for risk capital during the early stages and progressing to various forms of equity and debt as projects are commercialised and

businesses expand. The extent to which the different InnovFin instruments meet the identified needs of businesses at different stages of their development was examined in relation to the various aspects of the 'Valley of Death'. The extent to which the policy mix between loans, guarantees and (quasi-) equity schemes is optimal from the point of view of achieving the key EU policy objectives relating to promoting research and innovation was also considered. Lastly, the relevance of the InnovFin FIs from the perspective of the growth and jobs agenda in the wider context of the Investment Plan for Growth and Job and the vision of a Europe of open innovation, open science and being open to the world was assessed.

H.3.2. Factors influencing demand for InnovFin

There are regional variations across the EU with regard to the maturity of risk financing markets which are more developed in Western and Northern Europe than Southern or Eastern Europe. Whilst the scale of VC activity in Central and Eastern Europe is much lower than in more mature markets, such markets have developed relatively quickly, in part driven by EU financial instruments, notably the Structural Funds (including the JEREMIE holding instrument) and by the EIF's fund-of-funds programme.[10] But even in mature markets, intermediaries and national authorities have indicated that the InnovFin instruments are filling a gap, especially in the area of debt finance, which is confirmed by high demand for the SMEG due to more favourable conditions than offered on the market.[11] The Infectious Diseases instrument was also credited with filling a specific market gap for projects that are too late in the R&I stage to receive a grant but too early to receive a regular loan (due to commercialisation potential not yet appraisable).

The availability of relatively generous levels of grant funding in Central and Eastern European countries may be a factor explaining a lack of interest among financial intermediaries to participate in InnovFin. The Innobarometer and SAFE Survey data highlights differences in terms of access to finance problems, and the reasons for these, between different regions across Europe. The findings suggest that access to finance has become less of an issue in recent years, but is still a major issue in some countries. Moreover, it suggests that both lack of finance and R&I intensity of the economy shape potential demand for InnovFin in certain countries. Taking firm size into consideration, the research suggests that even large firms can benefit from InnovFin support to invest in R&I activities. There are many factors influencing demand for and the uptake of the InnovFin instruments. Thus, market interest rates have an impact on the debt instruments more than on the equity instrument. The availability of alternative sources of finance, firm size, and market interest rates are all correlated with demand for InnovFin. For example, if alternative sources of finance are plentiful, this reduces the need for the InnovFin instruments. Conversely, a high level of R&I intensify in the economy positively correlates with demand for the InnovFin instruments. The link between business development stage and demand for InnovFin is inconclusive, and seems to vary by country. Generally, start-ups and early-stage companies tend to face more access to finance issues than later-stage companies.

[10] *Examples – the EIF Polish Fund of Funds, Baltic Innovation Fund.*
[11] *A specific market gap filled by SMEG in Sweden relates to university- and IT-related companies and micro-enterprises that would otherwise have most likely not succeeded in obtaining a loan at all.*

Table 93 - Factors influencing demand for InnovFin - matrix

	High/large/late stage	Low/small/early stage
Development of banking system	Low demand for InnovFin	High demand for InnovFin
Level of R&I intensity	High demand for InnovFin	Low demand for InnovFin
Availability of alternative sources of finance	Low demand for InnovFin	High demand for InnovFin
Firm size	Low demand for InnovFin	High demand for InnovFin
Market interest rates	High demand for InnovFin	Low demand for InnovFin
Business development stage	Low demand for InnovFin	High demand for InnovFin

Source: Interim Evaluation of Horizon 2020's Financial Instruments.

In relation to the question of the geographic distribution of take-up, it should be recognised that there may be justifiable reasons why take-up is unlikely to be even across all EU Member States during the lifetime of the InnovFin programme, since there are wide variations in alternative sources of funding, differences in maturity of debt and equity markets, differences in demand for innovation financing across geographies.

H.3.3. Extent to which InnovFin addresses market gaps

Overall, the InnovFin instruments' objectives of addressing market failures, strengthening risk capital provision and promoting R&I investment in Europe appear to remain relevant. The research suggests that there remains a need for innovation financing at the firm level, as evidenced by strong interest in InnovFin, or at least for the SMEG among financial intermediaries, suggesting that there is corresponding demand among SMEs. Demand for the other instruments has also picked up over the last year.

Strong demand is indicative that the InnovFin FIs remain relevant to identified needs. A total of 5,682 firms have benefited from the SMEG, and 82 final beneficiaries have been signed across all EIB-managed instruments. This is encouraging given that the implementation of the InnovFin instruments has only been underway for 2-3 years, and keeping in mind that the two thematic instruments were launched a year later than the other instruments.

When distinguishing between individual financial instruments within the InnovFin programme, the monitoring data show that demand among financial intermediaries to participate in InnovFin varies considerably by instrument, suggesting variations in the extent of need for EU support across different countries and ultimately among firms of different sizes.

Moreover, the level of take-up of InnovFin instruments in some markets is not necessarily a reflection on their relevance/ lack of relevance since low uptake may be due to other factors than demand for innovation financing such as restrictive eligibility criteria, lack of interest among intermediaries to become involved in particular countries (for instance due to alternative sources of financing being available offering better conditions or being perceived as easier to access), and the availability of other sources of similar funding.

The EIB's own assessment has identified factors that suggest that InnovFin FIs are highly relevant in addressing market gaps. For instance, commercial banks are not set up to support companies with little or no assets to collateralise and thus offer insufficient or inadequate financing for innovative companies. This deficiency appears to be strongest in case of midcaps whereas SMEs may resort to equity funding and large companies find it easier to obtain loans from commercial banks. Our research suggests that demand is lower in some new Member States but also that there may be a stronger focus on early-stage investments in these countries which may not always translate into demand for the EIB-managed instruments since these focus on Midcaps and larger firms. Interview feedback from intermediaries and industry associations suggests that the extent of market gaps varies considerably between countries, both in terms of private sector supply of finance, and in terms of existence or lack of programmes similar to InnovFin provided by NPBs. This suggests that the relevance of InnovFin differs by country, and hence its overall relevance could be maximised by adopting a more tailored distinguishing between different countries rather than a 'one-size-fits-all' approach.

Also important in assessing relevance is the difference between supporting innovation financing for disruptive (start-ups) and incremental innovation. The latter is much more common in most businesses, and such companies in many cases tend to prefer debt products over equity. This means that the SMEG is highly relevant to identified needs. The research suggests that there could be a correlation between countries where SMEs invest a lot in product and process innovation and demand for InnovFin instruments (and the SMEG in particular). Italy and Sweden sand out in terms of demand, whereas demand in Poland is lower.

Another factor influencing InnovFin relevance is the state of development of the financial markets in different countries and the macroeconomic environment overall. In Poland, for instance, the NPB has general purpose schemes in place but does not support innovation specifically. In banking systems with a lack of capital, guarantee instrument can be particularly effective and can thus be considered very relevant to the needs of companies. It is important to note in this context that demand and needs are determined by exogenous factors such as the macroeconomic climate. In an economic downturn, innovative firms generally find it harder to access finance as lenders usually reduce the financing new ventures. This is precisely when publicly funded schemes are most relevant.

However, given that the InnovFin programmes is set up in line with the EU-funding cycle over a period of seven years (2014-20), it will most likely have to operate over an entire economic cycle, including and economic downturn and an upturn when the private sector increases investment, also in innovation-driven firms. This is mirrored within companies that move from early stages of business development to growth and expansion stages. It is in the earlier stages where demand for programmes such as InnovFin should be highest given the lack of interested among private investors in this asset class which is considered riskier. Whether the differences in take-up described in Section 3 reflect varying extents of market deficiencies is not straightforward to answer. High take-up may indicate a market deficiency but may equally indicate high demand in a market already providing some access to R&I finance but at less favourable conditions. The objective of the InnovFin programme is to improve R&I financing for innovative firms, suggesting that both those firms who could not obtain financing otherwise and those who could but at less favourable conditions shall be

supported. These issues are further discussed in Section 4.5 looking at different types of additionality of EU support.

Intermediaries consulted for this study to date appear to agree that investors' interest in innovation has generally increased since the previous programming period, and in particular in the last five years. According to several interviews, the InnovFin FIs, especially those targeted at SMEs, remain highly relevant since there is a growing market for innovation financing capable of absorbing additional funds. This may lead to the conclusion that investment in R&I is not yet at the level where additional investment cannot create any further economic benefits, irrespective of whether InnovFin is the most relevant tool to remedy this or not. The fact that the SMEG is in particular high demand may indicate that InnovFin is particularly relevant in reducing the risk of innovation financing for other investors.

The need for innovation finance does vary extensively, however, even between countries which at first glance may be rather similar in structure.

H.3.4. Extent to which InnovFin is meeting demand and addressing market deficiencies in particular countries

The feedback received to date through a survey of financial intermediaries and interviews with financial intermediaries and industry associations suggests that there is strong demand across the InnovFin programme for funding. But this differs substantially between individual instruments and countries. Some National Promotional Banks (NPBs) noted that there is growing interest among both promotional and commercial banks in lending to start-ups and high-growth SMEs, given the growing interest in the commercial potential of gazelles that are able to scale up and internationalise rapidly. The development of major clusters of start-ups, such as Tech City in London, Silicon Valley in Berlin and similar clusters in Paris and across Scandinavia has stimulated interest in lending to innovative firms that was previously rather limited.[12]

Strong demand is indicative that the InnovFin FIs remain relevant to identified needs. A total of 96 operations have been signed across all EIB-managed instruments and that this is close to the number of signed operations under the RSFF in 2007-13. This is encouraging given that the implementation of the InnovFin instruments has only been underway for 2-3 years, and that some InnovFin FIs, such as the mid-caps growth scheme, were launched much later than others. There has been demand for InnovFin Large Projects, where the 49 signatures to date is in line with the EIB's expectations, and in the case of the Midcap instruments where the EIB envisages particularly high demand, although since these schemes were launched later than anticipated, there is currently a shortfall of around 20% in relation to the annualised targets and projected InnovFin expenditure profile (more information on the pipeline of projects can be found in Section 3.1). This could be due to difficulties arising from

[12] *There is some evidence to suggest that where NPBs are well-established and experienced there may be less of a need for EU-funding managed by the EIF/EIB in general. This is the case, for instance, in Germany, whereas Ireland and the UK have more recent NPBs and hence may benefit from EIF/EIB-managed instruments more directly. In newer Member States, intermediaries may be less prepared to invest in what they consider risky assets and hence prefer COSME with its wider focus over InnovFin when choosing EIF support. This shows that InnovFin can play a role in addressing shortcomings in national support measures.*

competition with EFSI which targets similar beneficiaries as InnovFin but uses different eligibility criteria and has a larger budget due to the political priority attached to it.

The EIB's own assessment has identified factors that suggest that InnovFin FIs are highly relevant in addressing market gaps. For instance, commercial banks are not set up to support companies with little or no assets to collateralise and thus offer insufficient or inadequate financing for innovative companies. This deficiency appears to be strongest in case of Midcaps whereas SMEs may resort to equity funding and large companies find it easier to obtain loans from commercial banks. Our research suggests that demand is lower in some new Member States but also s that there may be a stronger focus on early-stage investments in these countries which may not always translate into demand for the EIB-managed instruments since these focus on Midcaps and larger firms. Interview feedback from intermediaries and industry associations suggests that the extent of market gaps varies considerably between countries, both in terms of private sector supply of finance, and in terms of existence or lack of programmes similar to InnovFin provided by NPBs. This suggests that the relevance of InnovFin differs by country, and hence its overall relevance could be maximised by adopting a more tailored distinguishing between different countries rather than a 'one-size-fits-all' approach.

Also important in assessing relevance is the difference between supporting innovation financing for disruptive (start-ups) and incremental innovation. The latter is much more common and such companies tend to prefer debt products over equity. This means that the SMEG is highly relevant to identified needs. The research suggests that there could be a correlation between countries where SMEs invest a lot in product and process innovation and demand for InnovFin instruments (and the SMEG in particular). Italy and Sweden sand out in terms of demand, whereas demand in Poland is lower.

Another factor influencing InnovFin relevance is the state of development of the financial markets in different countries and the macroeconomic environment overall. In Poland, for instance, the NPB has general purpose schemes in place but does not support innovation specifically. In banking systems with a lack of capital guarantee instrument can be particularly effective and can thus be considered very relevant to the needs of companies. It is important to note in this context that demand and needs are determined by exogenous factors such as the macroeconomic climate. In an economic downturn, innovative firms generally find it harder to access finance as lenders usually reduce the financing new ventures. This is precisely when publicly funded schemes are most relevant. However, given that the InnovFin programmes is set up in line with the EU-funding cycle over a period of seven years (2014-20), it will inevitably have to operate over an entire economic cycle, including and economic downturn and an upturn when the private sector increases investment, also in innovation-driven firms. This is mirrored within companies that move from early stages of business development to growth and expansion stages. It is in the earlier stages where demand for programmes such as InnovFin should be highest given the lack of interested among private investors in this asset class which is considered riskier. Whether the differences in take-up described in Section 3 reflect varying extents of market deficiencies is not straightforward to answer. High take up may indicate a market deficiency but may equally indicate high demand in a market already providing some access to R&I finance. These issues are further discussed in Section 4.6 looking at different types of additionality of EU support.

Survey responses from financial intermediaries shows some trends with regard to their perception of the instrument's relevance – the findings mainly apply to the SMEG as, and to a more limited extent to SME VC and Midcap Guarantee. Only nine out of 31 financial intermediaries responding to the survey to date state that R&I-driven companies and projects in their region (at all stages of development) currently have sufficient access to debt and equity finance. Distinguishing between different stages of development, a particular need seems to be seen in access to finance for start-ups, and to some extent companies on growth stage, but less so for companies in expansion /scale-up stage. Finally, when distinguishing between different types of R&I investment, 18 (out of 22) respondents do not see either a 'perfect' market failure nor fully sufficient access to finance, with no clear trend when looking at R&I leading to new products or services and commercialisation, development and commercialisation of new innovations and technologies, or infrastructures.

Financial intermediaries were also asked how the InnovFin instruments meet their clients' (the final beneficiaries) financing needs. The relevance is viewed as high by 10 out of 18 respondents, with a further six viewing the instruments as even more relevant. The perception that the InnovFin instruments are highly relevant is contrasted by more nuanced interview feedback from financial intermediaries. While an intermediary in France faced higher demand than they had expected, and already had to sign additional agreements with the EIF after having disbursed all funds within 16 months rather than the anticipated three years, the opposite was the case in Germany where demand under RSI had been higher than now under InnovFin both at the level of commercial banks as intermediaries and at beneficiary level. The German intermediary stated more favourable conditions under the RSI and more restrictive eligibility criteria under InnovFin as possible reasons for lower demand.[13] A Spanish intermediary also stated that demand had been lower than expected and attributed this to increased competition from commercial banks that have developed an interest in innovation financing.[14]

With regard to the InnovFin financial instruments' design, 12 out of 18 survey financial intermediary respondents rate this highly (i.e. with a four on a scale from one – poorly designed – to five – very well designed, and another three give it a score of five. Only one respondent gave the instrument they were involved in (SMEG) a score of two, and another two gave the instruments they were involved in a score of three). Two respondents stated that lower guarantee fees would be helpful in the context of low interest rates, and three respondents suggested more flexible eligibility criteria with one respondent mentioning the maximum number of employees per beneficiary as a constraint preventing many companies from using the programme.

Overall, the assessment based on the research conducted so far suggests that the degree of InnovFin relevance is high. As the monitoring data analysis shows, the level of take-up

[13] *InnovFin funding is also considered to be more conditional in that, for instance, when a company applies for funding because it has registered a patent for an innovation, then it has to use the finance it receives under InnovFin to market that patent whereas previously under RSI it could have used the money for any purpose it preferred (once it had been established that the company was innovative). However, overall the demand for innovation financing is high in Germany meaning that the instruments may still be relevant but perhaps ineffective in reaching their target group.*

[14] *This, however, would suggest that there is less of a need for InnovFin than in the past. The loans offered by commercial banks outside InnovFin are generally more flexible and come with fewer requirements. At the same time, particularly small firms can still not be supported by the Spanish intermediary interviewed even with a guarantee from the EIF since they are too risky, meaning that an unserved market remains.*

differs by InnovFin financial instrument and this is an indication of relevance although there is a difference between actual and latent demand. In terms of number of transactions and final beneficiaries, the SMEG has by far the highest uptake, followed by the Midcap Guarantees. In terms of volume of investments disbursed, SMEG along with Large Projects lead the ranking.

Nevertheless, **efforts are currently underway to refocus some of the InnovFin instruments**.

Since the set-up of EFSI in 2015, it has proved challenging to reach InnovFin's objectives, as a significant part of the products deployed overlap with EFSI in terms of both risk spectrum and eligibility. Indeed, the introduction of EFSI has arguably slowed down the deployment of InnovFin. In 2016, the Bank signed only EUR l.5 bn of InnovFin transactions, reaching just 56% of the annual objective, while EIB signed EUR 2.4 bn of EFSI financing under the RDI EFSI objective. This modest 2015 InnovFin activity confirmed a declining trend since the launch of the initiative: EUR 2.5 bn signed in 2014, followed by EUR 2.0 bn in 2015, the year EFSI was launched. In cumulative terms, as at 31 December 2016, the EIB had deployed EUR 5.9 bn of financing under the InnovFin programme across 96 operations spread between the EU and EIB windows. The budgetary contribution from the EU to date to support the existing portfolio amounts to about EUR 0.8 bn. In total, over the first three years to December 2016, only 73% of the target of EUR 8.1 bn for the period was achieved, representing a cumulative shortfall of EUR 2.2 bn. InnovFin was expected to make up for this shortfall in the period 2018-2020 in the period following the deployment of EFSI as originally conceived; but in the context of discussions on the extension of EFSI to 2020 ("EFSI 2.0'), this assumption is no longer valid.

Given the above, the EIB and DG RTD have concluded that the current approach is no longer sustainable and that changes are necessary to re-focus InnovFin's deployment in the post-EFSI context. **The aim is to improve cooperation with EFSI through better complementarity and to combine InnovFin and EFSI financing where needed, building on the success achieved under EFSI's SME ·window (implemented with the EIF) for both equity and debt joint InnovFin/EFSI products.**

Work is underway to transform InnovFin into two portfolios — one for debt, one for quasi-equity — covering a wider range of tisk profiles and underpinning a suite of products that more closely target, in marketing terms, a variety of constituencies. This approach will, in turn, make it possible to build on the experience of the current thematic pilots - 'InnovFin Energy Demo Projects', 'InnovFin Infectious Diseases' - and open up possibilities for crafting risk- finance products for other sectors.

Currently, the EIB InnovFin product portfolio is composed of two high-risk thematic products (see above) and three non-thematic products, which represent the main overlap with EFSI: InnovFin Large Projects has a very similar eligibility to the debt financing under EFSI Infrastructure and Innovation Window (IIW); InnovFin MidCap Guarantee has an equivalent product offering as EFSI's Risk Sharing; and equity-type operations under InnovFin Midcap Growth Finance have already been fully transferred under EFSI with the European Growth Finance Facility.

Two new facilities are envisaged with minimal overlap with EFSI: InnovFin Research Institutes, Universities, Research Organisations Facility (RIURO), and InnovFin Moderate &

Modest Innovator Countries and Associated Countries Facility (MMI). RIURO will strengthen the InnovFin focus on research organisations, including public entities. MMI will target regions which are currently underserved by InnovFin operations, in particular in Associated Countries, but also in EU countries indicated as less innovative in the 2016 Innovation Scoreboard.

The possibility of combining InnovFin and EFSI finance is also being explored, with InnovFin used as a junior tranche to credit-enhance EFSI equity-type deployments. This would potentially unlock new financing options in the fields of risk-sharing for corporate R&I and corporate venture.

Besides this refocusing, the equity side of operations, implemented by EIF, has been remodelled to improve its relevance to a wider range of constituencies:

- **InnovFin Technology Transfer (InnovFin TT)** supports technology transfer projects or technology rights, through commercial demonstration and commercialisation, by targeting investments into technology transfer funds operating in the pre-seed (including proof of concept) and seed stages. Its objective is to accelerate technological innovations, especially in the areas of key enabling technologies (including, but not limited to ICT, nanotechnology, bio-tech, clean tech, and med tech) and other Horizon 2020 objectives, via supporting IP promotion and exploitation (licensing, sale of patents) and spin-outs, spin-offs or joint venture activities.[15]
- **InnovFin Equity Crowdfunding pilot** will explore the potential for investments to catalyse successful fundraising campaigns by seed-stage and other early-stage entities hosted by equity crowdfunding platforms. Market evidence[16] suggests this mechanism can mitigate firm and project-related risks, bridge the gap to more traditional suppliers of equity, and increase access to finance for innovative firms. The pilot will also demonstrate the ability of the EU to support alternative finance for SMEs and help speed up the development of this market segment. It is complemented by a capacity-building action in the 2016-2017 work-programme[17] and a pilot on crowdlending.
- **InnovFin Business Angels (InnovFin BA)** targets funds pooled by business angels or business angel co-investment funds investing into innovative early-stage enterprises and social enterprises established or active in Member States and Associated Countries operating in the sectors covered by Horizon 2020, including social impact. InnovFin BA is open for experienced business angels wishing to team up and set up their first BA funds, also in countries with less developed ecosystems for early stage investments.[18]
- **InnovFin Venture Capital (InnovFin VC)** targets investments into venture capital funds that provide funding to enterprises (including social enterprises) in their early

[15] Read more on InnovFin Technology Transfer at http://www.eif.org/news_centre/publications/innovfin_technology_transfer.pdf
[16] Assessing the potential for crowdfunding and other forms of alternative finance to support research and innovation, EY, Open Evidence, Politecnico di Milano, ECN for European Commission, January 2017.
[17] See call ALTFI-01-2017 in the Horizon 2020 Work Programme 2016-2017 part on 'Access to Risk Finance': *Improving access by innovative SMEs to alternative forms of finance*.
[18] Read more on InnovFin Business Angels at http://www.eif.org/news_centre/publications/innovfin-equity-leaflets/innovfin_business_angels.pdf

stage operating in Horizon 2020 sectors. Under InnovFin VC EIF seeks to invest in first closing of the funds. It can also invest in other closings, especially if its intervention is catalytic to further fundraising. 'First-time' or 'emerging' investment teams seeking for the first time institutional fundraising are also eligible. Via selected venture capital funds investing predominantly in seed and series A rounds, EIF provides risk-capital financing to enterprises in their seed, start-up and other early-stage. In the case of multistage funds (i.e., covering both early- and growth-stage investments), funding is provided pro rata from this facility and COSME's growth-stage equity facility, EFG[19].

- **InnovFin Fund-of-Funds (InnovFin FoF)** targets investments into funds-of-funds holding or aiming to build a portfolio of investments into underlying funds with significant early-stage focus. It also provides significant funding to the separately managed **Pan-European VC Funds-of-Funds Programme[20].** InnovFin FoF seeks to invest in fund-of-funds with a geographical coverage of more than three Member States countries and focus on early stage or follow balanced strategies with at least a 30% early-stage target allocation.[21] The Pan-European VC Funds-of-Funds Programme seeks to invest in funds-of-funds with a pan-European investment strategy.

H.4. COHERENCE

This section considers the extent to which the seven InnovFin financial instruments that were evaluated demonstrate coherence.

H.4.1. Overview

There are two aspects to coherence: **internal coherence**, i.e. how far the InnovFin programming architecture is internally consistent and, secondly, **external coherence**, namely how far the InnovFin programme is coherent with other EU financial instruments programmes being implemented under the 2014-20 Multiannual Financial Framework (particularly COSME and the Connecting Europe Facility (CEF) as well as national and regional support schemes available in certain countries, often through public promotional banks).

The coherence of bringing in additional funding through the SME Window within the European Fund for Strategic Investment (EFSI) is also considered, but this is not formally classified as an EU funding programme, but rather supplementary funding for existing programming instruments.

[19] Read more on InnovFin Venture Capital at http://www.eif.org/news_centre/publications/eif_innovfin_venture_capital_en.pdf

[20] Pan-European VC Funds-of-Funds Programme: ***http://www.eif.org/what_we_do/equity/paneuropean_venture_capital_fund_of_funds/index.htm***

[21] Read more on InnovFin Fund-of-Funds at http://www.eif.org/news_centre/publications/innovfin-equity-leaflets/innovfin_funds_of_funds.pdf

H.4.2. To what extent do the instruments relate to, and support each other?

Four of the seven InnovFin financial instruments are closely related to one another and provide a funding continuum irrespective of firm size. The review of the InnovFin programming architecture to assess internal coherence has found that the programme was well-designed overall since it is part of an integrated, portfolio of FIs. These are the **two guarantee schemes** (InnovFin SME Guarantee and InnovFin MidCap Guarantee), and the two **loan schemes** (InnovFin MidCap Growth Finance and InnovFin Large Projects)**,** which involve direct loans from the EIB.

Compared with the predecessor EIP programme in the 2007-13 period, there is arguably greater coherence between the design of the programming architecture and evolving EU policy in respect of access to finance. At least for the debt instruments, firms are supported along the "funding escalator" i.e. from SMEs through to mid-caps and large firms. The new 'funding escalator' concept is consistent with the Communication for an Action Plan for the Capital Markets Union (2015)[22], and describes a situation in which EU FI programmes (ideally mirrored in the financial system more widely) are designed to meet the financing needs of all businesses from the smallest micro-firm to the largest listed companies at different stages in their development. There is however a need for some degree of prioritisation within InnovFin by funding stage and size of firm. This is somewhat reflected in the expenditure profile for the programme since greater funding has been made available to the SMEG (EUR 6,874m) and a further EUR 460m for InnovFin Equity for SMEs, whereas EUR 6,750m has been made available across the Mid-Cap Growth scheme, Mid-Cap Guarantee and Large Projects combined. This division suggests that SMEs remain a priority focus. As noted earlier when assessing the extent of market failure across different market segments, the lack of access to innovation financing by SMEs on reasonable terms is one of the major areas of identified market failure. It could therefore be argued that the evidence base in terms of market failures suggest that SMEs need an even greater proportion of the total (especially given low levels of take-up of the mid-cap scheme, although there are other factors that have influenced take-up here (see Section 3.5 – Mid-Cap Guarantee Instrument).

In the previous period, under the EIP within the CIP, only SMEs (which includes smaller midcaps), were targeted, whereas in 2014-2020 through InnovFin, all midcaps, as well as prospective beneficiaries seeking loans for large R&I projects, can access innovation financing. Moreover, whereas in 2007-13, corporates and universities wishing to access large loans to invest in the Knowledge Economy had to apply directly to the EIB for loan finance for support under an own-financed funding scheme to promote R&I and other types of investments[23], this is now EU-financed and has been brought under the framework of the EU RTD Framework Programmes. This approach has arguably strengthened coherence since the investments concerned relate to major investments in R&I, both in particular priority sectors (e.g. investment in the automotive sector to develop clean emissions technologies and electric vehicles) and for universities / research institutions to invest in modernising research infrastructures where Structural Funds are not available).

---

[22] *The concept of Europe's 'funding escalator' was mentioned in the Action Plan on Building a Capital Markets Union, COM(2015)468 final.*

[23] *EIB large loans to support the Knowledge Economy 2007-2013 - http://www.eib.org/infocentre/publications/all/ev-report-knowledge-economy.htm*

Some feedback was received in terms of perceptions of internal coherence among external stakeholders between programming periods. Some financial intermediaries that had participated in the predecessor programme saw the instruments as being strongly complementary, especially the SMEG. However, it was observed in some interviews and at the Berlin focus group discussion that for financial intermediaries, the regular renaming between programming periods of financial instrument programmes and of the specific instruments available within was confusing. For example, at the programme level, the EIP within the CIP in 2007-2013 became two different programmes, InnovFin and COSME in 2014-2020, with new names for some of the instruments themselves, with the exception of the SMEG).

This means that there is a need for promotional banks to explain such name changes and different instruments available to intermediaries regularly. A stakeholder commented that it would be more coherent and effective not to change the programme and instrument names in each MFF since otherwise the schemes come across as being overly-fragmented and complicated to understand from an external perspective. This may also explain why some financial intermediaries, especially commercial banks but even promotional banks, prefer to apply indirectly through EIF signposting to the most appropriate EU instrument rather than apply directly, since brand awareness of InnovFin is not universal.

The four debt-based guarantee and loans instruments appear to be internally consistent and coherent, since investment size / instrument have all been defined in a distinctive way to avoid overlaps. Through the SMEG and Midcap Guarantee schemes respectively, there is a funding continuum between EUR 25,000 and EUR 50m which covers a large range of guarantee needs to firms of all sizes. Although micro-credits of less than EUR 25,000 are not available through InnovFin, start-ups and micro-enterprises can take out a guarantee through COSME of less than EUR 25,000 which means that between InnovFin and COSME, all stages of the SME financing lifecycle are addressed.

Table 94 - InnovFin debt-based Financial Instruments (guarantees/counter-guarantees, direct loans)

InnovFin Financial instrument schemes	Type of FI	Investment size per beneficiary	Investment duration
SME Guarantee	Guarantee	EUR 25,000-EUR 7.5m	1-10 years
MidCap Guarantee	Guarantee	EUR 7.5-EUR 50m (firms with 500-3000 employees)	Maturity from 2-10 years, with a fixed repayment schedule
MidCap Growth Finance'	Loans	EUR 7.5m-EUR 25m	Up to 10 years
Large Projects	Loans	EUR 25m-EUR 300m	Up to 10 years

Source: CSES/ Oxford research - Interim Evaluation of Horizon 2020's Financial Instruments, contribution to the evaluation of Horizon 2020, forthcoming.

There is also a link between the coherence of the programming architecture overall and the efficiency and effectiveness evaluation criteria. For instance, the development of a new MidCap Guarantee scheme alongside the SME Guarantee Scheme (which built on the SMEG under the EIP in 2007-2013) should in theory reinforce interest in, and stimulate the future take-up of the MidCap Guarantee scheme by providing a future project portfolio of potential

applicants that have already participated through a financial intermediary in the SMEG. However, as noted under the section on effectiveness, and also in Section 3.5 in relation to the Mid-Cap Guarantee scheme, although there has been some cross-promotion of the schemes and encouragement of financial intermediaries to make an application to more than one instrument, since the EIF is often the main driver influencing which schemes financial intermediaries apply for, there appears to be a lack of awareness about participants in a given scheme about all the other schemes that they could potentially apply for.

A further issue in relation to internal coherence is whether there is sufficient communication across the instruments within the InnovFin portfolio to ensure more effective cross-promotion or whether opportunities are being missed in this regard. The interview feedback suggests low levels of awareness among final intermediaries (and also final beneficiaries) as to which other instruments are potentially available. One possibility worth raising is that every firm that has received funding ought to receive information about other instruments in order to strengthen awareness and to promote the idea of an integrated suite of financial instruments. However, the EIF commented during one of the focus groups on the practical difficulties involved, in terms of the risk of creating expectations that intermediaries and final beneficiary firms will gain access to other instruments successfully, which cannot be determined in advance.

Turning to equity, the design of the InnovFin Equity scheme is also broadly coherent. The focus is on supporting early-stage and growth enterprises (i.e. equity financing to SMEs and Small Midcaps with less than 500 employees). This is consistent with the evidence base in available literature (see first interim report) which showed that there is stronger evidence of market failures in the early-stage financing sphere, as well as a need to facilitate the rapid scale-up and internationalisation of start-ups, gazelles (high-growth SMEs in the scaling up phase) and Unicorns[24]. For later-stage expansions and especially management buy-outs, there are a wider range of private sector funding opportunities. Moreover, through the new InnovFin Fund-of-Funds Programme, multi-stage VC funds may be supported since the fund-of-funds operating model will not be restricted to investing in early-stage finance, so long as this is part of a balanced investment portfolio overall, in order to diversity risk and to be able to support higher risk tolerance at the early-stages whilst still in principle maintaining strong profitability.

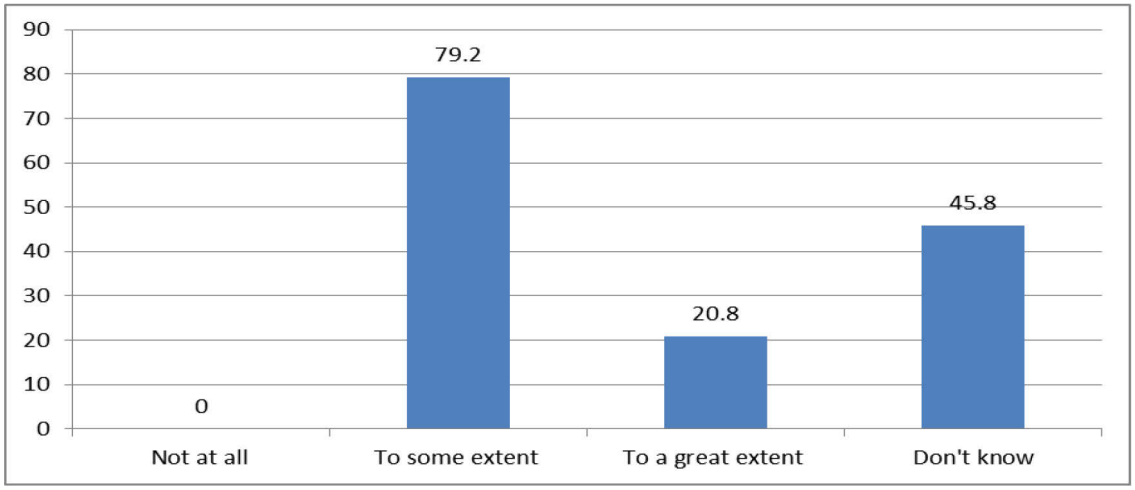
The other two thematic InnovFin schemes - focusing on first-of-a-kind energy demonstration projects and infectious diseases respectively – are different from the core InnovFin instruments, and there are no direct predecessors to compare them with. These have been designed as somewhat standalone in nature, reflecting the fact that they have pilot characteristics. From a coherence perspective, there is a need to investigate through the interview programme whether supporting projects in the energy and infectious diseases, but not in other thematic areas, is seen as coherent in terms of the overall programming architecture and branding by financial intermediaries participating in the other InnovFin FIs, as well as by prospective or actual applicants to the thematic FI. There is no feedback yet on this issue.

Feedback from the survey of financial intermediaries suggest a clear majority consider that the InnovFin portfolio of instruments demonstrate internal coherence, at least 'to some

[24] *Unicrons are fast-growth start-ups and scale-ups that have rapidly achieved an estimated market value of a minimum of US one billion.*

extent'. However, respondents in the interview programme typically only knew one or two of the instruments that they are directly dealing with. The large number of "don't know" to the question in the online survey on this issue is therefore perhaps not surprising.".

Figure 144 - To what extent do the 7 financial instruments complement each other and meet the needs of businesses at different stages of the R&I funding cycle?



Source: CSES survey (n=35).

H.4.3. In terms of the funding escalator, valleys of death and company/project lifecycles, are there gaps? If so, how could these be filled via other financial instruments or by other means?

With regard to coverage of the InnovFin FIs by funding stage, the InnovFin instruments address most but not all stages of the enterprise development lifecycle. Two of the FIs are focused on SMEs, a further two on mid-caps and one instrument is focused on large projects. The latter accepts applications from large firms but also other types of institutions, such as universities wishing to take out loans from the EIB to invest in strengthening R&I infrastructures. The energy demo and infectious diseases instruments are thematic. Overall, this appears to be an appropriate balance, although further research is needed to assess the coherence within the portfolio of the thematic FIs.

Start-ups are not explicitly targeted through InnovFin. Generally, however, there is enough effort on start-ups at the national and regional levels. For instance, some Member States such as France have significant-scale national funding schemes, such as BPIfrance's start-up scheme, BPI Prêt d'amorçage[25], although micro-loans made are not backed by a guarantee.

From a programming architecture perspective between InnovFin and COSME, it could also be argued that start-ups and very early stage SMEs can already be funded through the COSME Loan Guarantee Fund (LGF) given the focus on market failures and the decision to focus on loans below the EUR 150,000 threshold.

[25] http://www.bpifrance.fr/Toutes-nos-solutions/Prets/Prets-sans-garantie/Pret-d-amorcage

Moreover, there has also been scope to finance start-ups through the ESIFs in the 2007-2013 period (for instance through Jeremie co-investment funds). Similarly, in the 2014-2020 period, in 2016, the Commission launched a new instrument, a co-investment facility to provide funding to start-ups and SMEs to enable them to develop their business models and attract additional funding through a collective investment scheme managed by a financial intermediary. Total investment combining public and private resources can amount to up to EUR 15 million per SME.

Overall, lack of provision of innovation financing for start-ups does not therefore appear to be a gap within InnovFin.

H.4.4. To what extent are the InnovFin Financial Instruments complementary with other FIs such as COSME, the European Structural and Investment Funds and the CEF[26]? Are there any other relevant funding schemes such as EFSI? How could complementarities be improved?

There are clear differences between InnovFin and other EU funding instruments (especially the CEF), although there are some areas of possible overlap. This includes a possible overlap between the InnovFin and COSME programmes in respect of SME finance, but the extent to which this is considered a problem varies among financial intermediaries.

The InnovFin and COSME programmes were created as a result of a political decision to go ahead with two separate programmes within two different Commission DGs. This has meant that at the outset of the programme planning process, there were challenges for policy makers in ensuring that the design of the COSME and InnovFin FIs respectively was sufficiently differentiated and well-delineated. However, in practice, once the political decision was made to go ahead and implement two different programmes, there was a subsequent need to differentiate the FIs supported through InnovFin and COSME respectively as part of the process for developing the detailed programming architecture. This has meant that that the two programmes, which risked being duplicative, have each developed their own intervention logic, programming and policy rationale, which underpins their differentiation at the implementation stage.

In particular, coherence between InnovFin and COSME FIs has been achieved by:

- Setting different policy objectives: COSME focuses on supporting start-ups and SMEs, promoting entrepreneurship and addressing clear market failures while InnovFin - promotes access to finance for innovators, improving the terms and conditions for access to innovation finance respectively
- Defining different targeting strategies, although there is some overlap of targeting in the SME segment.
- Drawing up different eligibility criteria – e.g. in the case of COSME, criteria relating to market failure and being an SME, in the case of InnovFin, developing a list of 10 innovation-related criteria.

[26] https://ec.europa.eu/inea/en/connecting-europe-facility

- Using different state aid rules – de minimis (COSME) vs. Art. 21 of the GBER (InnovFin).

The fact that the two programmes have evolved in different ways to avoid duplication has led to a reasonably clear delineation emerging, even if there is some blurring of targeting strategies for the SME instruments (i.e. both the LGF and SMEG provide guarantees to SMEs). Whilst InnovFin puts a stronger emphasis on SMEs having to be innovative, the definition of innovative is quite broad and arguably investing in SMEs irrespective of their degree of innovativeness involves a higher risk given the two valleys of death than for other types of lending and equity investment. SME final beneficiaries may be eligible to participate in either programme through a financial intermediary, which has caused some confusion for financial intermediaries as to which FI to apply for until the schemes and their differences became better known.

However, some overlapping may not necessarily a negative in practice since in some Member States, financial intermediaries have only applied to COSME (or only applied to InnovFin). Therefore, SMEs may not be able to participate in both financing schemes through an intermediary in all 28 EU Member States. Moreover, the geographic coverage of InnovFin (EU-28 plus 14 associated countries) is wider than for COSME which mainly focuses on the EU although there are a very limited number of COSME- associated countries.

Financial intermediaries interviewed commented that whilst they had not found the FIs themselves very difficult to apply for, the fact that there were two instruments that could potentially be used to obtain an EIF counter-guarantee so as to be able to provide guarantees to sub-intermediaries required them to spend additional time discussing internally as to the optimal FI to apply for. This raises questions relating to efficiency. An argument could therefore be made that under a counterfactual situation in which the current programming architecture for the two separate programmes was instead integrated into a single umbrella programme, then issues around gaps in geographic coverage, depending which FI financial intermediaries in a particular country had decided to apply for, would not have been a problem. There are again links here between coherence and efficiency in terms of comparing actual programme implementation with a counterfactual alternative programming structure (see efficiency).

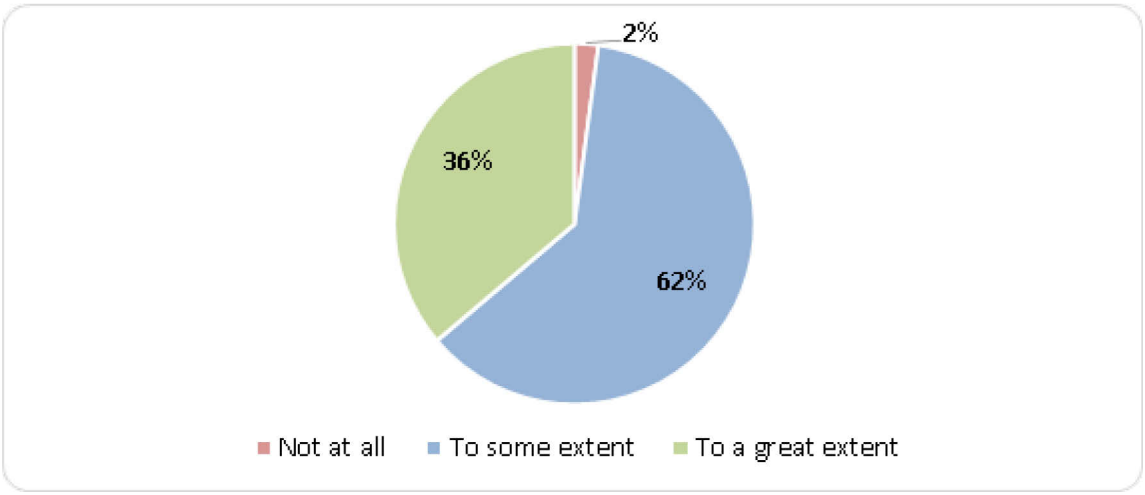
A clear differentiation between COSME and InnovFin is that within the latter, there is an explicit policy objective of improving the terms and conditions of finance for innovative start-ups and increasing volume effects, whereas within Cosme the focus is mainly on addressing market failures. Under the COSME LGF, the policy objective is to "support SMEs which would not otherwise obtain financing" through a focus on market failures and "higher risk SMEs".

The rationale for this focus within InnovFin is that this reflects the fact that innovative, higher-risk firms may face punitive terms and conditions to access finance during the early growth and expansion phases. It can furthermore be noted that in terms of those administering the financing at a programme level, and among financial intermediaries, the skills sets will also need to be differentiated since innovation-related financing needs much greater knowledge of technologies, markets, and trends.

There were no coherence-related issues in respect of the programming architecture for Midcaps and large firms, since these have been addressed through InnovFin, and are not targeted through COSME.

Feedback was obtained through the online survey with regard to coherence with other EU programmes. The survey findings from financial intermediaries in terms of external coherence are summarised in the following chart:

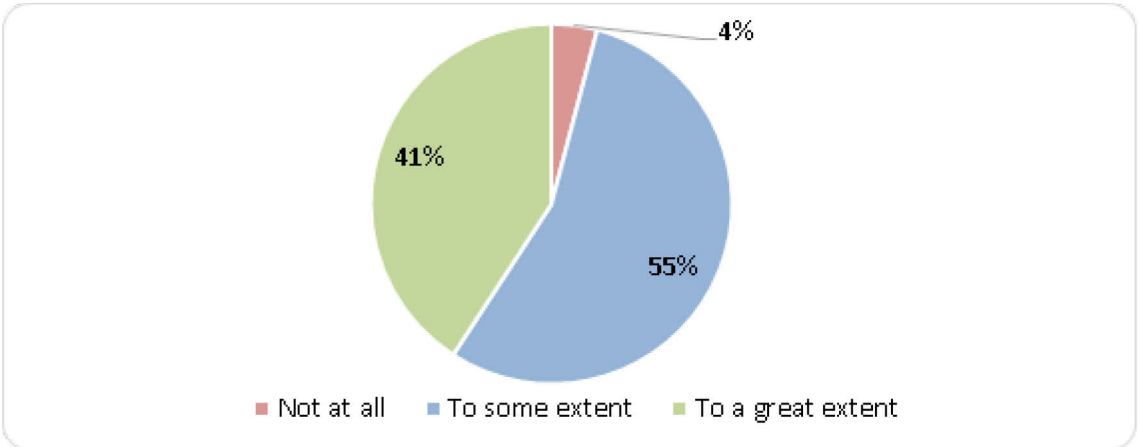
Figure 145 - To what extent is the instrument coherent with EFSI, COSME, and other EIB/EIF/EU financial instruments such as the Cohesion Policy Funds?



Source: CSES/ Oxford research - Interim Evaluation of Horizon 2020's Financial Instruments, contribution to the evaluation of Horizon 2020, forthcoming.

A clear majority of respondents stated at least to some extent, and 17 financial intermediaries stated that this was to a strong extent. A further important question relates to how well the different financial instruments within InnovFin complement national instruments relating to investment in businesses involved in R&I. The responses suggest that only 4% believe they are not complementary at all, whilst 55% stated to some extent and 41% to a great extent.

Figure 146 - How well do the financial instruments complement national sources of funding for businesses involved in research and innovation?



Source: CSES/ Oxford research - Interim Evaluation of Horizon 2020's Financial Instruments, contribution to the evaluation of Horizon 2020, forthcoming.

The finding that most financial intermediaries believe that national instruments are complementary with InnovFin either to some extent or to a great extent was confirmed through the interview programme. For instance, at the focus group held in France, the strong

complementarity between InnovFin and national French FIs schemes was noted. A promotional bank that participated in the focus group stated that "France is unusual because there is significant public funding for R&I. InnovFin was positioned as representing the third phase in the implementation of national innovation financing schemes for innovative businesses". It was seen as strongly complementing earlier, national schemes.

However, there may be a danger of dominating the market through the introduction of new EU funded innovation financing products when existing national products already exist. A comment was received at the focus group in Vienna that *"An ex ante assessment should always be carried out to look at where market gaps are. However, EIF-backed national guarantee schemes may risk cannibalising the market and making existing products uncompetitive even when such an assessment is done. This happened for example in case of the RSI in HU: Unicredit decided to take on the cost of the guarantee. It was impossible for them to compete with the offering of the national guarantee bank".*

Coherence of EU financial instruments schemes with other EU policies and legislation

A further aspect of external coherence is whether wider EU policies and legislation**,** which determine the framework conditions for start-ups and SMEs are consistent with EU policies and programmes (including InnovFin) on access to innovation and SME finance more broadly. This includes, for instance:

- EU legislation pertaining to financial reporting and regulatory simplification;
- EU legislation relating to capital adequacy;
- EU legislation and support structures relating to IPR (e.g. setting up of the European Patent Office, IPR helpdesk).

There has been a tendency towards the simplification of financial reporting requirements for small firms promoted by the European Commission, for instance, through reforms introduced through Directive 2012/6/EU on accounting requirements for micro-entities[27]). However, simplifying reporting requirements means that those firms have less quantitative data available to back up loan applications making it harder for them to obtain financing from conventional sources. This was an issue addressed in a study by CSES for DG GROW on SME credit ratings (*Evaluation of Market Practices and Policies on SME Rating)*.

A further issue relating to coherence is the inherent tension between the imperative of encouraging banks to finance start-ups and SMEs, and to try and persuade small firms to invest and innovate and the need to ensure capital adequacy within banks through the Basel III rules to avoid a repeat of systemic risks to the banking system during the global economic and financial crisis, and. This often amounts to a direct conflict of interest in which Basel-related considerations usually win. This helps to explain the rationale for the creation of the British Business Bank in the UK, for example.

Whilst these are important considerations, they are not unique to the InnovFin FIs but are part of the wider policy backdrop in terms of the difficulty of ensuring consistency between EU programmes that provide FIs to strengthen access to (innovation) finance, and the need to

[27] *Directive 2012/6/EU of the European Parliament and of the Council of 14 March 2012 amending Council Directive 78/660/EEC on the annual accounts of certain types of companies as regards micro-entities*

align EU policies and legislation pertaining to the framework conditions accordingly so that the policy framework is fully consistent.

H.4.5. Overall conclusions on coherence

From a programme design perspective, InnovFin's inclusion of a combination of debt financing and equity-based FIs is coherent and ensures continuity with the earlier 2007-2013 period. This is because the EIP included both debt financing (SMEG) and equity (GIF1 and GIF2). From a demand perspective, both debt (especially guarantees) and equity FIs are needed by financial intermediaries.

From an internal coherence perspective, the InnovFin programming architecture is generally consistent with the broader EU policy aim of ensuring that firms can access either debt (guarantees or loan products) or equity through financial intermediaries, irrespective of their stage in the development lifecycle. The debt (guarantee and direct loan) instruments within InnovFin provide a continuum in access to innovative finance for firms along the funding escalator. Bringing in the EIB loan scheme for large R&I projects within the EU RTD FPs has helped in this regard. Access to innovation financing for start-ups was the main gap identified, but such funding is available through COSME and national start-up financing schemes (at least in some EU-28 MS).

With regard to external coherence with other EU programmes, InnovFin was found to be broadly coherent, although there are some areas of overlap with COSME in respect of the SME-targeted FIs. Our initial counterfactual assessment suggests that whilst the programming architecture between COSME and InnovFin has ended up being coherent, a viable alternative would have been not separating access to finance for SMEs from innovation financing and instead combining these within a single umbrella programme, which would have been easier to explain to financial intermediaries.

There are nevertheless some areas of clear demarcation between the two programmes. Whereas COSME is primarily concerned with enhancing the volume of financing available to SMEs in areas of clearly identified market failures, InnovFin is seeking to improve the terms and conditions to access innovation finance, which has helped to differentiate the two programmes. No evidence of overlap with the CEF was identified. The availability of supplementary financing through EFSI has not caused any problems relating to coherence, because the funding will be used to top up the InnovFin SMEG rather than to create new rival, alternative FIs.

In terms of the extent of **coherence between InnovFin and national loan guarantee and VC programmes**, there was found to be strong coherence in terms of the types of instruments available, especially in respect of innovation financing for SMEs (the dual focus on SME Guarantees and on SME equity). The fact that similar support was already available in some Member States was not seen as duplicative, since there was evidence of sufficient demand, especially under the SMEG, for InnovFin to be seen as complementary in allowing national promotional banks to engage in a greater volume of guarantee-backed lending activity.

A small number of national guarantee institutions were concerned that EIF-backed guarantee products risk crowding-out equivalent national schemes. Similarly, a number of banks were concerned that the availability of EIF-backed guarantees through InnovFin to the national guarantee institutions could crowd out any commercial involvement in the provision of loan

guarantees. However, this was not a perception that was widely shared, since most stakeholders viewed InnovFin as being complementary with national FIs. Overall, there was viewed as being good coherence.

H.5. EFFECTIVENESS

H.5.1. Overview

This section examines the specific objectives of different InnovFin financial instruments and the extent to which these are being achieved. The particular focus is on assessing progress towards the aim of improving access to finance for R&I-driven companies and high-risk innovation projects. This includes both the effect on intermediaries' willingness to provide finance to R&I-driven SMEs and other firms, and the effect on those companies to increase their R&I activities. The issue as to whether the right balance is being struck through Horizon 2020 FIs between loans, loan guarantees and equity from the point of view of the demand side will also need consideration.

Ultimately, the contribution of the InnovFin programme to creating an ecosystem supporting innovation at all stages of development will be the litmus test of the programme's effectiveness. A practical challenge in this regard is that the design of the InnovFin programme has moved on since the launch of this interim evaluation. On-going discussions at various EC DGs, the EIF and the EIB about further reforms to the InnovFin programme are taken into account as feasible.

Clearly, it is important to determine whether a situation is avoided where banks use guarantees only for loans they would not otherwise be willing to make because they would not be profitable. With the InnovFin Large Projects scheme, the extent to which the aim of promoting first-of-a-kind, commercial-scale industrial demonstration projects is being achieved is a key issue. An important question is whether there is a real market failure here, i.e. why are such projects not able to secure finance from other sources given the creditworthiness of the borrowers and their capabilities/track-record? Another important question is why certain instruments seem to be in much higher demand than others. Is this due to differences in the design and accessibility of the instruments or due to a larger or smaller market failure for certain investment and company sizes, or related to the specific features of the markets in question?

H.5.2. To what extent is InnovFin contributing to the objective of "enhancing access to risk finance for investing in R&I"

The overall aim of the InnovFin programme is to help SMEs, MidCaps, large firms and other organisations such as research and technology organisations, research infrastructures, universities, all engaged in R&I to gain easier access to loans, guarantees, counter-guarantees and equity finance. As part of Horizon 2020, the InnovFin programme is also expected to contribute to EU policy objectives such as the Europe 2020 strategy, the Juncker jobs and growth agenda, the associated Investment Plan for Europe and the EFSI, as well as the Innovation Union policy flagship and the vision of Open Innovation, Open Science and Open to the World.

As the review of monitoring data shows, nearly all EU Member States as well several accession and associated countries have made use of InnovFin instruments. A substantial amount of finance has become available for innovative enterprises and organisations throughout the EU, accession and associated countries – some EUR 8.4billion. Some EUR 2.5 billion of this is for SMEs (including small Midcaps) and the remaining EUR 7.7 billion is for larger enterprises and infrastructures. Much of this will be leveraged so the effective sum is substantially larger.

As noted earlier, there is a wide range in take-up rates. Thus, Italy is by far the largest user of InnovFin funds (over 20% of the total), followed by Spain, France and then Belgium and Germany – with between 11% and 9% each. The UK follows with just over 6% and then Sweden with just under 5%. Clearly country size is not the key driver of the use of InnovFin funds. France, Spain, Italy and Portugal are the most intense users of programmes directed at SMEs, with Italy by far the largest user of programmes directed at larger enterprises, followed by Belgium and then Germany.

Survey responses from **financial intermediaries** (mainly implementing the SMEG, with some being involved in SME VC and MidCap Guarantee) show that out of 52 respondents, 51 either believe that the InnovFin programme is helping to address a gap in the availability of risk capital finance for R&I-driven companies to a *great* extent (40.4% of respondents) or to *some* extent (57.7% respondents). This information should be interpreted with caution, however, given the interest that intermediaries have in presenting their transactions as successful.

Distinguishing between specific objectives the following picture emerges from the intermediary survey:

Table 95 - To what extent have the financial instruments achieved their objectives, or are likely to by the end of the programming period? Please distinguish between the specific objectives (intermediary survey responses; n=51)

In your view, to what extent have the financial instruments achieved their objectives, or are likely to by the end of the programming period? Please distinguish between the specific objectives.			
Answer Options	**To a great extent**	**To some extent**	**Not at all**
Increased private investment in R&I	13	35	3
Provided risk financing for a variety of beneficiaries at different stages at reasonable terms: *not at all*	10	36	4
Increased risk financing (number of entities and volume of funds)	18	33	0
Strengthened EU venture capital in terms of attracting institutions and operating trans-national	8	26	16
Increased the role of Business Angels in R&I funding	6	22	21
Increased investment in Technology Transfer (number and volume of transactions)	9	31	9

Source: CSES/ Oxford research - Interim Evaluation of Horizon 2020's Financial Instruments, contribution to the evaluation of Horizon 2020, forthcoming.

The survey results suggests that the financial intermediaries that responded view the most positive results in terms of effectiveness as related to the objective of 'increased

risk financing' (number of entities and volume of funds) followed by 'increasing private investment in R&I'. The financial intermediaries are in a good position to answer the question as they would know whether they are providing more risk financing than they would otherwise have. The third most positive expression of an outcome was for 'Provided risk financing for a variety of beneficiaries at different stages at reasonable terms: not at all'. Some one fifth of responses (21.3%) fall in the "to a great extent category", three fifths (61%) "to some extent" and 17.6% not at all. The category "to some extent" can potentially be quite broad, but it does indicate a positive effect.

Overall it can be concluded that the SMEG is the instrument that has so far achieved the general objective most of "enhancing access to risk finance for investing in R&I". Other programmes, even if they have involved larger sums, have either been less successful in obtaining take-up (e.g. InnovFin Equity, and Midcap Guarantee) or there are questions about the basic additionality involved (e.g. Large projects and MGF).

External factors have of course influence InnovFin's progress towards achieving its aims. **In addition to factors relating to the macroeconomic environment in Europe mentioned in Section 2, an issue raised in the interviews is the presence of several other programmes that could act as substitutes for the InnovFin instruments.** Some of these are regional, others national and others at EU level (e.g. in the Czech Republic). The existence of these programmes also means that in some instances clients can be confused about which programmes offer the best results for them. The challenges of staff training in financial intermediaries should also not be underestimated. Managers and staff at financial institutions have on the one hand limited time and on the other revenue targets to meet. Investment in training is expensive and it Is not always possible to keep up to date with latest developments over a wide range of products.

The banking and business culture also has an impact on the success of programmes. For example, the approach to banking in Italy, where companies might rotate financing between several short term lenders as opposed to say in Germany or Austria where there could be one "hausbank", has been mentioned as a factor that has made it difficult for Italian companies to meet the formal requirements of EIF/ EIB loan applications. The relationship between banks and their customers (business cultures) differs in the various cultural regions of Europe.

Other structural factors that have an impact on the delivery of InnovFin include the number and density of SMEs in the different countries. This can help explain, for example, why SMEG is more used in Italy and Spain than in Germany, which has a much larger economy. The nature of the banking system – the presence of different types of banks – also can have an effect. For example, countries with more promotional banks, and savings/ co-operative banks (e.g. France, Italy) can be expected to take up more InnovFin products than those with predominantly general universal banks (e.g. the UK).

H.5.3. To what extent is the instrument reaching the target group or groups of beneficiaries envisaged? What could be done to improve targeting? Is sector coverage in line with expectations?

Generally speaking, the target group is enterprises or organisations with difficulties in obtaining access to finance for relatively higher risk innovative projects. As is set out in the

Ex ante Evaluation, these generally tend to be SMEs and also some smaller mid-caps. In addition, there are organisations with strong innovative capacity whose funding is being constrained due to cuts in public funding. With regard to larger enterprises (above 500 employees) the view of the EIB is that while it may be hard to determine the existence of a funding gap for them methodologically, in terms of practical experience the EIB often comes across such gaps.

In the case of the SMEG it seems that on the whole the target groups are being reached. Feedback from intermediaries is that they market the instruments to existing well-defined segments in their portfolio. In countries like France and Moldova, feedback is strongly positive, whereas in others like Germany it has proved harder to reach the target market, largely it appears, due to external factors. However, it has also emerged that the definition of "innovative" may be interpreted in different ways in various countries. Thus, feedback is in some instances that the definition was too constraining, whereas in others it seems bank loan officers had more latitude in defining what is considered innovative. For example, in some instances the Oslo definition has been used.

Large enterprises tend to be more successful than SMEs in obtaining finance, and at better terms than is the case with SMEs. So the challenge is to identify and finance the ones that would not obtain finance through normal banking channels for their specific innovative projects. The research team has not seen or been able to evaluate the applications for InnovFin Midcap Growth Finance or InnovFin large projects (which could include public sector organisations as well) to determine whether this was in fact the case.

Whereas in the case of EIF instruments beneficiaries are by definition SMEs (including small midcaps), in the case of EIB-managed instruments the situation is summarised in the table below (final recipients of (EIB) InnovFin funds).

Table 96 - InnovFin EU Portfolio - Final Recipient Type - Cumulative 2014-2016

InnovFin EU Portfolio - Final Recipient Type - Cumulative 2014-2016				
	Amount signed	**% Total amount**	**Number of operations**	**% Operations**
Type				
Large corporate	1217.9	41	19	36
Large Mid-Cap	998.5	33	21	40
Other	70.3	2	1	2
R&I Infrastructure	527	18	5	9
Small Mid-Cap	82	3	3	6
SME	77.4	3	4	8
Total	**2973.1**	**100.0**	**53**	100.0
Source: EIB, Annual Operational Report, EIB Facility under Horizon20202, Debt Financial Instruments				

In terms of sectors, according to the 2016 Operational Report, 65.6% of the InnovFin EU portfolio was invested in manufacturing, 23% in professional, scientific and technical services, 7.3% in Information and communication, with the remainder in construction (1.7%), mining and quarrying (1.3%) electricity gas and air conditioning supply (0.8%) and water supply, sewerage and waste management (0.3%). One would expect the presence of more

collateral for debt in the manufacturing sector than in services. The spread in terms of Horizon 2020 target areas is provided in Section 4.3.8 below.

H.5.4. Has the communications strategy achieved its goals? How could the strategy be improved?

The research has indicated that intermediaries follow differentiated branding approaches with regard to their InnovFin instruments. In some instances, InnovFin is mentioned prominently, in others, it is just communicated through a logo. This is usually related to where the FIs fit in the financial institution's portfolio: whether it is a leading product or one among many, or has effectively been blended into an existing or new product offered by the intermediary.

Key issues surrounding the communication strategy related to InnovFin products that were identified during the research are: branding of the intermediary vs branding of InnovFin, the use of an umbrella brand, the importance of branding and the cost of communications.

Some intermediaries emphasised that they were more concerned in branding themselves as the go-to institution for enterprises seeking funds for innovation or modernisation than in marketing the brands of the specific products they might deem suitable for such companies. It can create a problem for bank loan officers when potential clients come in insisting they want "InnovFin". However, once the transaction is under way, the evaluators have not heard of any issues that might arise if the product is then clearly identified as InnovFin, except in one case. This is where in some countries support through the EU is seen as a type of subsidy (in a negative sense of the word) and the beneficiary might not necessarily want to be linked to such a perception, even if misplaced.

In some instances, the use of InnovFin as an umbrella brand was considered useful, as it indicated clearly what the instrument was for and it was described as quite a "zippy" term by one intermediary. However, in other instances it was considered that having such different products with a very similar name was confusing. There does not appear to be a general rule that can be applied to resolve this matter.

Several intermediaries indicated that the branding was not very relevant for the final beneficiary anyway. They were told what the source of the support was and the logo displayed, but their interest really is in getting the money on the best terms, no matter where it comes from.

H.5.5. Conclusions on effectiveness

Overall, the research suggests that the InnovFin scheme is performing well against its objectives of improving access to finance for innovative companies and projects, and helping to address related market failures. To the extent that shortcomings have been identified, these are more to do with the implementation of particular InnovFin schemes than being inherent programme design faults. However, the research suggests that InnovFin has proved responsive to changing market circumstances and changes in the EU policy support environment with some adjustments already in place and others currently under consideration. At the interim stage, it is not possible to evaluate the impact of the InnovFin financial

instruments on innovation and economic growth in Europe. This will only be possible towards the end of the programming period, with some of the full impacts materialising and being evaluable after the present period.

H.6. EFFICIENCY

In this section the efficiency of the instrument is analysed. Efficiency can be defined as the extent to which the benefits and outputs of an intervention are commensurate with the costs/resources and inputs used to achieve benefits/outputs.

- The costs related to the FIs can be assessed at an overall governance level involving **DG RTD, EIF and EIB**, at a more operational level using **financial intermediaries** (in case of intermediated instruments) to implement the FIs and at the level of the **final beneficiaries**.
- The costs for **DG RTD** using the EIB and EIF to manage the instruments includes the procurement exercise to set up FI delivery mechanisms, the allocation of funds to intermediaries, monitoring and reporting, and an overall supervisory function.
- The **costs of managing the financial instruments** lies in the overheads, namely the costs of the personnel needed to process applications, monitor loans and investments, reporting to DG RTD/EIF and/or EIB and to manage the FI entities themselves (where new entities are created to specifically operate an FI, e.g. a new venture capital fund).
- The **cost for the final beneficiaries** relates to the price for the financing, typically in the form of interest and/or equity, and administration.

In addition to examining how efficiently the FIs themselves are being managed, there is the question of **efficiency in relation to their loans and investments**. The key issue here is whether the outcomes being achieved by FI loans and investments are proportionate to the costs. More specifically, there is the question of whether the same financial inputs could lead to more outputs or, conversely, whether the same outputs could be achieved with reduced inputs.

H.6.1. What are the barriers, if any, impeding access by beneficiaries to the instrument? What could be done to make access easier?

Barriers to using the various FIs have been partially analysed by the assessment of relevance and effectiveness above (specifically with regard to demand for, ease of use and design of instruments). As mentioned in section 4.2 the financial intermediaries regard the relevance of the InnovFin instruments as high and the design of the instruments as good. At the same time the monitoring data presented in section 3 shows the level of uptake differs by instrument, which could indicate that barriers might impede access for final beneficiaries?

Barriers to access can both be at the financial intermediary level (if intermediated) – meaning the InnovFin instruments are not offered and at the final beneficiary level – meaning that the instruments are offered but not in demand because they are not known or attractive.

At the intermediate level the following barriers have been highlighted in interviews with stakeholders:

- Lack of interest among intermediaries becoming involved in certain countries, for instance due to alternative sources of financing being available - offering better conditions or being perceived as easier to access, and low interest rate - meaning that competing products offered by commercial banks through more streamlined administrative processes are at an advantage compared to the higher level of bureaucracy and administration associated with the InnovFin products
- Difficulties convincing the commercial banks to participate – for example due to lack of knowledge, tradition and interest in financing innovation (even if interest is growing).
- Availability of – and competition from – other EU-backed equity and debt instruments leading to reduced demand for InnovFin instruments
- Burdensome reporting requirements (e.g. case studies, various performance metrics)
- Difficulty to distinguish between the Financial Instruments and what instrument to apply for.

At the **final beneficiary level,** the following factors have been highlighted as barriers and/or factors that limit uptake by final beneficiaries: firstly, strict eligibility criteria for accessing InnovFin financing - meaning that not all firms in need of innovation financing may be served; lack of availability of collateral. As highlighted by e.g. in Iceland and Austria; and rigorous risk assessment carried out under the banks internal rating system as required by Basel III/ CRDiv CRR means that many companies fail. What can be done to make access easier is being investigated further through the remaining interview programme with intermediaries and final beneficiaries.

H.6.2. To what extent are the costs of managing the instrument reasonable and in line with the expectations of DG RTD, EIB and EIF, and (if applicable) financial intermediaries?

Following criticism of the administrative burdens and costs involved with administration of many instruments under the European Framework Programmes in general significant efforts have been made to reduce administrative burdens and costs associated with instruments under Horizon 2020.

EIF and EIB manage InnovFin funding alongside their other mandates (e.g. the EIB Group's own risk capital financing mandate, the InnovFin and COSME mandates). While there is a relatively clear distinction between InnovFin and COSME (see section of coherence) financial intermediaries need to have a good understanding of the two mandates and their financial instruments to understand the differences. The financial intermediaries do not always have the necessary understanding to identify the most relevant instrument for them. Since both COSME and InnovFin are under EIF the current setup allows the EIF to guide interested financial intermediaries to the most appropriate financial instrument to apply for. This saves financial intermediaries from having to navigate through a plethora of different FIs since they are advised on which FI is most suitable for the financing needs.

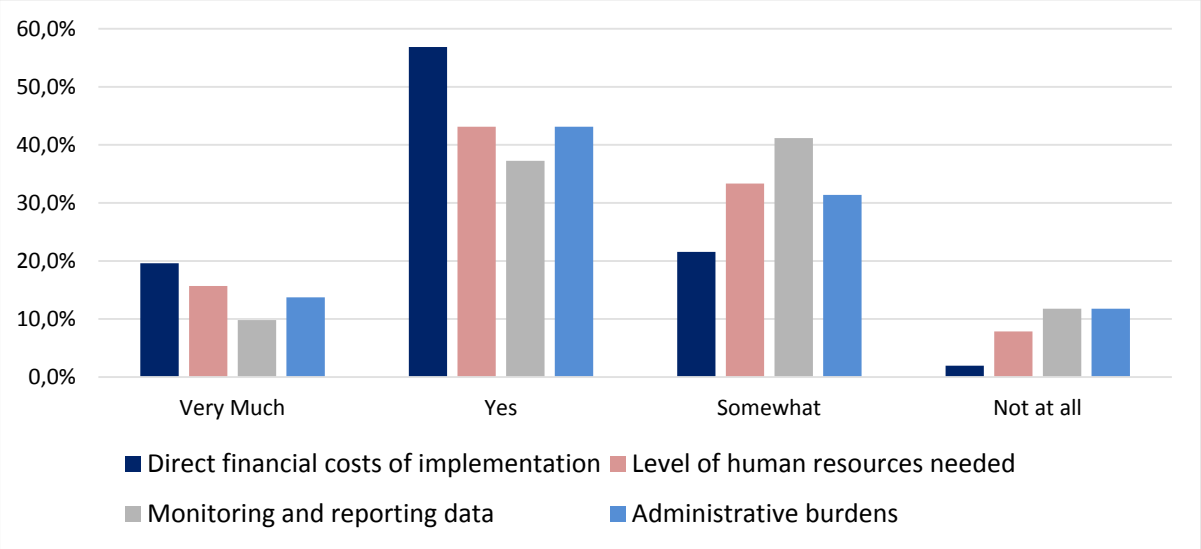
According to the EIF, financial intermediary applicants often do not apply through the formal application process but approach the EIF who then helps them through the application

process. This is especially for COSME but also InnovFin. This reduces costs for financial intermediaries, helps achieving commitments and reaching disbursement targets and thereby improves efficiency compared to a scenario where a separate organisation manages InnovFin.

An alternative scenario would have been to merge access to finance for SMEs (COSME under DG Grow) and innovation financing (InnovFin under DG RTD) to a single umbrella programme providing finance for SMEs and innovation. Some intermediaries find it difficult to distinguish between the different instruments under COSME and InnovFin and even if EIF guides financial intermediaries to the most appropriate instrument financial intermediaries often spent time and resources on researching the different instruments before they contact EIF. This increases costs for financial intermediaries and reduces efficiency. It also affects efficiency of the program as a whole if costs are passed on by the financial intermediaries to EIF through increased overhead and to final beneficiaries through a higher price for finance. A singular structure would make it easier for financial intermediaries to understand and apply for the most appropriate instrument and reduce their costs. It would also be easier to communicate to other stakeholders, who might struggle to understand the difference between the different financing mandates. At the same time the efficiency gain would be rather limited since the current framework remains relatively efficient with the EIF signposting intermediaries to the most relevant FI.

The results of the survey of financial intermediaries indicate that the costs of managing the instruments are in line with the expectations of the financial intermediaries. Table 6 below shows that the most positive assessment in terms of expectations versus actual costs relates to "Direct financial costs of implementation". 19.6 percent of the financial intermediaries find the costs "very much" in line with expectations and 56.9 percent find the costs in line with expectations. 2.0 percent finds the costs "not at all" in line with expectations. The level of human resources needed is also favourably assessed by almost 60 percent, which find the cost in line with or very much in line with expectations. 7.8 percent find the costs "not at all" in line with expectations.

Figure 147 - Have the costs of implementing the instrument from a financial intermediary perspective been in line with expectations? (n=17)



Source: CSES, Interim Evaluation of Horizon 2020's Financial Instruments.

Monitoring and reporting data is the type of costs, which is the least in line with expectations. Just below half of the respondents, find the costs to be in line with or very much in line with expectations. Just over 40% find the costs "somewhat" in line with expectations and 11.8% find the costs "not at all" in line with expectations.

The results of the survey are in line with the views expressed by financial intermediaries in the interviews. While most of the financial intermediaries find it difficult to provide an exact estimate of their total costs involved in managing the instruments they generally estimate them to be in line with their expectations and they acknowledge the need to report to EIF. At the same time, when expressing criticism in the interviews, most also point to monitoring and reporting as a burdensome task where improvement is possible. Also, some financial intermediaries point out that they expected administrative costs to be burdensome so "in line with expectations" does not necessarily mean that burdens were low. Excessive administrative cost may also led some intermediaries in Eastern Europe not to sign an InnovFin agreement, given that much of the cost if fixed and the critical mass of loans intermediaries can make in some smaller Eastern European countries is just not large enough to justify the cost.

Separate calculations, for example, of the guarantee premium under SMEG have to be submitted daily and for some financial intermediaries have to be calculated I a different way to what they do themselves. **While it is recognised by the financial intermediaries that there is a need to account for amortisation and in-life events on SMEG loans to make sure the EIF are not over-charging for guarantees, this requirement is administratively burdensome.** While reporting could in theory be done on a computerised basis it would require large IT-investments for many intermediaries and reporting is therefore often conducted manually. Several intermediaries are therefore calling for simpler or more automated reporting. This could increase the cost effectiveness of the SMEG scheme. At the same time, if the EIF allows individual reporting procedures tailored better to the existing reporting standards of the financial intermediaries the administrative burden for the EIF will go up.

Some stakeholders believed that the **reporting requirements** are such because the European Court of Auditors, and to some extent the European Parliament, do not treat financial instruments differently from grants under the Structural Funds, where more detailed reporting and due diligence may be advisable. Intermediaries pointed out, for example, that any bank as part of their due diligence process will look at whether an applying firms has broken any EU law, so there is no need to make this a particular reporting requirement under the SMEG. Moreover, it is very costly to add new reporting requirements throughout programme implementation, since banks oftentimes have to manually collect these. As an example, banks will look at the number of employees of final beneficiaries when they sign a loan agreement to make sure these fit the scope of the SMEG (or the MCG), but they will not monitor the evolution of number of staff throughout the loan duration. If the EC is interested in new information throughout programme implementation, a representative sample approach may be better than insisting on complete information when some banks may have great costs in collecting the requested data.

Some intermediaries and companies also find that the application procedure for a loan/guarantee agreement is complex, that it takes long time to get an agreement in place with EIB/EIF and that the terms of the guarantee agreement can pose certain

challenges. One example mentioned is that it contains many clauses which the intermediaries have to pass on to final beneficiaries, who often find the clauses complex and difficult to understand. Another example is that procedures can be slow, if a minor contract addendum is needed. Some also point out that they see a general trend towards increasing reporting requirements. Several intermediaries indicated that this may explain why they only signed up to the SMEG so far, and shy away from applying separately for the MidCap Guarantee Instrument.

Some intermediaries have called for better dialogue with the EIF before reporting starts. The financial intermediaries do not always know why EIF is asking for certain pieces of information or what they are using it for. It can therefore be difficult to provide the right information to the EIF in the most cost efficient manner. Similarly, some intermediaries who have a long history of dealing with the EIF experience that they deal with many different staff at EIF and that new staff often have limited knowledge of the financial intermediary and previous cooperation. **A single point of contact or key account at EIF could help streamline cooperation.**

Especially in the smaller markets where national promotional banks and export credit agencies offer guarantees in cooperation with commercial banks the administrative burdens have been mentioned as one of the reasons why **many commercial banks do not find the guarantees attractive.**

EIF is working on a new reporting platform that could potentially reduce the reporting costs. Since most costs for the financial intermediaries arise when they have to report information they do not already collect and information they have to calculate manually it is important for the EIF to have a **dialogue with the financial intermediaries on the design of the new reporting platform.**

EIF has already attempted to reduce the reporting requirements for financial intermediaries. In Germany, for example, EIF has signed individual agreements with seven promotional banks with an overall combined allocated volume. This means that the banks can report jointly, which reduces the reporting requirements and the legal work for each bank. Financial intermediaries in other countries have expressed an interest in such solutions indicating that joint agreements and reporting can potentially be employed elsewhere and improve cost efficiency.

Finally, financial intermediaries point out that it is burdensome every time the name and/or structure of the financial instruments change. It takes time and resources to communicate the existence and benefits of the financial instruments to the employees, partners and customers. In the case of SMEG this is witnessed by the slow initial uptake of the allocated amounts to financial intermediaries experienced by many. The financial intermediaries therefore call for continuity in the structure and branding of the instruments.

The EIF is also working on developing **outcome and impact indicators** to be able to follow the development of the portfolio companies and impact continuously. It is in most cases difficult to identify the effect of the finance provided by InnovFin due to the influence of external factors on company performance and potential time delay from financing is provided to impact can be measured. EIF is cautious to introduce new reporting requirements, which

increase administrative burdens on intermediaries and final recipients. They therefore focus on utilising existing public data.

Besides the reporting requirements, the EIF receives praise from some intermediaries for their professionalism, communication, understanding of the how banks operate and their response time.

The costs of managing the instruments seem to be similar to other financial schemes. Asked how the administrative burden of operating the financial instruments on a scale from 1-5 compare with other schemes the financial intermediaries on average rank the financial instruments at 3.17 (1 being very difficult and 5 being very easy). No respondents rank the costs at 5 or 1. Similar views are expressed in the interviews.

One issue raised by German promotional banks is the burden created by **compliance with state aid rules.** In their view, even if DG RTD may not consider this an issue, DG COMP may, and so long as this is not clarified, they will try to comply with the Financial Regulation and state aid rules to the full extent. The same does not apply to commercial banks, meaning there is **not a level playing field** for financial intermediaries under the SMEG (and possibly the MCG). One way to tackle this may be to adapt the **pricing** for national and regional promotional banks to account for a) the fact that they face a higher administrative burden than commercial banks in implementing the InnovFin instruments, and b) the fact that due to their on-lending to partners banks, they can achieve a greater leverage for the programme than when the EIF signs directly with commercial banks.

The instruments are also generally regarded as well designed by financial intermediaries. The survey to intermediaries asked respondents to rate the overall design of the instrument(s) they dealt with. On a scale from one to five - five being positive – the instruments received an average rating of 4.94, with 41 out of 51 respondents giving a score of four or five, nine respondents giving a score of three, and 1 giving the lowest score of five. This suggests that respondents see the design of the instruments they dealt with as fairly strong overall.

In the eyes of the financial intermediaries, the financial instruments are also fairly easy to use for final beneficiaries. Asked if the financial instrument has been easy to use for final beneficiaries – again using a scale from 1-5 with 1 being very difficult and 5 being very easy – the financial intermediaries rank the easiness at 3.53.

H.6.3. So far, overall, has the instrument been implemented and managed efficiently by the EIB or EIF (depending on the instrument) and DG RTD? What could be done to improve efficiency for the period 2018-2020?

Overall the interim assessment of efficiency of managing the instruments is fairly positive, highlighting:

The **relationship with the EIB and the EIF** in particular has been praised by intermediaries from several countries for being very positive and professional, with EIF and EIB staff responding quickly to any queries and ‘speaking the same language’ as bank staff. Even if it

might be difficult for financial intermediaries – and other stakeholders - to distinguish between the different financial instruments under the EIB Group the fact that they are under the same organisation helps EIF guide financial intermediaries to identify and apply for the most appropriate instrument.

While some **barriers to access the financial instruments** have been identified the financial intermediaries find the instruments well designed and relevant.

The **costs of managing the instruments** are generally in line with the expectations of the financial intermediaries and in line with other financial schemes. However, there is some concern in relation to the resources involved for financial intermediaries to sign agreements with the EIF (EIB for MidCap Guarantees) and monitoring and reporting requirements. While there is an understanding among financial intermediaries that reporting is necessary, there is also a wish to simplify requirements and shift away from requirements that financial intermediaries fulfil manually, better dialogue with the EIF/EIB before reporting starts and a single point of contact at the EIB and EIF.

One issue could be that the EIB Group faces resource constraints since it has been entrusted with managing the EFSI, a political priority, and this may adversely affect the resources available to managing the InnovFin instruments efficiently. This may change, however, as the EIB increases its staff and as demand for InnovFin picks up increasing its importance within the bank's product portfolio.

H.7. EUROPEAN ADDED VALUE

This section assesses the extent to which the InnovFin Financial Instruments are adding value by reason of interventions at a European level and achieving results that could not have been obtained by the Member States acting individually or through the action of smaller groupings of Member States.

H.7.1. Introduction

Critical to the issue is the extent to which the action at a European level is addressing market failures in a way that could not be achieved through action at national level alone. However, as well as considering the case for intervention through Financial Instruments at a European level as a general proposition, there are also issues relating to the added value of the specific interventions at a European level in the form of the InnovFin Financial Instruments as opposed to the other Financial Instruments provided at a European level, and to the added value of these Financial Instruments, as opposed to other forms of support.

Examination of European added value involves in its broadest scope the counter-part of a consideration of whether **the EU principles of subsidiarity** have been applied (Article 5 Treaty on European Union). It considers what is the nature of the contribution that means that the objective of the action can be achieved at a European level, when it would not have been sufficiently achieved by the Member States at national, regional and local levels and also the

extent to which the action at the EU level is better achieving the objective by reason of its scale or effects.

European added value may result from delivering legal and market certainty, coordination gains, economies of scale, multiplier effects, complementarities, demonstration and catalytic effects and capacity building. Most of these considerations are relevant to Financial Instruments, which to a large extent are **motivated by the need to address market failures**. These take the form of significant information asymmetries and high transaction costs and also the possibility of exploiting positive externalities. Financial institutions are frequently not in a position to be able to assess the prospects of scientific developments or new procedures and processes or cannot do so without considerable investigation and transaction costs. There is therefore a situation of asymmetric information. Alternatively, there can be positive externalities, where EU interventions generate demonstration and catalytic effects. Confirming this rationale for the intervention in the form of the Financial Instruments is the fact that banks remain largely absent from higher-risk lending and, more generally, that there is a persistent gap between the supply and demand for funds to finance research and innovation.

The Ex-ante Evaluation of 'the Financial instrument facilities supporting access to risk finance for research and innovation in Horizon 2020' considered **the European added value that the Financial Instruments were capable of delivering**. It estimated that at any one time, 150,000 to 500,000 innovating SMEs were originating bankable operations that the market cannot support, suggesting a loan **funding gap** of between, roughly, EUR 112 billion and EUR 375 billion. In addition, for innovative midcaps, it was estimated that there was an average total annual demand for debt of EUR 250 billion for debt financing, though the shortfall in relation to supply was difficult to estimate. Similarly, for equity finance, the gap for SMEs was estimated to be some EUR 800 million per year, while for midcaps, there was an estimated demand of just under EUR 39 billion for equity, considerably above the available funds.

EU-level intervention to foster access to risk finance was said to support the achievement of the EU's innovation policy objectives, facilitate the financing of trans-national projects and lead to capacity-building through the transfer of the expertise accumulated in the European institutions responsible for implementing the interventions (the Commission, the EIB, EIF). The implementation also led to economies of scale, multiplier effects, complementarities and other demonstration and catalytic effects. A significant question at this stage then is the extent to which these anticipated effects have been realised.

H.7.2. Financial additionality

A key question is whether there is additionality associated with the interventions and whether the scale of the intervention at an EU level is such that there is definite added value. Clearly, although they are not of the same order as the estimated funding gap, contributions are being made to addressing it. At the general level, therefore, the InnovFin instruments as a whole appear to be making a contribution of absolute additionality and also to be complementary to the other financial instruments offered at a European level in that taken altogether (and also including national funding) there still remains a significant funding gap, if the estimates made previously are correct. In fact, rather than crowding out national

funds, the intervention through the InnovFin instruments is helping other funders to invest and through this leverage effect contributing further to filling the funding gap.

Furthermore, although the scale is insufficient to make a significant impact on the funding gap in general, it is clearly making considerable contributions to certain parts of it, in some countries more than others. This applies especially to enterprises that are promising in that they have passed through highly competitive Horizon 2020 selection processes in order to develop their initial ideas. Furthermore, specific investments can make a substantial difference. In the case of one Danish SME, for instance, an InnovFin loan has helped them move from a defensive to an offensive strategy and this has led to the development of new products, the targeting of new markets, opening an office in a new country and doubling their growth rate.

In addition, there is a clear element of added value in that, as well as contributing to the quantum of financing available to enterprises with eligible projects, finance through the Financial Instruments can be delivered on more favourable terms, as far as final beneficiaries are concerned, since the EIB can raise capital on the international money markets at relatively low rates of interest and pass this advantage on to financial intermediaries and final beneficiaries. Moreover, the Financial Instruments debt interventions can also offer easier collateral requirements and longer loan terms because of the EIB's position and there are other elements to the added value associated with their favourable terms. One of the interviewees remarked that this was a major consideration for their involvement and for the impact on beneficiaries. Similarly, an interviewee commented that the arrangements with the EIB meant that national intermediaries shared the risk on advantageous terms and this made them better able to support potentially high growth SMEs with a limited collateral and credit history.

The reference to the differential impact of the instruments points to extra dimensions of the analysis that it is necessary to consider, since as well as assessing the added value of the InnovFin instruments as a whole, it is also important to consider whether each of them individually can be said to be offering added-value. At this level, it is much more likely that particular instruments may be offering only partial additionality, if they are addressing defined needs that others are also seeking to address. The conclusions of the section on the coherence of the instruments are that, in fact, there is not an overlap of this kind, not least because the different instruments have been designed to avoid such an overlap.

Evidence has been provided by the **responses to the survey** of intermediaries developed for this assignment. Responses are generally from well-established financial institutions, though in all but a couple of cases they are from institutions involved with the InnovFin SME Guarantee.

20 respondents thought that the financial instruments complement national sources of funding for businesses involved in research and innovation 'to a great extent' while a further 27 thought that this happened 'to some extent' and only 1 thought 'not at all'.

Similarly, 17 thought that the instrument is coherent with EFSI, COSME, and other EIB/EIF/EU financial instruments such as the Cohesion Policy Funds 'to a great extent' while 29 thought that this was the case 'to some extent'.

In terms of the possibility of using alternative sources of finance, a question that is critical for determining the extent of additionality, most responded to the question 'What would be the impact for you or your organisation if the InnovFin programme were to be discontinued?' by saying that they would have to reduce activities or leave the market altogether.

Similarly, in response to the survey of beneficiaries, 12 said that 'without the funding we would not have been able to go ahead with our plans', 16 said that 'we could have gone ahead but at a later date and/or with a reduced or modified basis' and only 5 stated that 'without the funding we would have gone ahead as planned'.

H.7.3. Other types of added value

However, the most detailed responses in this area were to a question asking about areas where the Financial Instruments could be providing added value. The responses are set out below:

Table 97 - Areas of Added Value from the Financial Instruments

On a scale of 1-5, please indicate how far each financial instrument in which you have participated has added value in the following six areas? (Please rank from 1 - limited or no value to 5 - strong added value)		
	Average	**Respondents**
Helping to achieve EU policy objectives	3.7	n=48
Facilitating the financing of trans-national projects	2.5	n=48
Demonstration and catalytic effects	3.0	n=48
Economies of scale	3.2	n=47
Multiplier effects	3.4	n=47
Capacity-building	3.4	n=46

Source: Interim Evaluation of Horizon 2020's Financial Instruments.

Clearly the evidence has its limits, but it can be seen that the responses were generally positive, though not strongly so on average. The highest added value was felt to be in 'helping to achieve EU policy objectives', 'multiplier effects' and 'capacity-building', while there was less added value perceived in relation to 'demonstration and particularly 'Facilitating the financing of trans-national projects'. This last result is also consistent with responses to a question on 'gaps or overlaps in the R&I funding cycle not covered by financial instrument', where there were some comments that there were problems in the period after initial start-up funding but before a project starts to generate sufficient positive returns, but also there was a gap in relation to finance to support international trade.

It is worth noting that while most of the respondents were involved in the InnovFin SME Guarantee scheme, the one respondent involved in InnovFin Equity, who replied to these questions, was considerably more positive. In case of that last instrument, an interesting point brought forward by a German intermediary involved in the SMEG is that currently, US investors capture a significant share of the value of fast-growing enterprises in Germany, which would not be the case if European VC investors would become more engaged. InnovFin may play a role here in making sure fast-growing enterprises can remain in European ownership, which is another point of added value.

Overall, therefore, the evidence points to positive, though not really substantial added value arising from the deployment of the specific InnovFin Financial Instruments. This may well be because the instruments have only been partially deployed, and the more specialised of them (the InnovFin Energy Demo Projects and Infectious Diseases) hardly at all, at this stage in the policy cycle. There may also be a problem that intermediaries only have a partial view of the impacts of the system as a whole. For instance, many of the projects funded under Horizon 2020 are still under way and have yet to produce results that can be exploited. As these results emerge, the fact that the InnovFin instruments are in place represents a strategic advantage in the process of delivering more effective commercial exploitation of the results of research. In this sense, the real added value of the InnovFin instruments is yet to reveal itself.

There may also be some differences between the positions in different Member States. The extent of added value clearly depends on what already exists in each Member State and the terms on which funding is made available through national schemes, but there also appear to be differences in implementation. While the SMEG is generally appreciated and in Sweden, for instance, it is felt that the InnovFin instruments have successfully complemented national provision, feedback from Belgium suggests that cautious local implementation has meant that the SMEG has failed to benefit the target SMEs.

This consideration of the availability of finance suggests a further question, prompted by the comments of some MEPs, and Member State authorities who seemingly would prefer to increase the allocation of funding to grants and to allocate less to the InnovFin FIs. Here, there is a broader political issue relating to the balance in the financial allocation through Horizon 2020, as between innovative Financial Instruments and other types of interventions, principally R&I collaborative grants. The arguments are that grants are more likely to encourage the involvement in research particularly of SMEs than finance which needs to be repaid and that, since there is already intensive competition to obtain grants under Horizon 2020, additional funding would be welcome. In terms of the additionality of the InnovFin instruments, it could be said that they are squeezing out direct funding of research and innovation through grants.

However, this argument fails to take into account an important part of the rationale for the developments in Horizon 2020 that have put greater emphasis on the practical (and particularly commercial) exploitation of the research conducted. The InnovFin instruments are appropriate especially for these later stages in the innovation cycle and, as has just been suggested, need to be in place to ensure that the full strategy is implemented. Furthermore, the Financial Instruments are leveraging considerable further private investment and are therefore increasing the total amount of funding directed to achieving Horizon 2020 aims. Rather than squeezing out funding, the Financial Instruments are adding additional contributions.

Finally, by changing the funding mechanisms for a significant part of the work carried out under the Horizon 2020 umbrella, the Financial Instruments are adding value to research and innovation policy. While the traditional form of research financing - grants - are non-refundable, the Financial Instruments create a form of revolving finance in that once loans are repaid and loan guarantees expire and once exits are made from venture capital investments, funding can be recycled. In other words, the outlay is returned and can be used again. In an era of budgetary austerity, when the effectiveness of EU funding is a political

issue, the recycling of funds has considerable advantages and adds to the credibility of EU policy in this area, as well as enhancing the capacity for future funding.

In general, therefore, it can be said that there is evidence of additionality of *scale*, with intermediaries under the SME Guarantee instrument, for example, increasing loan volumes, and of *scope*, with new risky market segments being covered thanks to the programme and also the programme supporting trans-national investments.

H.8. LESSONS LEARNT/CONCLUSIONS

Overall Conclusions

InnovFin represents a significant development in the provision of EU-supported innovation financing that builds on the more modest and rather disparate schemes that previously existed. InnovFin has brought together different programmes previously run by the European Commission, EIB and the EIF under one umbrella. Continuity is strong between some elements, e.g. the Risk-Sharing Instrument and the SME Guarantee instrument, and Large Projects and the Risk-Sharing Finance Facility (RSFF). Other aspects are new - the thematic instruments introduce a new type of financial support.

So far, an estimated EUR 6.53 billion of InnovFin financial assistance has been made available to some 5,780 enterprises. This means that some 32% of the SMEG budget and 9% of the InnovFin Equity funding earmarked for InnovFin for the 2014-20 period has now been committed. In case of the EIB-managed instruments, 88% of the EUR 6.75 bn allocated for the past 2.5 years has been committed to final beneficiaries. There is a need for capacity building and awareness raising at intermediary and beneficiary to stimulate demand. The results of such measures should be monitored and, if this does not help reduce disparities between the different instruments, the continuation of instruments in low demand should be reassessed.

Overall, the research suggests that the InnovFin scheme is performing well against its objectives of improving access to finance for innovative companies and projects, and helping to address related market failures. To the extent that shortcomings have been identified, these are more to do with the implementation of particular InnovFin schemes than being inherent programme design faults. However, the research suggests that InnovFin has proved responsive to changing market circumstances and changes in the EU policy support environment with some adjustments already in place and others currently under consideration. At the interim stage, it is not possible to evaluate the impact of the InnovFin financial instruments on innovation and economic growth in Europe. This will only be possible towards the end of the programming period, with some of the full impacts materialising and being evaluable after the present period.

Performance of the various InnovFin financial instruments

Although the use of the different InnovFin financial instruments varies, overall the take-up is broadly in line with expectations. Where take-up has fallen short of expectations, the reasons include low levels of R&I investment and hence appetite for InnovFin (some Central and Eastern European countries), the existence of well-established national and regional support

programmes operated by public banks (e.g. in Germany), competition with low interest rates offered by commercial banks and a preference for other support schemes such as EFSI (in case of larger firms) and COSME (in case of SMEs), and Structural Funds grants (in the case of Central and Eastern Europe in case of Structural Funds).

SME Guarantee

There has been a very high take-up of the SME Guarantee with many agreements signed with financial intermediaries and already more than several thousand loans made to final beneficiaries, covering almost all eligible countries. Take-up has exceeded expectations and without the top-up provided by the EFSI, the resources available to the SME Guarantee would already have been exhausted. While the full delegation model adopted under the instrument is praised by financial intermediaries, there are concerns about the pricing of guarantees which is seen as relatively high (twice as high as with the previous scheme), and along with obligation to pass on financial benefits to the loan-receiving firms, this leaves little profit for financial intermediaries. Conversely, some banks stated that the costs of the guarantee were highly favourable and significantly cheaper than would be available through other sources. Notwithstanding concerns among some but by no means all banks, the fact that there has been such a high take-up of the SME Guarantee scheme indicates that it is proving to be a very successful intervention in helping banks to finance riskier businesses. From the business perspective, the guarantees free up assets that would otherwise have to be used to provide collateral. Moreover, there is strong evidence that this instrument largely benefits firms that would otherwise not have received the debt finance they require to innovate, or only on a much smaller scale.

InnovFin Equity

In the case of the Equity scheme, where a total of 10 deals have so far been signed with financial intermediaries, take-up and implementation in terms of disbursement to firms has been relatively slow, complicating the assessment of the scheme's effectiveness at interim stage. This is partly because the scheme was launched later than the SMEG. In addition, there is a considerable time-lag in implementation to allow time for the EIF to review calls for expressions of interest as financial intermediaries from VC fund managers and for the recently selected fund managers to make investments in underlying undertakings, which are typically made over a disbursement period of several years. However, fund managers interviewed that had benefited from participation in the equity scheme pointed to considerable volume effects compared with non-InnovFin funded equity funds and also noted that the presence of the EIF through InnovFin during the first closing round of their equity fund had helped to secure additional equity funding both from promotional banks during first closing and in subsequent closings from private equity investors. However, this is less to do with the specific characteristics of InnovFin and more concerned with the presence of the EIF as a cornerstone investor.

As part of a comprehensive remodelling, a number of additional components have been introduced as part of the SME Equity scheme, only one strand of which formally falls within the scope of this evaluation (InnovFin Venture Capital). The other strands relate to Business Angels, Technology Transfer, and Funds-of-Funds. These additional elements should strengthen the overall package of InnovFin support for SMEs by providing more targeted equity products as well as more clearly distinguishing the offer from the EFSI. This is being

achieved, inter alia, through the higher risks taken by InnovFin (i.e. providing cover for the first losses whilst private investors and the EFSI and EIF benefit first from any returns). The SME Guarantee scheme, too, allows intermediaries to take on much higher risks than would otherwise be the case, thanks to the coverage of up to 50% of losses provided by the EIF.

MidCap Guarantees and MidCap Growth schemes

Take-up of the MidCap Guarantee scheme has lagged behind expectation and is considerably lower than that of the SME Guarantee instrument. Some commercial banks have highlighted that they see the application process under InnovFin as cumbersome making them hesitant to apply for more than one financial instrument, and would prefer to see the scope of the fully delegated and standardised SMEG widened to cover firms with up to 3,000 employees without changing the maximum loan size, rather than having to sign a separate agreement under MidCap Guarantee. The EIB has reacted to this situation by going down the equity scale to provide quasi-equity and mezzanine financing to Midcaps. Conversely, it could be argued that offering guarantees to Mid-caps will be beneficial over the medium-long term, since it is compatible with the funding escalator approach outlined in the 2015 Capital Markets Union Action Plan.

There are also concerns among prospective applicants that the variable pricing of the guarantee, and emphasis on risk-sharing principles is unattractive and the absence of a standardised pricing model for the costs of the MCG (unlike the SMEG) dissuades financial intermediaries from making an application.

The MidCap Growth scheme is performing well with a good number of signatures to date. But the pipeline is rather low, and there is a degree of (potential) overlap with commercial providers in some countries. As with the Midcaps Guarantees, it could be argued that in recent years this market segment has tended to become 'overbanked' in terms of relatively cheap debt financing in the context of ever lower interest rates, at least in the Eurozone. Cheap debt is likely to always be preferred to increasing shareholders' equity. This can produce vulnerabilities as the firm grows and becomes over reliant on debt (over-geared). The guarantee schemes could exacerbate such a scenario, and also in some cases replace commercial bank funding, increasing the reliance of such firms on EU public funds.

InnovFin thematic instruments

The take-up of the InnovFin thematic instruments, which were launched one year later than the other instruments as pilot schemes, has been slow. In addition, there has been a tendency for bankable projects to be put forward which is not the purpose of the thematic instruments. Although it is still quite early in the implementation phase, enough experience has been gained to make it possible to identify actions that could be taken to optimise their performance.

There have been only three Infectious Diseases loan agreements signed so far although there is a quite large pipeline of 72 applications (probably quite a high proportion of the total identified potential demand).

There has also been less demand than hoped for in relation to the Energy Demonstration Projects. So far there have been 92 applications with 39 projects being identified as

potentially suitable for support. Around half of the current financial allocation is expected to have been utilized by mid-2017. We understand that 33 applications have been rejected, mainly on the grounds that they are 'bankable' projects and therefore do not match the scheme's risk profile. These applications have been referred to other more appropriate sources of funding. With financial allocations set to double from EUR 150m to EUR 300m, there is a need to accelerate the take-up of the scheme. In effect, the Energy Demonstration Projects has operated as a pilot with lessons being learnt that point to possible improvements.

Some stakeholders question the usefulness of thematic instruments, also from a branding point of view, and argue that Large Projects and other similar schemes could be used to fund such projects which would streamline the overall product offering. Clearly, any introduction of new thematic instruments should be carefully piloted and needs to be clearly justified. An issue relating to coherence was also raised in respect of the thematic instruments that whilst there is nothing wrong with supporting energy demonstration projects and infectious diseases projects per se, but this raises the question as to why these thematic instruments deserve support but not other thematic areas (e.g. health research more generally rather than only infectious diseases). A counter-argument is that there is a need to avoid the emergence of a plethora of thematic-specific innovation financing instruments since this could lead to over-fragmentation.

Large Projects

Building on the success of the EIF's Large Projects schemes to support the Knowledge Economy in the 2007-13 period, the take-up to date of the InnovFin Large Projects instrument has been strong with a total of EUR 4.5bn being committed to beneficiaries. The pipeline also suggests continued demand. External factors such as the amount of liquidity in the European money markets have also had a strong influence. However, demand could probably have been even higher if it were not for these external factors. Since the InnovFin financial instruments were launched, liquidity in the European money markets has increased and a consequence of this is that the EIB's offering has lost some of its competitive advantage in relation to large companies that can now obtain finance at similar rates of interest from commercial sources. The fact that the instrument nevertheless receives a considerable amount of applications suggests that the EIB has managed to target a specific segment of high-risk projects that are unlikely to receive the type of finance required even under favourable market conditions. On the other hand, some stakeholders voiced concerns that there is an overlap with the EFSI, in particular with the infrastructure window.

To ensure that InnovFin remains relevant in this market segment, the EIB is increasingly sharing the risks associated with innovation and new product development with the companies it lends to (this was, for example, the case with a recent EIB facility for a Belgian pharmaceuticals company where the Bank shared the risk on a 50:50 basis). Equally, in addition to sharing the downside risks, the EIB is able to benefit more fully from the upside gains. However, such facilities require bespoke structuring on a deal-by-deal basis, especially where the focus is on a single product rather than a company's IP portfolio as whole. This points to a general issue with the InnovFin instruments that the need for them can vary across the economic cycle with greater private sector finance becoming available in the boom periods, but the obvious institutional difficulty of switching off availability or modifying such that it remains relevant in such periods.

One possibility that might be considered to reduce the potential overlap with the EFSI with a number of Large Projects could be for financial resources to be allocated to other InnovFin financial instruments (e.g. the thematic instruments or the SME instruments) where a project can be funded under EFSI just as a well as through InnovFin. Conversely, where large projects involve a higher degree of risk than would normally be accepted by the EIB, one possibility would be to transfer them from EFSI to InnovFin. Actions such as this would strengthen the complementarities between the two instruments. Indeed, steps are ongoing to reduce overlaps and to segment Large Projects into facilities targeting Research Institutes, Universities and Research Organisations (InnovFin RIURO); and Moderate and Modest Innovator Countries and Associated Countries (InnovFin MMI).

Geographical spread of InnovFin operations

So far, the great majority of InnovFin activity has been in Western Europe but within this region take-up has varied quite considerably because of specific national factors. For example, there is a 'cash rich' situation in Belgium with pressure on banks to lend whereas the opposite is the case in the Netherlands and these variations in market conditions have implications for innovation financing. In Germany, for example, the National Promotional Bank (NPB) and regional public banks as well as commercial banks already offer financial

support schemes that have quite strong similarities with InnovFin, reducing the demand for the SMEG and MidCap Guarantee instruments. But InnovFin allows such NPBs to extend the scale and scope of their guarantee activities, specifically through the availability of the EIF counter-guarantee. In the UK, the uncertainties created by Brexit mean that delays have occurred in implementing InnovFin. In France, in contrast, demand for the SMEG has exceeded expectations by far, even as commercial banks develop an interest in risky, early-stage ventures. In Spain, too, the market seems to be reviving, but is not yet at the stage where it can fully satisfy the appetite for R&I financing, meaning that the InnovFin programme can play a relevant role.

For various reasons, take-up of InnovFin in EU Member States in Central and Eastern Europe has lagged behind. In the countries in Central and Eastern Europe and beyond, many enterprises do not have a strong enough balance sheet to borrow from the EIB. There is also a problem in many countries identifying companies that fulfil the InnovFin criteria of being 'innovative' (one financial intermediary stated they often have to persuade firms wishing to use the SME guarantee that they are innovative and meet the InnovFin criteria). Similarly, there is a lack of financial intermediaries in parts of Central and Eastern Europe with the know-how required to help implement the financial instruments. Experience in several countries (e.g. Greece, Czech Republic) suggests that there can be a snowball effect – once the first agreement has been signed with a bank, its competitors are then keen to participate in the InnovFin schemes too. However, in general, there is still a relatively weak system of intermediaries and innovation support in place in Central and Eastern Europe. The planned InnovFin MMI product (see under Large Projects, above) should help improve matters.

It should also be noted that one of the reasons why financial intermediaries have not applied to InnovFin is that there are alternative sources of EU funding support for financial instruments, mainly the Structural Funds (ESIFs) but equally COSME. There remains a misperception among financial intermediaries that since Horizon 2020 is generally highly selective and competitive, accessing other EU programmes, especially ESIFs which are nationally organised, is easier. Awareness-raising measures might correct this.

Similar considerations apply to countries beyond the EU that are eligible for InnovFin support. Only a few countries (notably Israel, Switzerland, Tunisia and Turkey) have made use of the schemes. Unlike in case of grants provided under Horizon 2020, which tend to fund international projects involving partners from both EU Member States and accession countries, in case of InnovFin financing it is less obvious why projects exclusively benefitting accession countries should be supported. Only eight countries had not made use at all of the instruments at the time when the monitoring data was analysed for this report, suggesting a relatively good geographic coverage overall at this stage of the programme's implementation.

I. INNOVATION IN SMES

I.1. INTRODUCTION

This document presents the midterm (interim) evaluation of the 'Innovation in SMEs' Work Programme of Horizon 2020, the EU Framework Programme for Research and Innovation.

Technopolis Group has conducted this evaluation on behalf of DG GROW in the period June 2016 – February 2017. Data collection took place in the period June 2016 – November 2016.

I.1.1. Objectives of the evaluation

This study covers two groups of activities, implemented under two calls for proposals, the **SME Instrument,** and the actions supported by the **INNOSUP**-calls (2014/15 and 2016/17) with the objectives of 'Enhancing the innovation capacity of SMEs' and of 'Supporting market driven innovation'. Primary focus was placed on the SME Instrument.

This mid-term evaluation contains an assessment based upon the five evaluation criteria set by the Better regulation pacakge, i.e. relevance, effectiveness, efficiency, coherence and EU added value ; It answers to 56 evaluation questions, 35 questions on the SME Instrument and to 21 questions on INNOSUP Actions, all pre-identified by the European Commission.

I.1.2. Evaluation questions and methodology

This evaluation uses five methods. These are desk research, European Commission data / portfolio analysis based on data from EASME, the Executive Agency implementing these assessed instruments/actions and from DG Research and Innovation (DG/RTD), interviews, surveys and case studies. The tables below provide an overview of the main evaluation questions (criteria) and the methods used to provide answer to those questions.

Table 98 - Overview of main questions and sources of information - SME Instrument

Main questions	Desk research	EC data / portfolio analysis	Interviews	Survey	Case studies
How relevant is the SME-instrument 2020?	✓	✓	✓		
How effective has the SME Instrument been?	✓	✓	✓	✓	
How efficient is the implementation of the SME-instrument?	✓	✓	✓	✓	✓
What is the EU added value of the SME Instrument?	✓	✓	✓	✓	✓
How coherent is Horizon 2020 'Innovation in SMEs' internally within Horizon 2020 and with other EU actions?	✓		✓		
How can the monitoring system be enhanced?	✓				

Source: Technopolis Group, forthcoming

Table 99 - Overview of main questions and sources of information - INNOSUP actions

Main questions	Desk research	EC data / portfolio analysis	Interviews	Survey	Case studies
What is current situation of supporting the innovation capacity of SMEs and how relevant are the activities under 'Innovation in SMEs' in that respect?	✓		✓	✓	
How effective are the activities under 'Innovation in SMEs' of Horizon 2020?	✓		✓	✓	
How effective is the implementation of the activities under 'Innovation in SMEs' of Horizon 2020?	✓	✓	✓	✓	
What is the EU added value of the activities under 'Innovation in SMEs' of Horizon 2020?			✓	✓	
How coherent is Horizon 2020 'Innovation in SMEs' internally and with other EU actions?	✓		✓		
How can the monitoring system be enhanced?	✓				

Source: Technopolis Group, forthcoming

Findings from **interviews**, as well as quotes from interviews are only used to support and enrich the findings from surveys. Case studies are primarily used to support and enrich the findings from surveys, and to yield a deeper understanding of the functioning of the SME Instrument.

Surveys were conducted with two type of stakeholders: SME Instrument applicant and beneficiary in one hand, and SME and innovation agencies in the other. The survey on SMEs included large assessments of the treatment groups, as well as large **control group** assessments.

The **SME survey** was implemented via six related questionnaires sent to six different respondents'groups - based on their 'application journey'. This was mainly because SMEs could have submitted proposals to Phase 1 or Phase 2 or both and could have been successful or unsuccessful in one, both or neither. The different questionnaires were constructed in order to enable the survey to deliver specific questions to specific types of SME Instrument applicant or beneficiary.

The survey was opened on Wednesday 28 September 2016, and was closed on Friday 14 October. Reminders were sent to members of the control group on Monday 10 October, 2016 and to members of all other groups on Thursday 13 October 2016. The survey received 2,402 responses across the six groups, a response rate of 16%.

The **Agency survey** was disseminated among SME and innovation agencies. The survey was opened on Wednesday 5 October 2016, and was closed on Wednesday 19 October. Reminders were sent on Wednesday 12 October 2016, 2016. A total of 140 agencies, from 35 different countries, responded to the survey. This represents a response rate of 18%.

The evaluation of the INNOSUP Actions was considerably challenged by lacking data. As the INNOSUP call is bespoke, intrinsically heterogeneous, and very young, limited qualitative documentation was available. There was little secondary quantitative information on the INNOSSUP available. Finally, most of the interviewees (identified together with the Commission) had little (overall) knowledge on the INNOSUP actions to address specific evaluation questions.

I.1.3. Description of programmes under evaluation

I.1.3.1. SME Instrument

The SME Instrument is a component of Horizon 2020 that provides "SME-tailored support to stimulate all forms of innovation in SMEs, targeting those with the potential to grow and internationalise across the single market and beyond". Small and medium-sized enterprises (SMEs) are defined in the EU recommendation 2003/361. Staff headcount needs to be below 250, while turnover needs to be no higher than EUR 50m and specific rules regarding the companies' autonomy apply.[28][29] The SME Instrument is a clear break with previous possibilities for SMEs to participate in EU level support programmes for Research and Innovation.[30] It feeds into bringing SME participation within Horizon 2020 programmes as set in the Regulation N1291/2013, up to a target of 20% investment from the 'Societal Challenges' and the specific objective 'Leadership in Enabling and Industrial Technologies' under Horizon 2020.

The Instrument provides innovation support and has been designed with three unsequential phases:

- Phase 1 (investigation of technical & commercial feasibility of a business idea): to explore the scientific or technical feasibility and commercial potential of new ideas. Business innovation grants for feasibility assessment purposes are EUR 50,000 each and there is the possibility of applying for further support (Phase 2).
- Phase 2 (development & demonstration): to develop innovation and with demonstration purposes. Examples of close-to-market innovation activities that can be supported are prototyping, miniaturisation, scaling-up, design, performance verification, testing, demonstration, development of pilot lines, validation for market replication, including other activities aimed at bringing innovation to investment readiness and maturity for market take-up. Grants can amount up to EUR 2.5 million (EUR 5 million in thematic area of "Health, demographic change and well-being").
- Phase 3 (additional EU support to enter the market) focuses on support, training, and coaching, as well as facilitating access to risk finance, by helping to meet potential private investors or by stenghtening key soft skills. It is a bundle of service to the community offered to all SME beneficiary of Phase 1 or Phase 2 – upon request. No additional grant funding is extended to the beneficiary SMEs in this phase.

[28] *In addition balance total needs to be no higher than €43m.*
[29] *In addition balance total needs to be below €43m.*
[30] *For example the EU's 7th Framework Programme for Research and Technological Development (FP7) and the Research for the Benefit of SMEs scheme or the EU's Competitiveness and Innovation Framework Programme (CIP).*

The SME Instrument targets projects that have reached a Technology Readiness Level 6 (TRL6) as a minimum (or similar for non-technological innovations).[31] This focus on innovation and close-to-market activities represents a break with past programmes. In particular, Horizon 2020 and the SME Instrument were streamlined and made more friendly to SMEs.[32]

The SME Instrument targets SME innovation activity related to any of the seven Societal Challenges from Secure, clean and efficient energy to health and the Key Enabling and Industrial Technologies under the Industrial Leadership pillar, such as ICT and advanced manufacturing. At least 7% , of the total budgets of the specific objective 'Leadership in Enabling and Industrial Technologies' (LEIT) and the priority Societal Challenges (SC), averaged over the duration of Horizon 2020 should be allocated to the SME Instrument.

I.1.3.2. INNOSUP Actions

INNOSUP covers a wide range of potential activities which aim at improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative SMEs with potential for fast growth. INNOSUP also hosts support programmes that were offered under the Competitiveness and Innovation Framework Programme (CIP), which ran from 2007 to 2013. The main mechanism for support under the auspices of the CIP was the Entrepreneurship and Innovation Programme (EIP), which supported national and regional programmes for business innovation as well as helping to develop and explore new types of innovation services.

The rationale behind INNOSUP is that SMEs receiving innovation support, too often remain dissatisfied with the services they receive. Moreover, the innovation support providers are eager to achieve a higher return from the support provided to the SME community.[33] INNOSUP actions are therefore supposed to result in (i) specialised support services established at European level to complement existing national and regional services or the support to enhancing locally existing services; (ii) to provide opportunities to Member States and regions for collaboration, peer-learning and uptake of new approaches to enhance their SME services; (iii) to provide room for experimentation with new approaches for a better innovation support. The INNOSUP has been a part of 'Innovation in SMEs' under Horizon 2020; it aims to develop the ecosystem of innovation support to SMEs in Europe.

The mandate for funding INNOSUP activities is relatively broad, with some of the subject matter having been carried over from previous incarnations of various support programmes funded by the European Union. The European IPR Helpdesk, for example, saw its start in 1999, while pilots of the Cluster Facilitated Projects for New Industrial Value Chains started in 2011 (CIP).

The challenges addressed by INNOSUP actions are defined in Horizon 2020's legal base and the 2014–2015 and 2016–2017 Work Programmes. These are:

[31] *The technology is demonstrated in relevant environment.*
[32] *Simonelli, F. (2016). Is Horizon 2020 really more SME-friendly? A look at the figures, (February), 1–5.*
[33] *European Commission (2015). Horizon 2020 Work Programme 2016-2017*

- SMEs receiving innovation support often remain dissatisfied with the services they receive
- The public expects a higher return from the support provided to innovation in SMEs

The 2014–2015 Work Programme identifies 'emerging innovation trends' as a means to help SMEs overcome some of the size disadvantages they face, and states that mobilising, coordinating and exploiting resources across national borders, sectors and firms will be key for SMEs as innovation moves towards a networked-based approach extending over borders.

The 2016–2017 work programme sees these innovations not per se as potential leverage for support to SMEs, but considers these as a development of their own. In addition, it states that social innovation is required at the interface between public services and private enterprise to maintain the high standard and security of living in Europe. It states that generally, "the actions are designed to provide opportunities to Member States and regions to enhance their services through collaboration, peer-learning and uptake of new approaches". Innovation agencies in the Enterprise Europe Network, the National Contact Points and the Member States are expected to play an important role in implementing the INNOSUP actions.

Nine topics started since March 2014, while two more are under preparation. The subject matter of these calls varies in both topic and the level of specificity. For instance, in all years, funding has been provided for "peer learning", where no specific subject is mentioned in the scope of the project ("Peer learning is open for all topics for a better innovation support to SMEs"). Other programmes provide very specific advice, such as one call that supports the development of European label for innovation voucher programmes in support of spin-in of technology.

I.1.4. Objectives and intervention logic

The figure below presents the intervention logic for the SME Instrument and INNOSUP actions. This intervention logic presents their rationale , the inputs that were invested in the instruments, and the expected outputs, results, and impacts following from these activities. The intervention logic aims to demonstrate the intended and expected functioning of the SME Instrument and the INNOSUP calls.

The intervention logic shows that there were several reasons ('needs') for introducing the instruments. It was observed that Research and Innovation did not contribute significantly to tackling key societal challenges, there was insufficient technological leadership and innovation capability in European SMEs, there was a need for Horizon 2020 to strengthen the science base and trans-national cooperation. In order to adress these needs, the SME Instrument and INNOSUP calls were launched. These instruments were intended to achieve a number of objectives, at various levels.

At the **operational level**, the SME Instrument and INNOSUP calls were intended to (1) help fill the gap in funding for early stage high-risk research and innovation, (2) stimulate breakthrough innovations, and (3) increase private-sector commercialisation of research results. These operational objectives were defined in the Council Decision establishing the specific programme implementing Horizon 2020.

At the **intermediate level**, the SME Instrument and INNOSUP calls were meant to contribute to two Horizon 2020 pillars. First, they were to contribute to the three specific objectives of the pillar Industrial Leadership:

- Boosting Europe's industrial leadership through research, technological development, demonstration and innovation in enabling and industrial technologies
- Enhancing access to risk finance for investing in R&I
- Increasing innovation in SMEs

Second, the instruments were foreseen to help tackling key Societal Challenges:

- Health, demographic change and well-being
- Food security, sustainable agriculture & forestry, marine, maritime & inland water research & bio-economy
- Secure, clean & efficient energy
- Smart, green and integrated transport
- Climate action, environment, resource efficiency & raw materials
- Inclusive, innovative & reflective societies
- Protection freedom and security

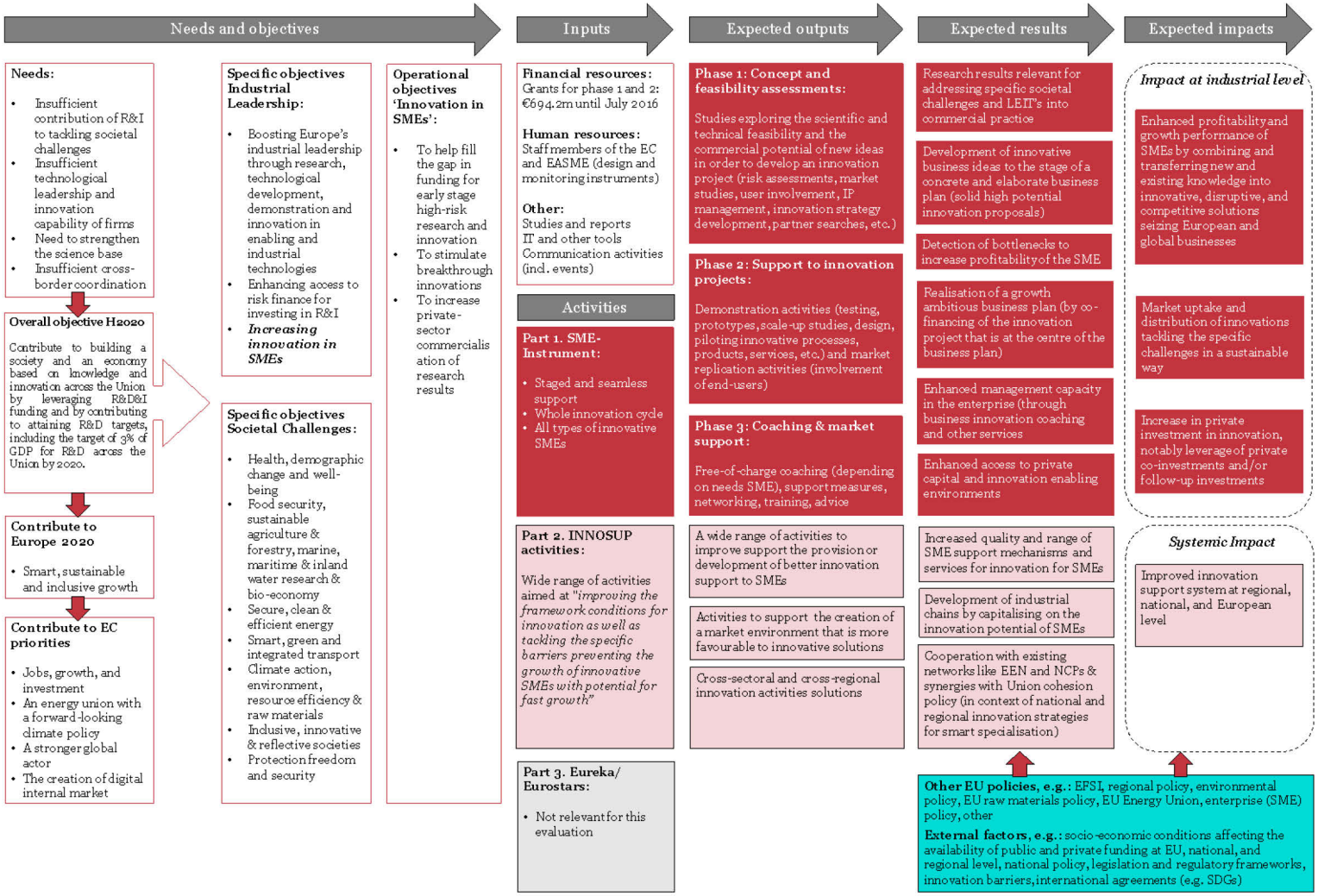
At the **highest level**, the SME Instrument and INNOSUP calls were intended to contribute to the overall objective of Horizon 2020, as well as the Europe 2020 targets related to smart, sustainable, and inclusive growth, and other EC priorities.

The SME Instrument and INNOSUP calls (together with EUROSTARS – which is not subject to the present evaluation) fall within the third specific objective of the pillar 'Industrial Leadership', namely *"increasing innovation in SMEs"*.

As described in more detail in section I.1.2, the **expected direct outputs** of the SME Instrument are (1) concept and feasibility studies, (2) concrete support to innovation projects, and (3) coaching and market support for SMEs. The foreseen outputs for the INNOSUP calls are less tangible as they intend to improve business support to SMEs and create a better market environment for innovative solutions.

The **expected results and impacts** are in turn closely related to the objectives of the instruments. It should be noted that there is a number of **other EU policies** and initiatives and **external factors** that may (positively or negatively) influence the actual results and impacts of the instruments, as shown in the green box at the bottom of the diagram.

Figure 148 - Intervention logic 'Innovation in SMEs'



Source: Technopolis Group, forthcoming

I.2. IMPLEMENTATION STATE OF PLAY

This chapter presents the full implementation state-of-play of the SME Instrument and the INNOSUP Actions. It contains key information on the implementation of the budgets, key characteristics of the proposals and projects funded by the instruments, topics covered by projects, and participation patterns.

This analysis is based on CORDA data as well as other data provided by the Commission services and EASME for the period from their launch in 2014 until July 2016. It should be noted that while the CORDA data provided a wealth of detailed information on the implementation state-of-play of the SME Instrument, the data on the INNOSUP Actions were more limited.

I.2.1. Overview of key data

The main findings in relation to the SME Instrument include the following:

- The SME Instrument was allocated a total **budget** of circa EUR 1.3 billion for the entire duration of Horizon 2020 (2014-2020). The budget allocated so far (until July 2016) was EUR 694.1 million.
- Until July 2016, the SME Instrument received 24,466 eligible **proposals** (74.5% for Phase 1 and 25.5% for Phase 2). Out of these, 5,124 proposals passed all evaluation thresholds. The proportion of eligible proposals that passed all evaluation criteria was considerably higher for Phase 2 (37.7%) than Phase 1 (15.2%).
- In total 61.9% of the eligible proposals submitted under Phase 1 and 58.8% of those submitted under Phase 2 were **first-time submissions**. The remainder of proposals were either re-submissions of the same ideas or SMEs re-submitting a new idea (for instance in a different consortium, to a different theme, or on different terms).
- A total of 1,871 **projects** have been awarded, thus the average success rate was 7.6%. There was a significant range in the EC contribution to projects funded under Phase 2 of the SME Instrument. While some projects received ca EUR 0.5 million, others received EUR 5m from the programme.
- In terms of **participation patterns**, the data showed that EU-13-countries were much less successful in the SME Instrument than EU-15 countries. In absolute terms, EU-15 countries received 85.7% of the total EC contribution (EUR 595.1 million), compared to only 8.4% for EU-13 countries (EUR 58.4 million). Moreover, the success rate of EU-13 countries was much lower than EU-15 and even Associated and Third Countries (combined). In absolute terms (i.e. the EC contribution), Spain, UK, Italy, Germany and France were the top 5 countries. They accounted for 58% of the total EC Contribution (equivalent to EUR 404 million).
- Regarding the **topics of projects**, out of the 1,871 projects awarded, 618 projects were awarded under the LEIT pillar. Open and Disruptive Innovation was the most-funded topic under this pillar (EC contribution of EUR 119 million). 1,253 projects were awarded under the Societal Challenges pillar (EC contribution of EUR 481.9 million). The Energy Challenge was the most funded theme under this pillar.
- There was a significant **over-subscription** across the majority of themes. This indicated that the SME Instrument has attracted relevant proposals, in exceess of the resources available. These results provide some evidence on the relevance of the instrument.

In relation to the **main findings related to INNOSUP Actions**, a large share of actions under Innovation in SMEs is implemented by call for tender or ad-hoc grants rather than open calls for proposals. In fact, 84.3% of the available budget (not including the allocation to Eureka/Eurostars, and the INNOSUP calls that were still under preparation) was committed by call for tender or ad-hoc grant. By choosing this form of budget implementation, the Commission aimed to enhance the ownership of activities at the level of intermediaries and regions, and to invest in qualifications of consultants in public support agencies and to develop the quality of the services locally available to SMEs. To date, nine different actions were implemented. INNOSUP Actions have committed EUR 37.4 million across nine call for proposals, which represents 119% of the allocated indicative budget.

I.2.2. Implementation state-of-play of the SME Instrument

This section describes the allocation of the budget, the number of submitted proposals , the number of selected projects, and the number and types of applicants and beneficiaries.

I.2.2.1. General overview of the budget, proposals, and projects

The SME Instrument call was allocated circa EUR 1.3 billion in Horizon 2020. A share of this amount was allocated to the SME Instrument via the Horizon 2020 Work Programmes 2014-2017.

Table 100 - Activities and allocated indicative budget dedicated to the SME Instrument for the programming period 2014-2017

Activities 2014-2015		**Allocated indicative budgets (EUR M)**		**Activities 2016-2017**	**Allocated indicative budgets (EUR M)**	
		2014	2015		2016	2017
Information and Communication Technologies	ICT-37-2014/2015 Open Disruptive Innovation Scheme	45.00	43.00	SMEInst-01-2016-2017	60.00	66.00
Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing	NMP-25-2014/2015 Accelerating the uptake of nanotechnologies advanced materials or advanced manufacturing and processing technologies by SMEs	21.80	23.80	SMEInst-02-2016-2017	31.83	35.32
	BIOTEC -5-2014/2015 SME boosting biotechnology-based industrial processes driving competitiveness and sustainability	3.80	2.40	SMEInst-03-2016-2018	7.50	7.50
Space	SME-SPACE-1-2014/2015 SME Instrument	8.50	8.55	SMEInst-04-2016-2018	11.37	12.60
Health, demographic change and well-being	PHC-12-2014/20153 Clinical research for the validation of biomarkers and/or diagnostic medical devices	66.10	45.00	SMEInst-05-2016-2019	35.00	80.00
				SMEInst-06-2016-2019	18.00	12.50

Activities 2014-2015		Allocated indicative budgets (EUR M)		Activities 2016-2017	Allocated indicative budgets (EUR M)	
		2014	2015		2016	2017
Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bio economy	SFS-8-2014/2015 Resource-efficient eco-innovative food production and processing	10.00	17.00	SMEInst-07-2016-2020	25.46	37.87
	BG-12-2014/2015 Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	4.00	5.00	SMEInst-08-2016-2020	9.50	12.42
Energy Challenge / Secure, Clean and Efficient Energy	SIE-1-2014/2015 Stimulating the innovation potential of SMEs for a low carbon and efficient energy system	33.95	34.76	SMEInst-09-2016-2021	46.00	50.00
Smart, green and integrated transport	IT-1-2014/2015 Small business innovation research for Transport	35.87	38.96	SMEInst-10-2016-2021	57.57	61.23
Climate action, environment, resource efficiency and raw materials'	SC5-20-2014/2015 Boosting the potential of small businesses for Eco innovation and a sustainable supply of raw materials	17.00	19.00	SMEInst-11-2016-2022	25.00	36.00
Europe in a changing world – inclusive, innovative and reflective Societies	INSO-9-2015 Innovative mobile e-government applications by SMEs		4.00	SMEInst-12-2016-2022	10.80	11.40
	INSO-10-2015 SME business model innovation		11.00			
Secure societies – Protecting freedom and security of Europe and its citizens	DRS-17-2014/2015 Protection of urban soft targets and urban critical infrastructures	7.00	7.40	SMEInst-13-2016-2017	15.37	14.67
Total indicative budget		**244.9**	**268**		**353.40**	**437.51**

Source: European Commission. Horizon 2020 Innovation in SMEs Work Programmes 2014-2015 and 2016-2017

As of July 2016, a total of 24,466 eligible proposals have been submitted to the SME Instrument (74.5% under Phase 1 and 25.5% under Phase 2).[34] These eligible proposals requested a total EC contribution of EUR 11.4 billion (8% under Phase 1 and 92% under Phase 2).

A total of 5,124 eligible proposals passed all evaluation thresholds. Of these 5,124 proposals, 54.1% (2,772 proposals) were under Phase 1 and 45.9% (2,352 proposals) were submitted under Phase 2. This represents 20.9% of the total number of proposals submitted. This proportion was higher for retained eligible proposals under Phase 2 (37.8%) than for those that passed all evaluation thresholds under Phase 1 (15.2%).

Eligible proposals that passed all evaluation thresholds as of July 2016 requested a total EC contribution of EUR 4.3 billion (3.2% under Phase 1 and 96.8% under Phase 2). This represents 38.2% of the EC contribution requested. This proportion was higher under Phase 2 (40.2%) than under Phase 1 (15.2%).

Table 101 - Key data on proposals per Phase for the SME Instrument: Number of eligible and proposals and proposals that passed all evaluation thresholds, EC contribution requested (in million Euros)

Phase	Number of eligible proposals submitted	Number of eligible proposals retained for funding	EC contrib. requested by eligible proposals (millions)	EC contrib. requested by retained proposals (millions)	Percentage of proposals retained	Percentage of proposals retained (based on EC contrib.)
Phase 1	18,234	2,769	€911.6	€138.5	15.2%	15.2%
Phase 2	6,232	2,355	€10,457.1	€4,204.0	37.8%	40.2%
Total	**24,466**	**5,124**	**€11,368.7**	**€4,342.4**	**20.9%**	**38.2%**

Source: Technopolis Group, based on CORDA data (July 2016), Success Rates by Type of Action (General).

A total of 1,871 projects have been selected. Selected projects include 1,997 individual SMEs across a total of 2,104 participations. The EC contribution allocated to the implementation of the SME-I open calls between June 2014 and July 2016 was EUR 694.1 million.

Of the total of 1,871 projects 80.1% of them correspond to Phase 1 while the remaining corresponds to Phase 2. The total EC contribution awarded to these projects is EUR 694.2 million (10.8% under Phase 1 and 89.2% under Phase 2). 91% of projects under Phase 1 were expected to finish by September 2016 (month in which the beneficiary survey took place). In contrast, only 2% of projects under Phase 2 were expected to finish by September 2016.

[34] *This figure is exclusive of 376 proposals that were considered ineligible under the programme. Of these, 50 were withdrawn by the beneficiaries themselves; 36 were inadmissible for one reason or another; 30 were duplicates of existing submissions; and a further 260 were ineligible for some other reason.*

The overall success rate of proposals has been 7.6%.[35] The overall success rate of individual applicants (SMEs submitting at least one eligible proposal versus SMEs being successful at least once) has been considerably higher: 12.6% overall (and 14.5% among EU28 countries). This success rate has been 13.4% in Phase 1 and 9.7% in Phase 2. Further analysis on re-submissions is presented in Section I.2.2.6.

Table 102 - Headline figures for Phase 1 and Phase 2 of the Horizon 2020 SME Instrument

Indicators	Phase 1	Phase 2	Total
Total projects awarded	1,499	372	1,871
• **EC contribution allocated**	€75.0m	€619.2m	€694.2m
• **Beneficiaries**	1,642	462	1,997
• **Participations**	1,642	462	2,104
Success rate of proposals	8.2%	6.0%	7.6%
Success rate of applicants	8.3%	5.8%	7.6%
Success rate of individual SMEs (SMEs submitting at least one eligible proposal versus SMEs being successful at least once)	13.4%	9.7%	12.6%

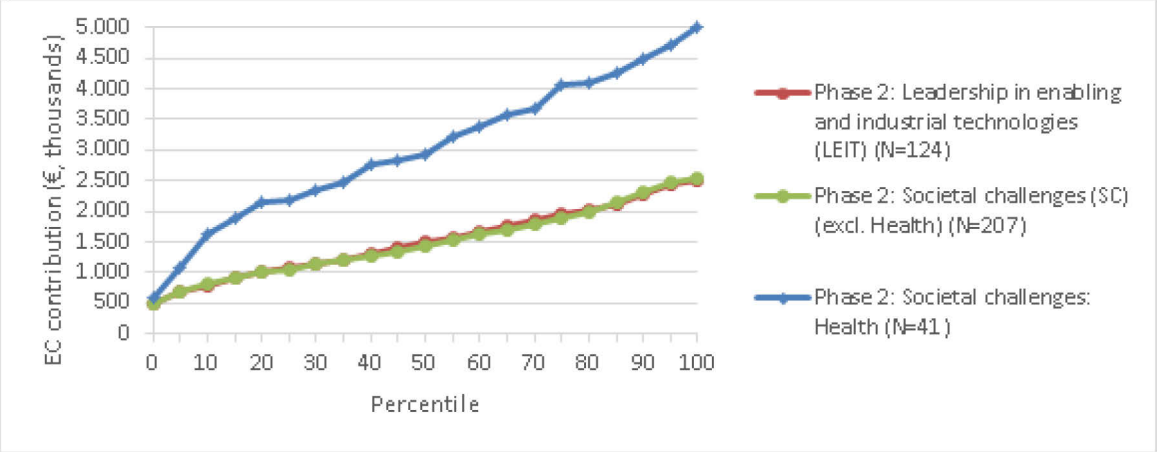
Source: Technopolis Group, based on CORDA data (July 2016).

I.2.2.2. EC contribution to individual projects

This section elaborates on the EC contribution to individual projects, only of Phase 2 – as Phase 1 EC contribution is of a fixed grant of EUR 50,000.

Figure 149 shows the distribution of projects under Phase 2, according to their EC contribution. The minimum value is shown under the 0th percentile, the maximum under the 100th percentile and the median value as the 50th percentile. (Phase 1 is not shown since its projects are be uniformly distributed (as a straight line) at a value of EUR 50,000.).

Figure 149 - Distribution of the EC Contributions of each project under Phase 2, by pillar



Source: Technopolis Group, based on CORDA data (July 2016).

[35] *A very similar success rate emerges based on participations (i.e. number of participants in eligible proposals versus number of beneficiaries in funded projects). This due to the fact in the SME Instrument the majority of proposals (90.2%) include only one applicant SME.*

The projects under Phase 2 have only slightly higher values under the Societal challenges (SC) pillar than under Leadership in enabling and industrial technologies (LEIT) but this is mainly driven by the size of the projects of the "Health" theme. The median value for SC projects (excluding the "Health" theme) is EUR 1.4 million and for LEIT projects is EUR 1.5 million. The median value of projects under the "Health" theme is EUR 2.9 million. Projects above the median had between EUR 3.2 million and EUR 5 million in EC contribution (in comparison with all other projects that had a maximum of EUR 2.5 million in EC contribution).

I.2.2.3. Participation patterns

This section elaborates on the participation patterns in the SME Instrument. It describes the geographical location of funded project . It also presents the performance of countries in terms of number of applications, EC contribution (absolute amounts awarded), number of beneficiaries per million inhabitants, number of coordinator roles, and geographical success rates.

The Annex contains a detailed overview of the selected projects under phase 1 and phase 2 per country.

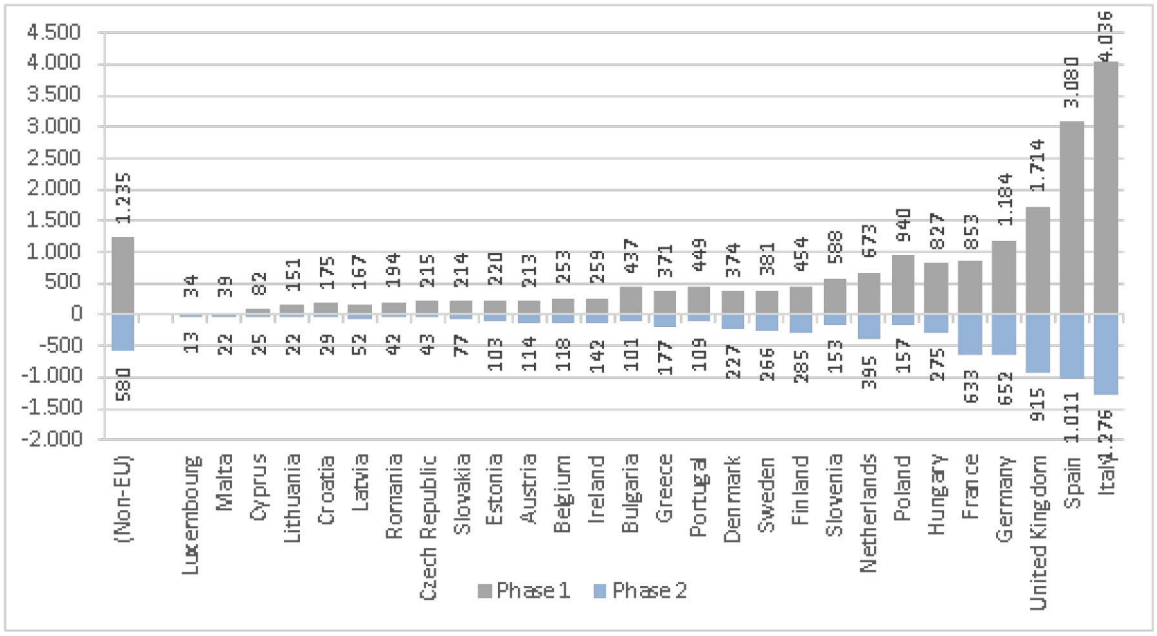
(a) Applications by country

Applicant came from across the entire EU as well as from a number of non-EU countries, in line with the Horizon 2020 Participants Rules. Italy accounted for the biggest number of single applicants within the proposals under both phases (2,913 individual SMEs from Italy applied for 4,036 participations under Phase 1 and 1,276 under Phase 2). Spain accounted for the second biggest number in both phases (2,119 individual SMEs applied for 3,080 participations under Phase 1 and 1,011 under Phase 2), followed by the United Kingdom (1,577 individual SMEs applied for 1,714 participations under Phase 1 and 915 under Phase 2, which implies that some applied more than once). SMEs from Germany had applied for the next biggest number of roles, across the two phases, followed by those from France, Hungary, Poland and the Netherlands (see the figure below).

Non-EU countries accounted for 1,073 individual SMEs that applied for 1,235 participations under Phase 1 and a further 580 under Phase 2. Three countries alone accounted for 83.5% of the SME applicants by non-EU countries across both phases: Israel (348 individual SMEs applied for 357 participations under Phase 1 and 320 under Phase 2), Turkey (309 individual SMEs applied for 372 participations under Phase 1 and 85 under Phase 2), and Norway (220 individual SMEs applied for 273 participations under Phase 1 and 108 under Phase 2).

Other non-EU applicants included SMEs from Albania, Bosnia and Herzegovina, the Former Yugoslav Republic of Macedonia, Iceland, the Republic of Moldova, Montenegro, Serbia, Ukraine and a number of overseas territories under the jurisdiction of EU Member States.

Figure 150 - SME applicants under Phase 1 and Phase 2, by EU Member State



Source: Technopolis Group, based on CORDA data (July 2016).

(b) Projects by country

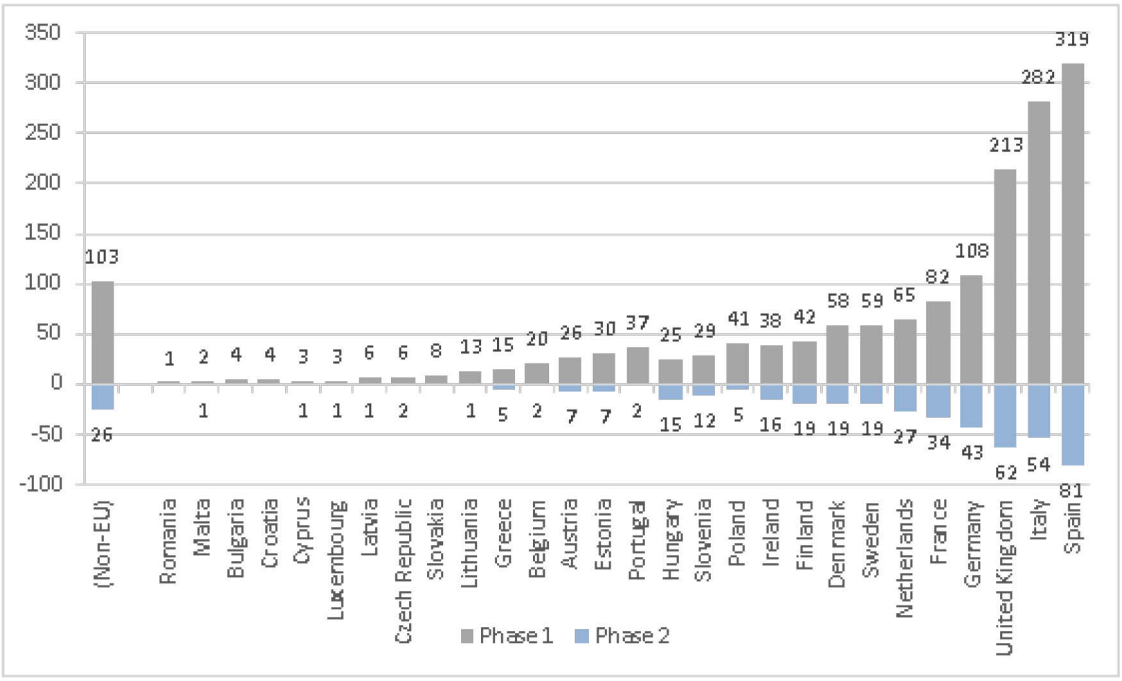
A total of 1,997 beneficiaries (individual SMEs) participated in funded projects nder the SME Instrument up to mid-2016. Phase 1 has had 1,642 beneficiaries, while Phase 2 has 462 beneficiaries.

The beneficiaries came from across the entire EU as well as from a number of non-EU countries. Spain accounted for the single biggest number of participations awarded under both phases (371 individual SMEs from Spain achieved 319 participations under Phase 1 and 81 under Phase 2). Italy accounted for the second biggest number across the two phases (321 individual SMEs achieved 282 participations under Phase 1 and 54 under Phase 2), followed by the United Kingdom (213 individual SMEs achieved 213 participations under Phase 1 and 62 under Phase 2). SMEs from Germany achieved the next biggest number of participations, across the two phases, followed by those from France, the Netherlands, Sweden and Denmark (see the figure below).

Non-EU countries accounted for 124 individual SMEs that achieved 103 participations under Phase 1 and a further 26 under Phase 2. Three countries alone accounted for 87.6% of the SME applicants by non-EU countries across both phases: Israel (56 individual SMEs achieved 46 participations under Phase 1 and 11 under Phase 2), Norway (40 individual SMEs achieved 34 participations under Phase 1 and 8 under Phase 2), and Turkey (14 individual SMEs achieved 10 participations under Phase 1 and 4 under Phase 2).

Other non-EU beneficiaries included SMEs from Iceland, Serbia, Ukraine and a number of overseas territories under the jurisdiction of EU Member States.

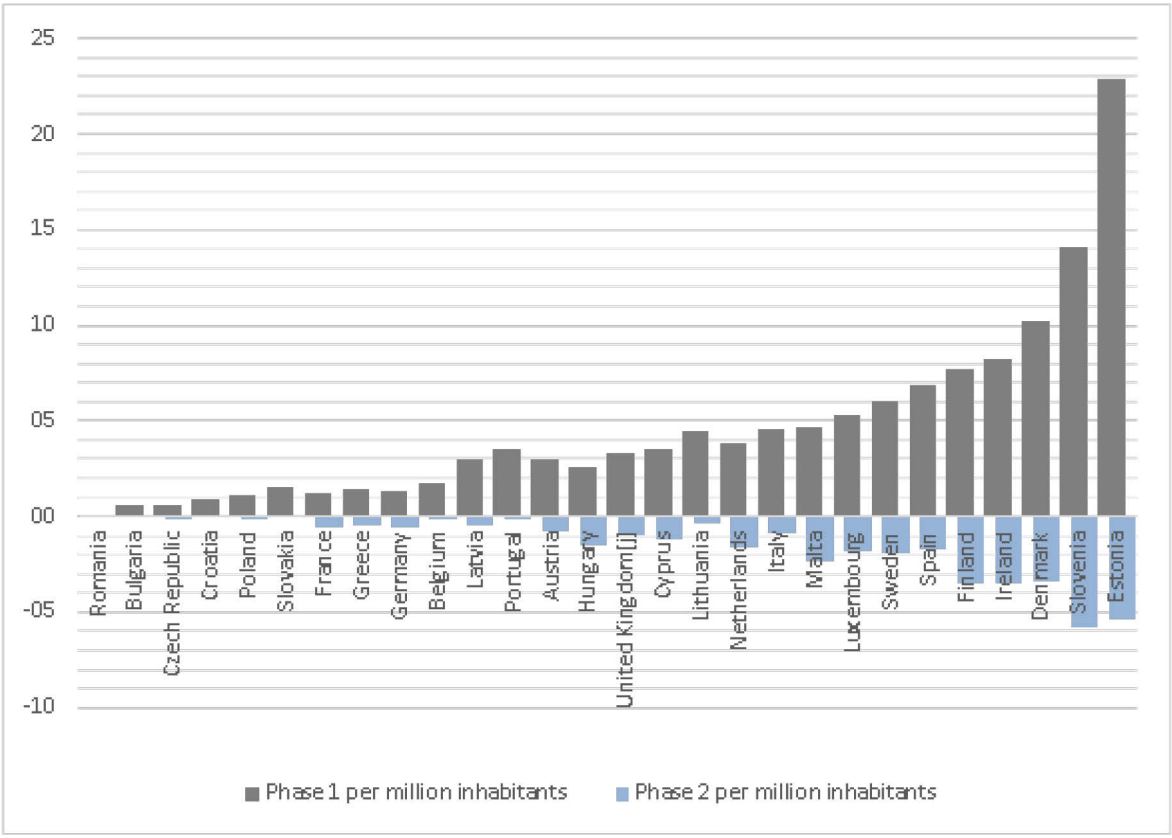
Figure 151 - Selected projects under Phase 1 and Phase 2, by EU Member State



Source: Technopolis Group, based on CORDA data (July 2016).

The figure below corrects the numbers of actual proposals for the number of inhabitants per Member State. It clearly shows that in particular Slovenia and Estonia are very successful in both Phase 1 and Phase 2.

Figure 152 - Selected projects under Phase 1 and Phase 2, per million inhabitants



Source: Technopolis Group, based on CORDA data (July 2016).

(c) EC contributions per country

Until July 2016, 1,975 out of the total 2,104 participations were within the EU-28, and the remaining within Associated Countries and Third Countries.

Successful participation in the SME Instrument depends on the mobilisation of the right innovative, growth ambitious companies. Spain, United Kingdom, Italy, Germany and France are the **top 5 countries in terms of EC Contribution** (absolute). They account for 58% of the total EC Contribution (equivalent to EUR 404 million).

1. In **phase 1**, SMEs from Spain received the largest EC contribution (EUR 15.2 million, 20.3% of the total awarded under Phase 1), followed by those from Italy (EUR 11.9 million, 15.9%), the United Kingdom (EUR 9.5 million, accounting for 12.7%), Germany (EUR 4.8 million, 6.5%) and France (EUR 3.9 million, 5.2%).

2. Similarly, in **phase 2** Spanish SMEs received the largest EC contribution (EUR 101.0m, accounting for 16.3% of the total awarded under Phase 2), followed by those from the United Kingdom (EUR 94.9 million, 15.3%), Italy (EUR 58.3 million, 9.4%), Germany (EUR 53.3 million, 8.6%) and France (EUR 51.4 million, 8.3%).

In absolute terms, EU-15 countries received 85.7% of the total EC contribution (EUR 595.1 million), compared to only 8.4% for EU-13 countries (EUR 58.4 million). Moreover, the success rate of EU-15 countries was much lower than EU-15 and even Associated and Third Countries (combined).

When looking at the **number of beneficiaries per 1 million inhabitants** a different distribution emerges. The table above clearly shows that in that case Estonia, Denmark, Finland, Ireland, and Slovenia outperform the other countries.

In terms of the country with **most coordinator roles** under **Phase 1**, Spain had the largest number of beneficiaries, coordinating 303 individual projects with participations from 319 different SMEs. Italy had the second largest number of coordinator roles (237 projects coordinated among 282 different beneficiaries), followed by the United Kingdom (196 projects coordinated among 213 different beneficiaries), Germany (96 projects coordinated among 108 different beneficiaries) and France (76 projects coordinated among 82 different beneficiaries).

Similarly, the country with most coordinator roles under **Phase 2** was also Spain, coordinating 73 individual projects among 81 different beneficiaries. The United Kingdom had the second biggest number of coordinator roles and individual beneficiaries (49 projects coordinated among 62 different 1 beneficiaries), followed by Italy (40 projects coordinated among 54 different beneficiaries), Germany (31 projects coordinated among 43 different beneficiaries) and France (30 projects coordinated among 34 different beneficiaries).

Table 103 - Key data on participation per country: number of beneficiaries and project coordinators, and EC contribution to participations (in million Euros)

EU Member State	Number of individual SMEs in signed grants	Number of projects	Number of participations in signed grants	EC contrib. to participations in signed grants (millions)	Individual applicants per 1m of population	Individual beneficiaries per 1m of population
Austria	31	31	33	11.6	23	4
Belgium	22	21	22	3.9	19	2
Bulgaria	4	4	4	0.2	49	1
Croatia	4	4	4	0.2	27	1
Cyprus	4	3	4	0.8	81	5
Czech Republic	8	7	8	3.4	13	1
Denmark	73	70	77	22.3	58	13
Estonia	34	34	37	14.6	128	26
Finland	58	55	61	32.4	82	11
France	109	106	116	55.3	13	2
Germany	143	127	151	58.2	13	2
Greece	19	19	20	7.4	31	2
Hungary	38	34	40	14.4	63	4
Ireland	50	51	54	29.1	49	11
Italy	321	277	336	70.2	48	5
Latvia	7	5	7	0.5	58	4
Lithuania	13	14	14	1.8	33	4
Luxembourg	4	3	4	0.7	52	7
Malta	3	2	3	2.0	68	7
Netherlands	89	77	92	47.8	38	5
Poland	46	33	46	7.0	17	1
Portugal	38	36	39	3.5	30	4
Romania	1	1	1	0.1	8	0
Slovakia	8	7	8	0.4	30	1
Slovenia	39	35	41	13.0	201	19
Spain	371	376	400	116.3	46	8
Sweden	76	72	78	31.9	39	8
United Kingdom	260	245	275	104.4	24	4
Total (EU-28)	**1,997**	**1,871**	**1,975**	**653.5**	**n/a**	**n/a**

Source: Technopolis Group, based on CORDA data (July 2016). Participants and Participations by EU-28 Member State. Total population figures used in calculations obtained from Eurostat (2016), as valid on 1 January 2015.

(d) Success rates per country

The table below shows that Ireland has the **highest success rate** of the EU-28 Member States, based on the success rate of proposals (13.3%) and ratio of EU contribution (12.9%). However, Denmark demonstrates the highest success rate of individual applicants (24.5%).

Each compares favourably to the overall success rates of EU-28 Member States of 14.5% (SME applicants), 7.5% (proposals) and with a ratio of 6.3% (EC contribution).

The data shows that EU-13-countries were generally less successful in the SME Instrument than EU-15 countries. They had lower success rates and lower contribution awarded than EU-15.

Table 104 - Success rates (as % of proposals submitted, and as % of budget available) per EU-28 country for the SME Instrument

Country	Success rate of proposals	Success rates at individual SMEs' level	EU contribution
Austria	10.5%	18.9%	8.2%
Belgium	6.20	11.9%	2.0%
Bulgaria	0.8%	1.3%	0.1%
Croatia	2.0%	4.2%	0.5%
Cyprus	3.7%	6.6%	2.2%
Czech Republic	3.1%	6.7%	5.7%
Denmark	12.2%	24.5%	6.5%
Estonia	11.5%	23.0%	9.1%
Finland	8.3%	14.0%	6.7%
France	7.8%	14.4%	5.3%
Germany	8.0%	16.1%	6.4%
Greece	3.5%	6.4%	4.3%
Hungary	3.6%	6.7%	3.6%
Ireland	13.3%	23.8%	12.9%
Italy	6.2%	13.1%	4.9%
Latvia	3.3%	6.8%	0.7%
Lithuania	8.1%	14.8%	4.2%
Luxembourg	8.5%	16.0%	5.1%
Malta	5.1%	12.0%	11.5%
Netherlands	8.4%	15.8%	7.0%
Poland	3.8%	7.8%	2.9%
Portugal	6.8%	12.8%	2.4%
Romania	0.4%	0.8%	0.1%
Slovakia	2.8%	5.3%	0.3%
Slovenia	5.8%	11.0%	7.6%
Spain	9.8%	19.1%	9.0%
Sweden	11.6%	21.5%	7.1%
United Kingdom	10.5%	19.1%	8.3%
Grand total	**7.5%**	**14.5%**	**6.3%**

Source: Technopolis Group, based on CORDA data (July 2016).

I.2.2.4. Topics of awarded projects

The budget for the SME Instrument was allocated to thirteen different topics (four under LEIT and nine under the Societal Challenges). For each of these pillars, this section elaborates on the topics of the projects that were awarded a grant under the SME Instrument.

I.2.2.5. Topics of projects awarded under the pillar Industrial Leadership

Table 105, below, shows that 618 projects out of the 1,871 projects awarded until July 2016, were allocated under the **LEIT pillar** (494 under Phase 1 and 124 under Phase 2). In total, these projects were awarded an EC contribution of EUR 212.3 million. Open and Disruptive Innovation was the most-funded topic under the LEIT pillar, with a total of 341 projects and a total EC contribution of EUR 119 million.

Under **Phase 1**, the Open and disruptive innovation topic had the highest demand in terms of proposals and funding applied (5,091 eligible proposals submitted, requesting EUR 254.5 million), accounting to 27.9% of the total funding requested. The next most prominent topic was Energy challenge (2,136 eligible proposals submitted, requesting €106.8 million), followed by topics linked to Nanotechnologies, advanced materials or advanced manufacturing and processing technologies (1,953 eligible proposals submitted, requesting EUR 97.7 million). Open and disruptive innovation has also been the topic with the highest level of funding in Phase 1 (274 projects awarded, with an EC contribution of EUR 13.7 million), accounting for 18.3% of the total awarded. Several other themes appeared far less prominently under Phase 1. Five separate thematic each encompassed fewer than 50 projects, to date: Space research and development (47 projects), Business model innovation (39 projects), Biotechnology (29 projects), Blue growth (22 projects), and Innovative mobile e-government applications (6 projects)

Open and disruptive innovation also had the highest demand in **Phase 2**, compared with other topics (1,676 eligible proposals submitted, requesting EUR 2.4 billion), alongside Health, demographic change and well-being (902 eligible proposals submitted, requesting EUR 2.6 billion). The former accounted to roughly one quarter of the total proposals submitted while the latter accounted for one quarter of the total EC contribution requested. Projects funded in Phase 2 are almost equally distributed among three priorities: Open and disruptive innovation (67 projects awarded, delivering EUR 105.3 million), Transport and smart cities mobility (61 projects awarded, delivering EUR 91.1 million) and Energy challenge (52 projects awarded, delivering EUR 82.3 million). Health, demographic change and well-being had somewhat fewer projects on the whole (41 projects) but was by far the most significant theme in terms of the EC contribution delivered (EUR 124.0 million). Several other themes appeared far less prominently under Phase 2. Four separate themes encompassed fewer than 10 projects, to date: *Business model innovation* (9 projects), *Biotechnology* (8 projects), *Blue growth* (7 projects), and Innovative mobile e-government applications (3 projects).

(a) Topics of projects awarded under the pillar Societal Challenges

In total, 1,253 projects were awarded under the Societal Challenges pillar (1,005 under Phase 1 and 248 under Phase 2). with a total EC contribution of EUR 481.9 million. The Societal challenges (SC) pillar accounted for 57.0% of the projects applied for under Phase 1 but a slightly higher share (67.0%) of those awarded. The Societal challenges (SC) pillar accounted for 65.0% of the EC contributions applied for under Phase 2 but a slightly higher share

(69.7%) of those awarded. The Energy Challenge was the most funded theme under the Societal Challenges pillar, with a total of 261 projects and a total EC contribution of EUR 135 million.

The EC contributions applied for per proposal and those awarded per project were exactly EUR 50,000 in every case under Phase 1 (as defined under the SME Instrument rules). The average EC contribution requested under Phase 2 was roughly EUR 1.68 million. The average EC contribution delivered under Phase 2 was only slightly lower at roughly EUR 1.67 million.

The average project under the theme Health, demographic change and well-being was awarded EUR 3.0 million of EC contribution. This was significantly higher – roughly double – than that of any other theme, whose average EC contributions delivered ranged between EUR 1.2 million and EUR 1.6 million. It can be assumed that project under the theme Health, demographic change and well-being are relatively capital intensive compared to those under other schemes.

Table 105 - Topics included in closed calls for proposals until July 2016

Topic/ Theme	Number of funded projects		EC contrib. awarded (millions)	
	Phase 1	Phase 2	Phase 1	Phase 2
Open and disruptive innovation	274	67	€13.7	€105.3
Nanotechnologies, advanced materials or advanced manufacturing and processing technologies	144	35	€7.2	€54.9
Space research and development	47	14	€2.4	€17.7
Biotechnology	29	8	€1.5	€9.6
Sub-total for LEIT pillar	**494**	**124**	**€24.7**	**€187.6**
Energy challenge	220	41	€11.0	€124.0
Health, demographic change and well-being	212	61	€10.6	€91.1
Transport and smart cities mobility	198	52	€9.9	€82.3
Climate action, environment, resource efficiency and raw materials	131	29	€6.6	€43.8
Food security, sustainable agriculture and forestry, marine and water research and the bio-economy	120	32	€6.0	€43.3
Security research and development	57	14	€2.9	€18.5
Business model innovation	39	9	€2.0	€13.3
Blue growth	22	7	€1.1	€10.6
Innovative mobile e-government applications	6	3	€0.3	€4.6
Sub-total for SC pillar	**1,005**	**248**	**50.3**	**€431.6**
Grand total (all themes)	**1,499**	**372**	**€75.0**	**€619.2**

Source: Technopolis Group, based on CORDA data (July 2016).

(b) Success rates by topic

The thematic with the highest success rate under Phase 1 was Space research and development (with a success rate of 14.4% of proposals and 27.0% of individual applicants),

followed by Security research and development (12.4% of proposals and 22.6% of individual applicants), Transport and smart cities mobility (12.1% of proposals and 21.1% of individual applicants), and Health, demographic change and well-being (11.9% of proposals and 17.7% of individual applicants). This information is shown in **Table 106**.

The table also shows that success rate based on proposals for the SME Instrument, is considerably lower than overall success rate (across all Horizon 2020 instruments), according to monitoring data published by the Commission.[36] However, the estimation of success rate based on individual SMEs (which takes into account the fact that re-submissions are allowed) presents a more positive comparison.

Two of these topics had comparatively much lower success rates under Phase 2: Health, demographic change and well-being had a success rate of 4.5% of proposals and 7.5% of individual applicants (compared with 11.9% and 17.7% under Phase 1) while Security research and development had a success rate of 6.3% of proposals and 11.3% of individual applicants (compared with 12.4% and 21.2% under Phase 1) (see Table 106).

Conversely, two separate thematics had considerably higher success rates under Phase 2 than Phase 1: Space research and development had a success rates of 17.1% of proposals and 26.0% of individual applicants (compared with 14.4% and 27.0% under Phase 1) while Innovative mobile e-government applications had a success rate of 10.7% of proposals and 11.1% of individual applicants (compared with only 4.7% and 8.9% under Phase 1).

Table 106 - Success rates of proposals and individual applicants by theme

	Phase 1		Phase 2	
Topic/ Theme	**Success rate of proposals (eligible proposals versus funded projects)**	**Success rate of individual SMEs (SMEs submitting at least one eligible proposal versus SMEs being successful at least once)**	**Success rate of proposals (eligible proposals versus funded projects)**	**Success rate of individual SMEs (SMEs submitting at least one eligible proposal versus SMEs being successful at least once)**
Space research and development	14.4%	27.0%	17.1%	26.0%
Nanotechnologies, advanced materials or advanced manuf. and processing technologies	7.4%	13.0%	5.2%	9.4%
Biotechnology	6.2%	9.4%	6.1%	8.1%
Open and disruptive innovation	5.4%	8.8%	4.0%	6.3%
Sub-total for LEIT pillar	**6.3%**	**10.5%**	**4.8%**	8.0%
Security research and development	12.4%	22.6%	6.3%	10.8%
Transport and smart cities mobility	12.1%	21.1%	10.5%	17.2%

[36] *http://ec.europa.eu/research/evaluations/pdf/archive/Horizon 2020_monitoring_reports/second_Horizon 2020_annual_monitoring_report.pdf*

	Phase 1		Phase 2	
Topic/ Theme	**Success rate of proposals (eligible proposals versus funded projects)**	**Success rate of individual SMEs (SMEs submitting at least one eligible proposal versus SMEs being successful at least once)**	**Success rate of proposals (eligible proposals versus funded projects)**	**Success rate of individual SMEs (SMEs submitting at least one eligible proposal versus SMEs being successful at least once)**
Health, demographic change and well-being	11.9%	17.7%	4.5%	7.5%
Food security, sustainable agric. and forestry, marine and water research and the bio-economy	10.4%	16.9%	9.0%	14.2%
Energy challenge	10.3%	16.8%	7.5%	12.0%
Blue growth	9.3%	12.4%	6.7%	7.8%
Climate action, environment, resource efficiency and raw materials	7.2%	11.8%	5.3%	8.7%
Innovative mobile e-gov. applications	4.7%	8.9%	10.7%	11.1%
Business model innovation	3.7%	5.2%	3.7%	3.9%
Sub-total for SC pillar	**9.7%**	15.4%	**6.8%**	10.7%
Grand total	**8.2%**	**13.4%**	**6.0%**	9.7%

Source: Technopolis Group, based on CORDA data (July 2016). Success rate across all instruments is taken from the Commission 2015 Monitoring Report (published in 2016).

(c) Level of budget oversubscription by topic

In terms of the 'demand' across each theme, the analysis shows that there is a significant over-subscription across the majority of topics. The 'rate of budget oversubscription' gives the ratio between the amount of EC contribution awarded and that requested under any given theme. The table shows that under Phase 1, the ratio between EC contribution requested and EC contribution awarded was 12.2, and 16.9 under Phase 2. There is clearly a high demand across all themes.

The table below shows that there has been a relatively high demand for the Topic called 'Business model innovation' in Phase 1 and Phase 2, where the EC contribution requested was more than 25 times the available budget. However, this ratio does not take into account the extent to which the EC contribution requested comes from proposals that meet the evaluation criteria. A more appropiate comparison can be drawn between the EC contribution requested in retained proposals and the EC contribution awarded, also included in the table below.

Table 107 - Budget over-subscription under Phase 1 and Phase 2, by theme

	Phase 1		Phase 2	
Topic/ Theme	**EC contrib. requested versus EC contrib. allocated**	**EC contrib. requested in retained proposals versus EC contrib. allocated**	**EC contrib. requested versus EC contrib. allocated**	**EC contrib. requested in retained proposals versus EC contrib. allocated**
Space research and development	18.6	2.2	22.7	7.9
Nanotechnologies, advanced materials or advanced manuf. and processing technologies	13.6	2.5	17.7	7.6
Biotechnology	7.0	1.1	5.5	2.6
Open and disruptive innovation	16.1	2.6	19.9	7.7
Sub-total for LEIT pillar	15.9	2.2	19.5	7.3
Security research and development	9.7	1.3	20.9	10.7
Transport and smart cities mobility	8.4	1.6	9.9	3.6
Health, demographic change and well-being	8.2	1.3	13.2	5.0
Food security, sustainable agric. and forestry, marine and water research and the bio-economy	14.0	2.6	18.9	7.7
Energy challenge	9.6	1.9	11.9	3.4
Blue growth	8.1	1.6	16.8	7.6
Climate action, environment, resource efficiency and raw materials	26.7	2.8	25.0	7.3
Innovative mobile e-gov. applications	10.8	1.4	18.2	3.1
Business model innovation	21.2	2.3	6.6	1.4
Sub-total for SC pillar	10.3	1.7	15.8	6.6
Grand total	12.2	1.8	16.9	6.8

Source: Technopolis Group, based on CORDA data (July 2016). Selected Projects and Signed Grants by Phase.

It shows that proposals retained requested 1.8 times the EC contribution awarded in Phase 1, and 6.8 times the EC contribution awarded in Phase 2. This indicated that the instrument has attracted relevant proposals, in exceess of the resources available. This results provide some evidence on the relevance of the instrument.

(d) Thematic focus of individual countries - Phase 1

Individual countries specialised in a variety of different themes in the projects they coordinated under the SME Instrument. For most of them, the top-occurring themes were Open and disruptive innovation (ICT), Energy challenge (ENERGY, Transport and smart cities mobility (TRANSPORT) and Health, demographic change and well-being (HEALTH).

The top-three themes for project coordinators are listed below for the main 15 countries involved in projects under Phase 1, according to the number of projects coordinated by their SMEs.

Spain (303 projects)
1. ICT (ODI) (63 projects)
2. ENERGY (49 projects)
3. FOOD (39 projects)

Italy (237 projects)
1. TRANSPORT (44 projects)
2. NMP (38 projects)
3. ENERGY (32 projects)

United Kingdom (196 proj.)
1. HEALTH (35 projects)
2. TRANSPORT (32 projects)
3. ICT (ODI) (29 projects)

Germany (96 projects)
1. HEALTH (21 projects)
2. ENERGY (18 projects)
3. ICT (ODI) (16 projects)

France (76 projects)
1. ICT (ODI) (22 projects)
2. ENERGY (13 projects)
=2. HEALTH (13 projects)

Netherlands (57 projects)
1. HEALTH (13 projects)
2. NMP (8 projects)
3. TRANSPORT (7 projects)

Denmark (56 projects)
1. TRANSPORT (11 projects)
2. HEALTH (10 projects)
3. ENERGY (9 projects)

Sweden (54 projects)
1. HEALTH (15 projects)
2. ENERGY (10 projects)
3. ECO-INNOVATION (9 proj.)

Ireland (38 projects)
1. ICT (ODI) (9 projects)
=1. ENERGY (9 projects)
3. HEALTH (5 projects)

Finland (36 projects)
1. ICT (ODI) (11 projects)
2. ENERGY (7 projects)
3. ECO-INNOVATION (6 proj.)

Portugal (34 projects)
1. ICT (ODI) (8 projects)
2. FOOD (7 projects)
3. TRANSPORT (4 projects)

Poland (32 projects)
1. ICT (ODI) (11 projects)
2. TRANSPORT (5 projects)
3. ENERGY (4 projects)

Estonia (28 projects)
1. ICT (ODI) (9 projects)
2. ECO-INNOVATION (5 projects)
3. HEALTH and TRANSPORT (3 projects each)

Slovenia (26 projects)
1. ICT (ODI) (7 projects)
2. TRANSPORT (6 projects)
3. ENERGY (5 projects)

Hungary (25 projects)
1. ICT (ODI) (8 projects)
2. HEALTH (5 projects)
3. NMP and FOOD (3 projects each)

(e) Thematic focus of individual countries - Phase 2

The top three themes for project coordinators are listed below for the main 9 countries involved in projects under Phase 2, according to the number of projects coordinated by their SMEs.

Spain (73 projects)
1. ICT (ODI) (14 projects)
2. FOOD (12 projects)
3. ECO-INNOVATION (9 proj.)

United Kingdom (49 projects)
1. ICT (ODI) (13 projects)
2. HEALTH (7 projects)
3. TRANSPORT (6 projects)

Italy (40 projects)
1. NMP (9 projects)
2. ENERGY (7 projects)
3. TRANSPORT (6 projects)

Germany (31 projects)
=1. TRANSPORT (6 projects)
=1. ENERGY (6 projects)
=3. HEALTH and NMP (5 projects each)

France (30 projects)
1. ICT (ODI) (8 projects)
2. TRANSPORT (7 projects)
3. HEALTH (3 projects)

Netherlands (20 projects)
1. HEALTH (6 projects)
2. TRANSPORT (5 projects)
=3. ICT (ODI), ENERGY and SECURITY (2 projects each)

Finland (19 projects)
=1. ICT (ODI) (4 projects)
=1. TRANSPORT (4 projects)
=1. ECO-INNOVATION (4 proj.)

Sweden (18 projects)
1. ENERGY (4 projects)
2. ICT (ODI) (3 projects)
=2. HEALTH (3 projects)

Denmark (14 projects)
1. ENERGY (5 projects)
2. TRANSPORT (4 projects)
3. FOOD (3 projects)

The Annex contains more detailed presentation, as well as of the success rates and EC contribution (requested and allocated) by topic and specified by Phase, topics and country

I.2.2.6. Submitted and re-submitted proposals versus eligible proposals over time

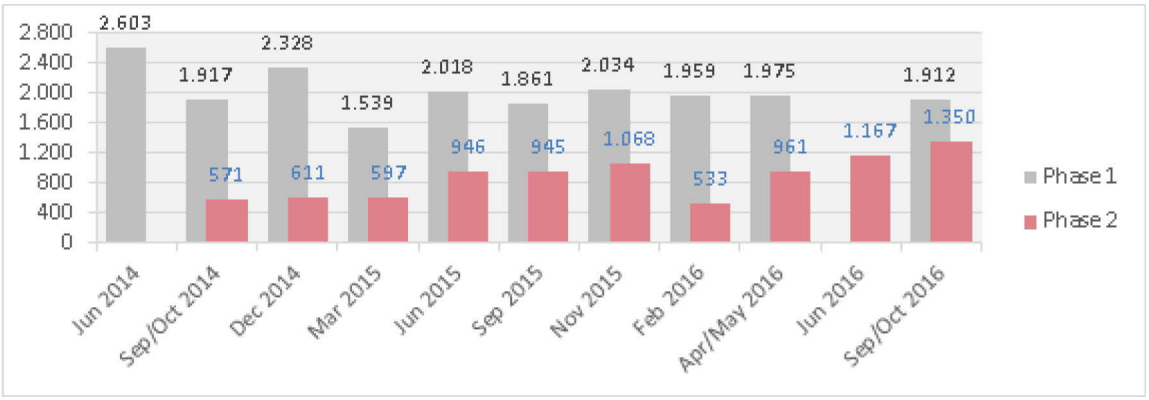
Unlike other parts of Horizon 2020, applicants are allowed to re-submit proposals under the SME Instrument. This has an impact on the attractiveness for SMEs and the operations in the Executive Agency for SMEs (EASME) whose role is to implement the Instrument -, as will

be shown in the Efficiency parts in this evaluation. The Annex contains all data on submission and re-submissions over time. The key issue for discussion in this paragraph is the share of re-submitted proposals.

(a) Proposals submitted

The figure below shows the total number of eligible proposals submitted under each of the cut-off dates within scope. It shows that the first cut-off date received the most eligible number of Phase 1 proposals (2,603) and the latest cut-off date received the most eligible Phase 2 proposals(1,350).

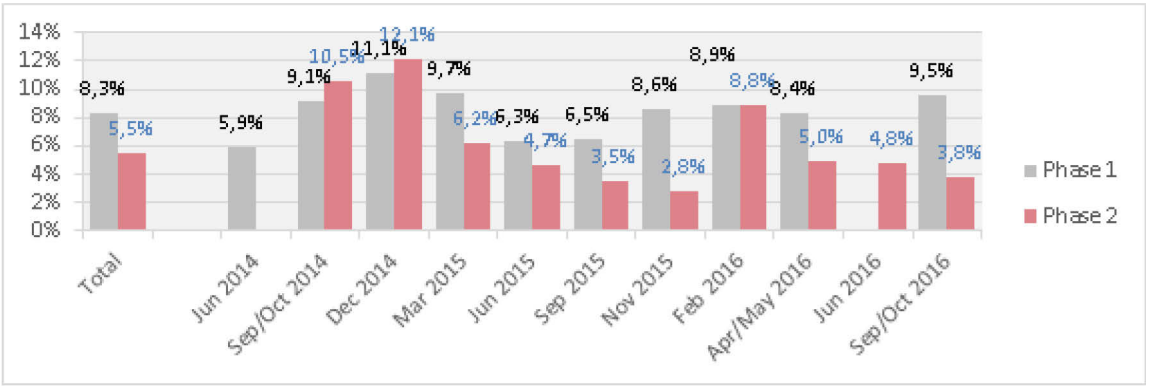
Figure 153 - Eligible proposals submitted per cut-off date and phase



Source: Technopolis Group, based on CORDA data (November 2016).

The figure below shows the success rates of proposals under each cut-off date. Under both phases, success rates were highest around the end of 2014 and generally the lowest during 2015 (up to the cut-offs in the scope of this evaluation).

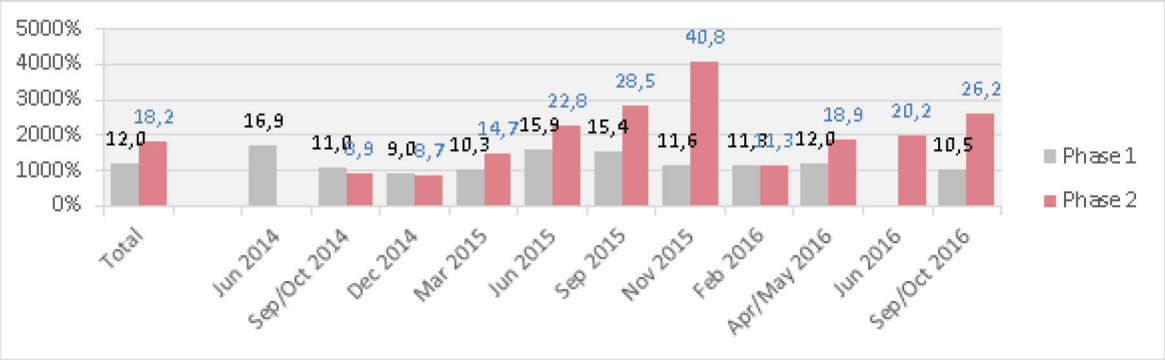
Figure 154 - Success rates of proposals per cut-off date and phase (%)



Source: Technopolis Group, based on CORDA data (November 2016).

The figure below shows the rates of budget oversubscription under each call for each phase.

Figure 155 - Rates of budget oversubscription per cut-off date and phase



Source: Technopolis Group, based on CORDA data (November 2016).

(b) Re-submissions of proposals

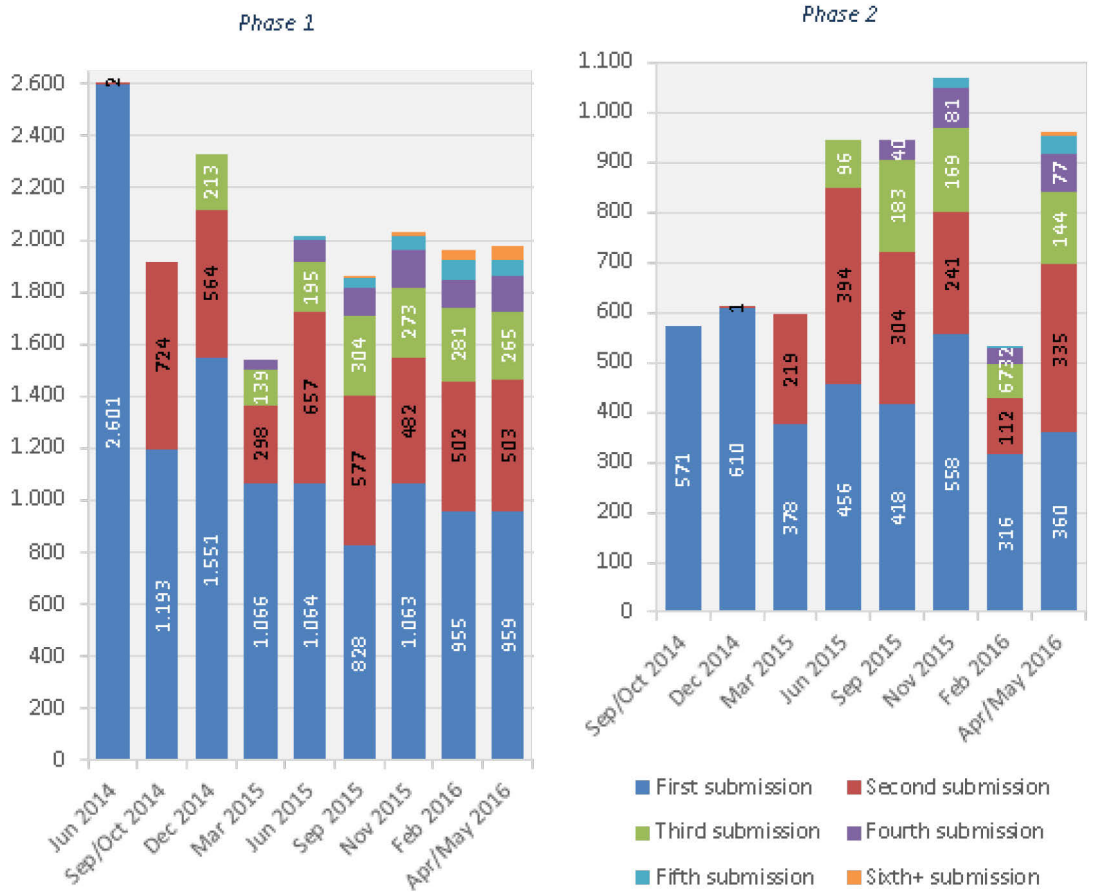
SMEs submitting a proposal for the first time accounted for 61.9% of the total number of eligible proposals submitted under Phase 1 and 58.8% of those submitted under Phase 2 of the SME Instrument. Data provided to Technopolis Group indicate that the rest of the proposals were re-submissions -sometimes in a different consortium, to a different theme, or on different terms). The participation rules state that an SME cannot participate in two different proposals simultaneously.[37] Data provided to Technopolis Group do not allow for a detailed assessment of this.

Figure 156 shows the original proposals for each SME within a coordinator's role under each individual call in Phase 1 and Phase 2. The number 'first-time submisions' decreases slightly over time under Phase 1 – from about 1,500–2,000 in late 2014 to about 900–1,000 by early 2016. The same applies to Phase 2.

SMEs submitting a proposal for the fourth, fifth, sixth, or further time make up only a relatively small percentage of the total proposals submitted under both phases. Among the most recent calls from April–May 2016, the share of such proposals reached 12.6% under Phase 1 and 12.7% under Phase 2.

[37] *That is: neither as lead partner nor as partner*

Figure 156 - Proposals per call under Phase 1 and Phase 2, by type of submission



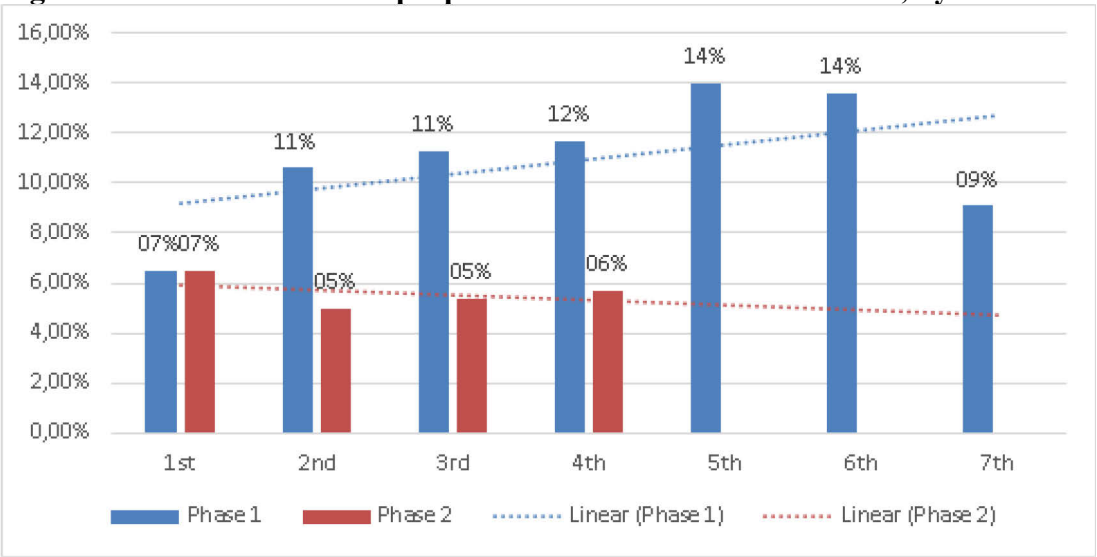
Source: Technopolis Group, based on CORDA data (July 2016).

SMEs submitting proposals for the second, third or further time have a somewhat larger chance of success under Phase 1 of the SME Instrument, though not under Phase 2:

- The success rate for SMEs submitting a proposal for the first time is 6.5% under both Phase 1 and Phase 2.
- The success rate under Phase 1 rises to 10.6% by the second submission and gradually increases to a maximum of 14.0% by an SME's fifth submission before falling slightly thereafter.
- Under Phase 2, however, the success rate falls to 5.0% for SMEs submitting for the second time and remains around 5.5% for the third and fourth submission before reaching a maximum of 9.5% for the fifth submission.

The relevant success rates for each submission type under both phases are discussed in the Efficiency Chapter.

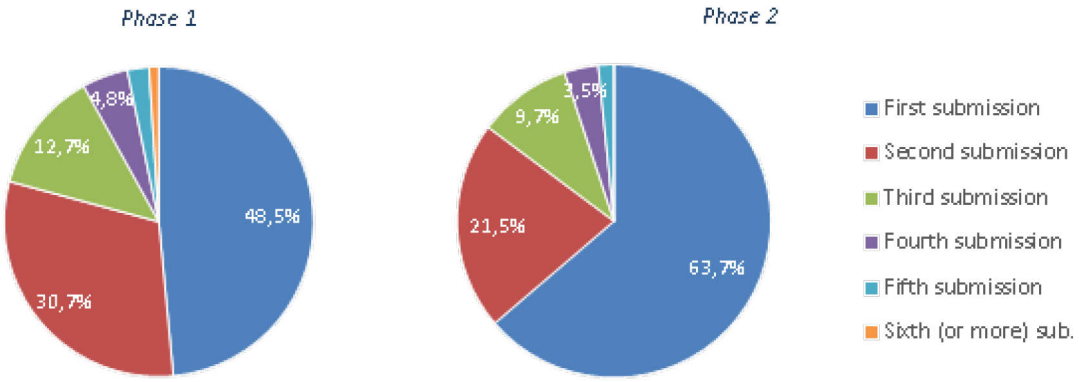
Figure 157 - Success rates of proposals under Phase 1 and Phase 2, by # of submission



Source: Technopolis Group, based on CORDA data (July 2016).

Data on fifth, sixth, seventh and eighth submissions are included for completeness, yet the number of observations is so low that relevance is limited. That is explained in the figure below.

Figure 158 - Successful projects by number of submissions under Phase 1 and Phase 2 (%)



Source: Technopolis Group, based on CORDA data (July 2016).

This pattern of re-submissions means that as an overall, 12.6% SMEs submitting at least one eligible proposal have been successful at least once.

I.2.3. Implementation state-of-play of the INNOSUP Actions

This last section discusses the implementation state-of-play of INNOSUP Actions. It should be noted that the data on these actions were limited. Since only some minor activities have been finalised so far, the analysis relies on call documents, evaluation reports, and information on proposals considered for funding.

I.2.3.1. Implementation of the INNOSUP Actions to date

Nine topics started since March 2014, while two more are under preparation. Data are from CORDA (July 2016). The total EC Contribution to the nine topics is EUR 37.4 million, which represents 119% of the allocated indicative budget.

A large share of actions under innovation in SMEs is implemented not by open calls for proposals but by call for tender or ad-hoc grant. In 2014/15 and 2016/17 WP 84.3% of the available budget (not including the allocation to Eureka/Eurostars, and the INNOSUP calls that were still under preparation) was committed by call for tender or ad-hoc grant. The reasons for this strategic decision are to increase ownership at the level of Intermediaries and regions, and to invest in qualifications of consultants in public support agencies and to develop the quality of the services locally available to SMEs.

I.2.3.2. Description of the actions implemented through open calls for proposals

The following actions were implemented through open calls for proposals:

- **Community building and competence development for SME Instrument coaching**: Ensures comprehensive and consistent delivery of the coaching service available to beneficiaries of the SME Instrument. Seeks to support for peer-learning and the exchange of ideas and experience among coaches in order to grow competencies within the network and ensure a consistent delivery of the service. A central facility will be established to gather experiences and data from coaching engagement and act as a single reference-point for assisting coaches. The main beneficiaries are the coaches and (indirectly) the SMEs they support.
- **IPR helpdesk**: Supports the management, diffusion and valorisation of technologies and other intellectual assets. The former IPR Helpdesk had come to an end, the new project will better reach potential target groups (both of a higher quantity and quality), including through developing relationships with various support organisations. Focuses on supporting SMEs.
- **IPorta 2:** The new version of this existing project includes different activities and target groups. In particular, it will link and assist as many NIPOs as possible in order to design and provide better services to SMEs. It will also contribute to improving and expanding business support service providers' intellectual asset services. Focuses on helping NIPOs by which to better support SMEs.
- **European label for innovation voucher programmes:** Establishes a European-level voluntary collaboration and brokerage framework for innovation voucher programmes, making such these services more accessible for SMEs. Provides an essential label for such programmes, treating other European service providers equally to national-level ones. Focuses on establishing a comprehensive label that can be awarded to innovation voucher providers in order to bring benefits to SMEs.
- **Professionalisation of open innovation management in SMEs:** Involves the collection and analysis of information on the application of open innovation in SMEs. Provides an EU-wide diffusion of success stories and practical management tools to support, educate and train them. Includes the development and testing of open innovation indicators to support management support tools enhancing decision-making on open innovation practices within SMEs.
- **Capitalising the full potential of online collaboration for SME innovation**: New and improved support services that assist SMEs in creating value from online collaboration

with contacts and other partners. The work package contains several options as to what the focus of the project (and its outputs) should be. The main beneficiaries are SMEs.

- **Cluster facilitated projects for new value chains:** Cluster organisations and intermediaries coordinate and facilitate trans-national and cross-sectoral collaboration and innovation by SMEs. This is done through setting up activities for collaboration and networking and creating spaces for cross-sectoral fertilisation and value chain innovation. Focuses on supporting of SMEs that are member in the clusters and supports projects clearly aligned to existing regional industrial development and smart specialisation strategies (RIS3).
- **Peer learning of innovation agencies:** Supports consortia of agencies to make use of standard peer learning methodologies in order to engage in peer learning on topics relating to the design and delivery of innovation support programmes for SMEs. The main beneficiaries are therefore such agencies aiming at innovating their services to SMEs.
- **Capacity-building for national contact points (NCPs) for SMEs and access to risk finance under Horizon 2020:** Various mechanisms may be included, such as benchmarking, joint workshops, enhanced trans-national brokerage events, and specific training sessions linked to Access to Risk Finance, Innovation in SMEs and SMEs in Horizon 2020. Special attention should be given to enhance the competence of NCPs, including helping less-experienced NCPs rapidly acquire the know-how accumulated in other countries.

I.3. RELEVANCE OF INNOVATION IN SMES.

This chapter focuses on various aspects of relevance, which looks at the relationship between the needs and problems in society and the objectives of the intervention. Section I.3.1 assesses if INNOVATION IN SMEs is addressing the right issues. Section 0 sees if there is sufficient flexibility to adapt to new scientific and socio-economic developments. Section I.3.3 assesses if the instruments sufficiently address the needs of their stakeholders, while Section I.3.3 explores the extent to which the SME Instrument meets the specific needs of its stakeholders.

I.3.1. Is Innovation in SMEs tackling the right issues?

This section of the report elaborates on the extent to which the objectives of 'Innovation in SME's still correspond to the problems and needs in the field. In other words, it assesses whether the SME Instrument and INNOSUP calls (still) respond to the problems and obstacles faced by SMEs in Europe. Additionally, this chapter discusses the relevance of 'Innovation in SMEs' to broader EU policies and objectives.

I.3.1.1. The relevance of INNOVATION IN SMEs given the challenges to address

(a) Relevance of the challenges which led to the introduction of the SME Instrument

This section assessed to what extent the challenges which led to the introduction of the SME instrument still prevail in Europe.

The Council Decision EC Reg 1291/2013 identified three objectives. These are (1) to help fill the gap in funding for early stage high-risk research and innovation, (2) to stimulate breakthrough innovations, and (3) to increase private-sector commercialisation of research results. The findings of this report suggest that the needs and problems faced by SMEs have pertained, and thus the SME-Instrument continues to be relevant. Moreover, new challenges have emerged in the field, which further enhance the relevance of the instrument.

The main challenges that the SME Instrument aims to address[38] are:

- Failing access to early stage financing for innovation by SMEs
- Insufficient breakthrough innovations from European SMEs
- Improving the opportunities to commercialise private-sector research results

Regarding failing access to early stage financing for research and innovation by SMEs, it is important to note that the European Investment Bank (EIB) recently stated that Gross Fixed Capital Formation (GFCF) in the EU has remained at depressed levels since 2008 in most EU countries. The volume of GFCF in 2014 was still lower than the 2008 levels in almost every country in the EU. Especially SMEs are more concerned with access to finance, largely due to their reliance on banks, according to the EIB. Increasing private and public R&D expenditure is therefore very key in improving Europe's innovation performance.[39]

In addition to that, OECD figures on Changes in Seed and Early Stage Venture Capital investments for the period 2008-2013 show a negative trend for a majority of European countries.[40]

The European Innovation Scoreboard 2016 reports that on the indicators for 'Performance in Finance and support' for more than half of the Member States, as well as for the EU average, performance has not improved in time, in particular due to declining Venture capital investments. Large differences between EU countries can be observed.

Invest Europe shows large fluctuations in funds raised for early stage financing, with a drop from EUR 2 billion in 2011 to EUR 1.7 billion in 2013, rising to EUR 2.7 billion again in 2015 again. However their figures do not disclose what share is raised on behalf of SMEs. At least some recovery can be seen in these figures in very recent years.[41]

The SAFE survey on the access to finance of enterprises shows a five-year declining trend in access to public financial support. For the last three years since 2014. The report shows an improvement in the conditions for external financing related to private sector lending and

[38] *2013/743/EC: Council Decision of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC. P. 997*
[39] *EIB (2015). Investment and Investment Finance in Europe 2015: Investing in Competitiveness*
[40] *OECD (2015). Financing SMEs and Entrepreneurs 2015, Paris, page 50.*
[41] *Invest Europe, (2015). 2015 European Private Equity Activity, Statistics on Fundraising, Investments, Divestments, Brussels.*

equity. However, these figures are not specific enough to identify what part of this is for early stage finance specifically for research and innovation.[42]

Thus evidence indicated that access to early stage financing has not significantly improved since the start of the SME Instrument, although some improvements in the general framework conditions can be seen from 2014.

There are no strong indicators to assess whether European SMEs have increased their ability to develop breakthrough innovations. Data on breakthroughs and radical innovations are mostly anecdotal or focus on specific sectors, markets or geographical areas. So there is little empirical evidence to state that over a period of years, the situation has changed, for the better or worse.

Regarding the opportunities to commercialise private-sector research results, it is important to note that the European Commission's European Semester Thematic Fiche on Research and Innovation observed that the number of firms that have in a relatively short term grown into world leaders on the basis of their R&D efforts, while still remaining independent, is much lower in the EU than in the US.[43] Young leading innovators in the US account for 35% of total business R&D compared to 7% in Europe, which can be expected to have a negative effect on the likelihood of breakthrough innovations in Europe.[44]

Since the 2013 Council Decision to launch the SME instrument, it is too early to measure whether private-sector commercialisation of research results has increased. EPO reports that in 2015 European patent applications increased by 4.6% compared with 2014. Increases in applications of European patents were however mainly allocated outside Europe, which clearly indicates that there is still room for improvement when it comes to private-sector commercialisation of research results.[45] This is typically a challenge with a long-term perspective which cannot be changed overnight.

These findings are backed by the interviews specifically on funding for early stage high-risk research and innovation. National funding for SMEs has become more and more scarce, even to the point that it has *"completely disappeared in a large set of Member States"*, as was put forward by many interviewees. This is *"made worse by austerity"*, budget cuts for reducing government budget deficits. They indicated that the *"instrument focuses on known challenges of the EU innovation system, like market entrance for innovations"*. Other interviewees argue that the challenges still prevail and that the impact of these challenges on SMEs has increased.

The funding available through routes other than the SME Instrument, particularly in some countries, is likely to have further decreased. This creates thus even more pressure for the SME instrument.

In addition to the challenges that existed at the time of its introduction, new challenges emerge as well. Several interviewees added that global competition for innovative SME has increased significantly – *"it is not enough anymore just to support their export activities. It is important that companies become part of the global value chain very quickly"*. It is argued

[42] *Panteia, (2016). Survey on the access to finance of enterprises, Analytical Report 2016.*
[43] *European Commission (2015). EUROPEAN SEMESTER THEMATIC: FICHE RESEARCH AND INNOVATION*
[44] *Veugelers, Reinhilde, Michele Cincera (2015). How to Turn on the Innovation Growth Machine in Europe. In: Intereconomics*
[45] *In particular in China (+22.2%) and in the US (+16.4%). Source: EPO (2016). Annual Report.*

that companies used to focus on *"a classical product development process",* whereas companies now need to focus on business model innovation and *"creating new value for customers"*. This requires a learning process in companies, and quick reactions/adaptations once the business model is not successful (enough).

Such analysis can be correlated to the relevance (or not) of the thematic approach, on which the SME Instrument has been designed. Despite their large topic appellation which lead to all potential thematic and type of innovation (long or short term), the increase of challenges and the need to emerge from each sector require the most broad topics available to applicants; It is not yet possible to assess whether a non-thematic call could solve some of the emerging problems, however it would most probably open doors to new comers and /or to new types of innovation.

(b) Relevance of the challenges which led to the introduction of the INNOSUP Actions

The section at hand assesses is the challenges that are addressed by INNOSUP Actions still relevant in Europe. The evaluation looks at the challenges addressed by the INNOSUP at the aggregated level of the combined INNOSUP actions. Challenges addressed by each of the individual actions are not assessed.

Horizon 2020's legal base and the 2014–2015 and 2016–2017 Work Programmes observe that SMEs receiving innovation support often remain dissatisfied with the services they receive, and that the public expects a higher return from the support provided. There is no evidence to conclude that the situation has altered significantly since the launch of INNOSUP Actions. It would be valuable to repeat a Pro INNO type study, in order to update the 2009 survey and adapt the focus to align with the current INNOSUP Actions.

The challenges addressed by the INNOSUP actions are defined in Horizon 2020's legal base and the 2014–2015 and 2016–2017 Work Programmes. These challenges are that SMEs receiving innovation support often remain dissatisfied with the services they receive, and that the public expects a higher return from the support provided.

These challenges are identified in the 2009 PRO INNO Europe paper #1346 that states that 67% of enterprises would require 'better innovation support' from innovation agencies. Moreover, it finds that most innovation intermediaries are well aware of the need to better customise their services, considering new needs and higher expectations of enterprises. The most frequently mentioned new challenges, according to PRO INNO EUROPE include better support for:

- the internationalisation of innovative SMEs within Europe
- new forms of innovation (such as user-driven innovation)
- the specific needs of enterprises with high growth potential (gazelles)

[46] *PRO INNO Europe (2009). Making public support for innovation in the EU more effective. DG Enterprise*

The conclusions in the PRO INNO Europe study are based on 2009 survey responses from 792 enterprises, mainly 'from Finland, Spain, Poland, Germany, and Italy. More recent studies indicate that overall satisfaction with innovation support has been improving since 2011.[47]

However, there is no recent European wide survey that systematically assesses the satisfaction of SMEs with their local, regional, national and international innovation agencies. So there is no evidence to conclude that the situation has altered significantly since the launch of INNOSUP Actions. It would be valuable to repeat a Pro INNO type study, in order to update the 2009 survey and adapt the focus to align with the current INNOSUP Actions.

I.3.1.2. The relevance of INNOVATION IN SMEs to address European objectives

(a) Overall objectives of 'Innovation in SMEs"

This assesses to what extent the SME instrument in its design and implementation contributes to the general objectives of making Horizon2020 more oriented towards social and economic impacts taken by Horizon 2020.

Based on interviews with Commission staff, programme committees, advisory groups, and umbrella organisations, the SME Instrument seems to contribute in its design and implementation to the general objectives of making Horizon 2020 more oriented towards economic impacts.

Such statement is based upon the following:

- First, by its unique focus on innovation management. Phase 1 of the instrument is unique in its focus on helping SMEs assess the technical feasibility and commercial potential of a breakthrough innovation and "*helping SMEs with better managing innovations*". That alone logically leads to a stronger orientation of Horizon 2020 and its beneficiaries towards innovation and economic impact. Phase 3 –all though being too young to have its impacts measured- may contribute to this by offering coaching activities. .
- Second, by offering new project designs and modes of implementation to SMEs that are new to the Framework Programmes. Both Phase 1 and Phase 2 of the instrument bring in "*a new angle to the Framework Programmes*", according to one interviewee, and thus "*bring in new types of SMEs into Horizon 2020*". This helps broaden the innovation impacts of Horizon 2020. One Commission staff member indicated that *"phase two does engage SMEs from TRL6 onwards making it very market oriented"*.

[47] *Technopolis' 2016 evaluation of the Enterprise Europe Network collected data in 2015 Q3 that indicated that client SMEs are satisfied about the improved quality of services provided, and they notice a constant increase in that respect.*
This is also confirmed by the 2011 and 2012 Client Satisfaction Survey (CSS) that showed that SMEs receiving innovation support from the EEN reported slightly increasing satisfaction rates for innovation support services.
Both above mentioned data sources give a very weak indication that satisfaction rates are slowly improving due to various instruments, one of these potentially being some of the INNOSUP Actions that were already operation in Q3 of 2015

It is too early to expect market entrances at this stage, even though Phase 3 is to a large extent designed to encourage this.

Especially umbrella organisations state that the previous Framework Programmes were mainly focused on *"R&D and technological breakthrough"*, while it is also stated that past programmes *"did not reply to the needs of innovative companies"*. The consensus is that the current balance between supporting innovation and supporting the company/commercialisation is in a better state than in the past.

Interviewees look forward to the further implementation of the dedicated support actions in Phase 3, which were first described in detail in the 2016-2017 Work Programme. Phase 3 aims to 'facilitate access to private capital and innovation enabling environments'. That includes providing access to both financial instruments and to private investors. It also includes business innovation coaching activities to Phase 1 and Phase 2 beneficiaries.

(b) Extent to which the SME Instrument effectively reaches SMEs that so far did not participate in EU framework programmes

This section assesses if the SME Instrument effectively reach SMEs that so far did not participate in EU framework programmes. "It aims to assess to what extent SMEs have been reached that had not been funded up until the current framework programme (i.e. so-called 'newcomers' to the programme).

The SME Instrument very effectively reaches SMEs that so far did not participate in EU framework programmes. There are clear indications that it is more effective than FP7 in doing so.

The SME Instrument targets a limited portion of all EU SMEs – due to their innovative character but also the European definition of SMEs[48]. It aims at SMEs with the potential to grow and internationalise across the single market and beyond, while offering services for which significant innovation activities in Technology Readiness Level 6 (TRL6) or higher are required. That also implies that the relevance of the SME Instrument, particularly Phase 2, is relatively small for start-ups. Even though start-ups are part of the SME European definition and as such eligible to the SME Instrument, the implementation of the SME Instrument requires a significant cash-position from its beneficiaries as (1) the chances of being successful are small, (2) the time-to-grant is long, (4) financial documents to provide are not always available to start-ups and (4) co-funding required from the start-up beneficiary is significant. Even though data do not allow to precisely assess the number of start-ups in the SME Instrument, its combination of requirements can be a bottleneck for start-ups.

Within this focus, our evaluation shows that the SME Instrument very effectively reaches SMEs that until 2014 had not participated in any of the EU framework programmes. Over the period 2014-2015, 89% of the SME applicants and 83% of those awarded under the SME

[48] *High Level Group (2014). Inspiring and Completing European Innovation Ecosystems*

Instrument were 'newcomers' to Horizon 2020.[49] This also implies that the SME Instrument in Horizon 2020 is more effective than FP7 in reaching 'new' SMEs.[50]

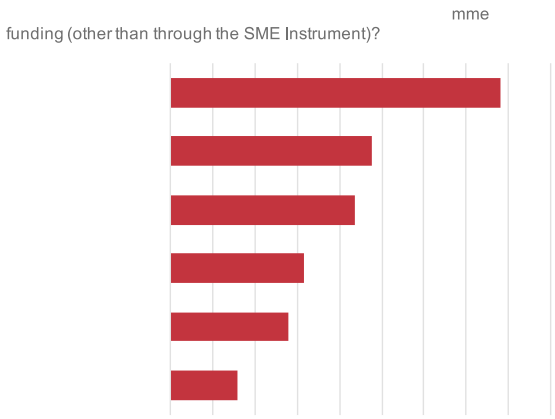
As was to be expected given the sequential set-up of the SME Instrument phases, the shares were slightly higher for beneficiaries under Phase 1 than Phase 2.

Moreover, the percentage newcomers were higher in 2015 compared to 2014, both for phase 1 and phase 2 of the instrument. Specifically, 'newcomers' made up 83% of the beneficiaries under Phase 1 in 2014 and 90% in 2015, while they made up only 74% of those under Phase 2 in 2014 and 80% in 2015. These data indicate that the SME Instrument effectively reaches SMEs that so far did not participate in EU framework programmes.

Technopolis' SME survey adds more detail to these figures. It shows that almost one quarter (22%) of applicant SMEs never previously considered applying to the Framework Programme. A further 39% had considered it, but ultimately did not apply. Therefore, more than half of respondents (61%) were 'new applicants' to the Framework Programme/Horizon 2020 when they applied to the SMEI. A further 8% had applied to FP7 and/or Horizon 2020, but had never been successful.

Therefore, the vast majority (69%) of respondents had never participated in EU framework programmes before. This is a good indication that the SMEI is reaching out to a new group of SMEs that have not previously benefited from FP7 or Horizon 2020 programmes.

Figure 159 - Applicant organisations' experience with Framework Programmes

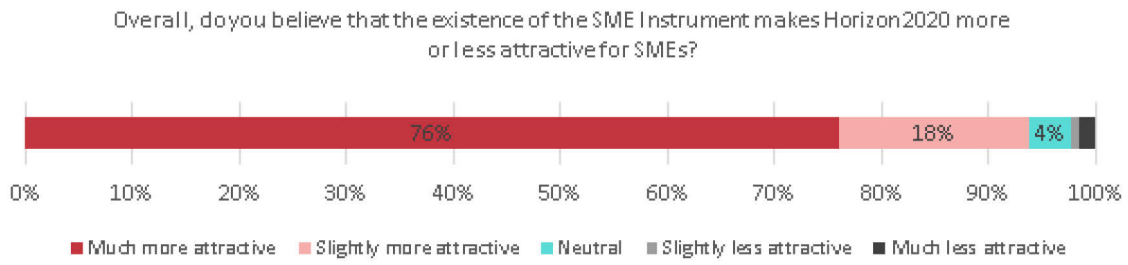


Source: Technopolis, based on SME survey data Sample size: 2,047.

These views were supported by the intermediary organisations. They were asked, overall, whether they thought the existence of the SME Instrument had made Horizon 2020 more or less attractive for SMEs. The responses, shown in Figure 160, are clearly very positive. Nearly all intermediary organisations believe that the SME Instrument has made Horizon 2020 'slightly' (18% of respondents) or (76% of respondents) 'much more attractive'. This compares with just 2% who consider that Horizon 2020 has become less attractive for SMEs as a result of the introduction of the SME Instrument.

[49] *EASME (2016) Catalysing European innovation*
[50] *High Level Expert Group (2015). COMMITMENT and COHERENCE: Ex-Post-Evaluation of the 7th EU Framework Programme (2007-2013). Brussels: European Commission.*

Figure 160 - Whether the SMEI makes Horizon 2020 more attractive for SMEs



Source: Technopolis, based on Agency survey data Sample size: 130 (excludes "don't know" answers).

(c) Extent to which the INNOSUP activities contribute to addressing the needs of the EU in general, and of innovating SMEs in particular

The section at hand assesses to what extent INNOSUP activities contribute to addressing the needs of the EU in general, and of innovating SMEs in particular.

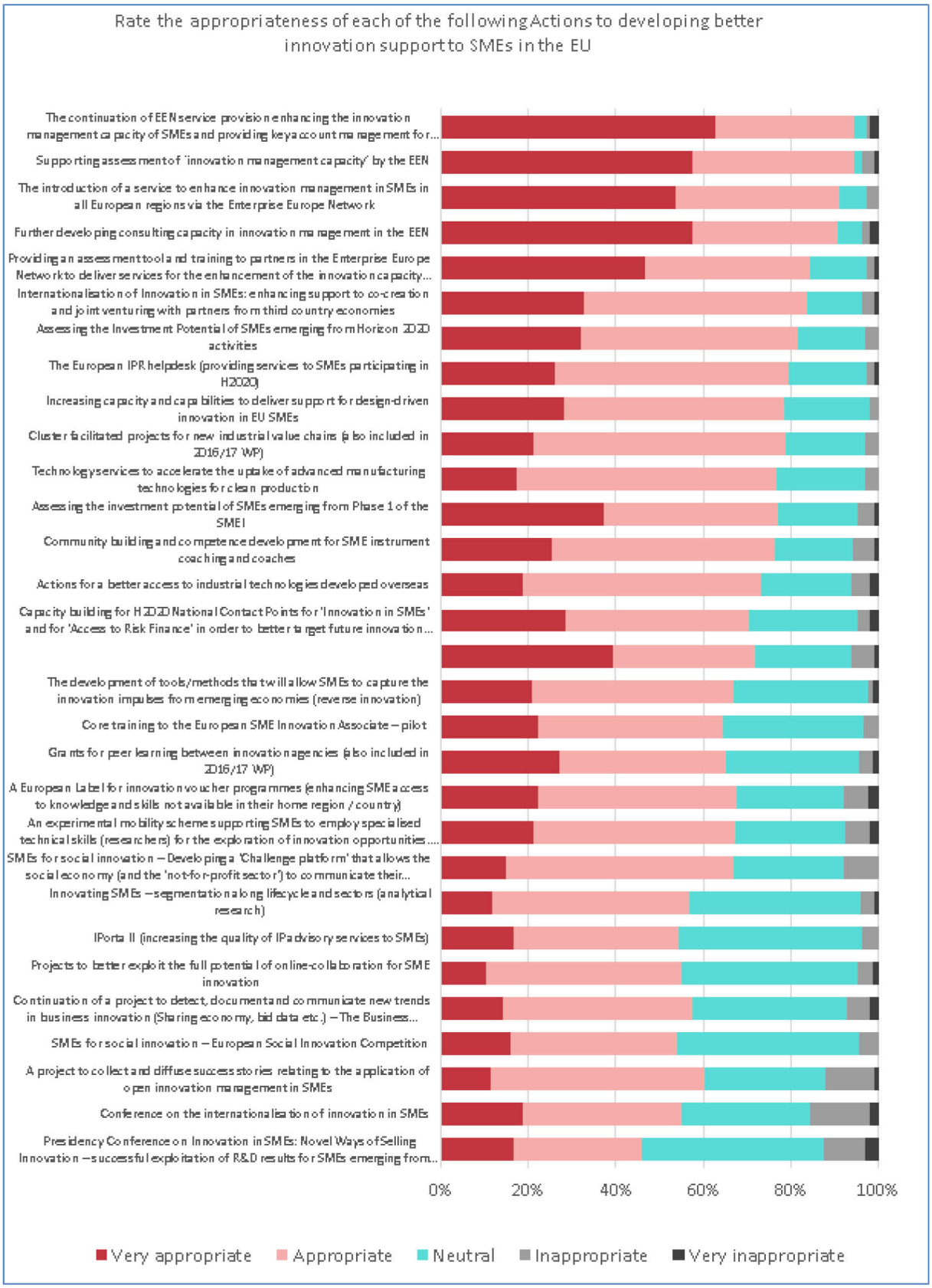
Intermediary organisations in general are positive about the extent to which INNOSUP activities contribute to better innovation support to SMEs in the EU. There are four INNOSUP actions that are highly appropriate for the development of better innovation support to SMEs in the EU. These four actions all build on the well-established Enterprise Europe Network.

The 'needs of the EU in general and of innovating SMEs in particular' are defined according to the challenges addressed as stated in Horizon 2020's 2014-2015 and 2016-2017 Work Programmes. These are operational as 'the development of better innovation support to SMEs in the EU'.

The mandate for funding INNOSUP activities is broad, with some of the subject matter having been carried over from previous incarnations of various support programmes. Some individual evaluations of past support programmes have taken place, but none can provide insight into contribution to the development of better innovation support to SMEs in the EU. That includes evaluations of both the European IPR Helpdesk and IPorta — both of which are aimed at improving SME performance with managing intellectual property.

Our survey of agencies shows that intermediary organisations in general are positive about the extent to which INNOSUP activities contribute to better innovation support to SMEs in the EU. Details are presented in the figure below.

Figure 161 - Appropriateness of the INNOSUP 2014/15 and 2015/16 Actions



Source: Technopolis, based on Agency survey data Sample size: 79 - 110 (excludes "don't know" answers).

Overall the picture is positive.[51] When looking at individual INNOSUP actions there are four INNOSUP actions that are highly appreciated and regarded as appropriate to improve innovation support to SMEs in the EU.[52] These four best scoring actions are:

- The continuation of EEN service provision enhancing the innovation management capacity of SMEs and providing key account management for SME Instrument beneficiaries 2016/17 Work Programme (WP 2016/17)
- Supporting assessment of 'innovation management capacity' by the EEN 2016/17 Work Programme (WP 2015/16)
- The introduction of a service to enhance innovation management in SMEs in all European regions via the Enterprise Europe Network 2014/15 Work Programme (WP 2016/17)
- Further developing consulting capacity in innovation management in the EEN 2016/17 Work Programme (WP 2016/17)

The above four actions build on the well-established Enterprise Europe Network. Most of the actions that have lower scores have a relatively narrow focus (such as the organisation of conferences, and competitions, setting up individual platforms), have a smaller target group (such as SMEs internationalising outside Europe), or are have only recently started (some of the actions identified started only very shortly before the survey was conducted) and have no deliverables yet.

I.3.2. Flexibility to adapt to new scientific and socio-economic developments

The section at hand assesses to what extent the SME instrument builds on recognised strengths of the European innovation system. The European Innovation Scoreboard 2016 was used to identify the recognised strengths of the European innovation system.

The findings show that the SME Instrument builds on three of the seven most recognised strengths of the European innovation system, and unintentionally builds on a fourth.

The European Innovation Scoreboard 2016 identifies a number of recognised strengths of the European innovation system.[53] The focus is on the top seven strengths,[54] as presented in the figure below. One can assume that all top seven strengths of the European Innovation system either directly or indirectly help strengthen the target group of the SME Instrument.[55]

[51] For all the Actions that were called for in both Work Programmes, the proportion rating these as somewhat/very appropriate far outweighs the proportion rating them as somewhat/very inappropriate. Also, the 'average' rating given across all actions is that they are 'appropriate'. The Actions are sorted by the 'balance of opinion', which is the difference between the proportion rating it as very/appropriate and the proportion rating it as very/inappropriate. In all cases, this 'balance' is positive, but there is considerable variation.

[52] *The balance of each is over 50%.*

[53] *European Commission (2016). European Innovation Scoreboard 2016.*

[54] *A >0.6 score is used as cut-off for that.*

[55] *Youth in upper secondary education is considered by the measurement framework of the European Innovation Scoreboard an important human resources enabler for growth. Public sector R&D expenditures are clear enablers in the domain of finance and support. The number of cited scientific publications are considered as an enabler in the research system domain.*

The table shows that the SME Instrument builds on three of the seven most recognised strengths of the European innovation system, and unintentionally builds on a fourth. Other recognised strengths, in particular the high numbers of scientific papers, PTC patent applications, and Youth in upper secondary education, are not addressed.

Table 108 - Extent to which the SME Instrument builds on recognised strengths of the European Innovation system

Strength	European Innovation Scoreboard ranking	Importance of this strength for the SME Instrument	Extent to which the SME Instrument builds on this strength
Exports of medium and high-tech products	0.713	This is an important asset for potential beneficiaries of the SME Instrument. It gives potential beneficiaries of the SME Instrument – and their product innovations- easier access to export networks and markets outside Europe.	The SME Instrument intends to build on this particular strength as one of its main objectives is to increase private-sector commercialisation of research results, regardless of the target market.[56]
The relative large employment base of fast growing companies in innovative sectors	0.667	This is an important asset for potential beneficiaries of the SME Instrument. It gives them easier access to well-trained human capital labour pools	Unlike commercialisation of research, the employment effects of such commercialisation processes are not among the official objectives of the SME Instrument. Employment effects should however be considered a potentially important unintended side-effect of the SME Instrument. The SME Instrument can build on this strength.
Public sector R&D expenditures	0.652	This is an important asset for potential beneficiaries of the SME Instrument. It gives them easier access to funding in high TRLs, which are more intensively fed from lower TRLs.	The SME Instrument builds on this strength. Increasing R&D expenditures in the above-5 TRL levels is one of the objectives of the SME Instrument.
Most-cited scientific publications	0.642	This is not relevant for potential beneficiaries of the SME Instrument.	The SME Instrument explicitly does not build on this strength as it focuses on closer-to-market research than the ones that result in peer-reviewed publications.
Exports of knowledge intensive services	0.641	This is an important asset for potential beneficiaries of the SME Instrument. It gives potential beneficiaries of the SME Instrument – and their product innovations- easier	The SME Instrument intends to build on this particular strength as one of its main objectives is to increase private-sector commercialisation of research

PCT Patent Application indicates intellectual assets in firm activities. The relative large employment base of fast-growing companies in innovative sectors, as well as exports of medium and high-tech products and exports of knowledge intensive services are output indicators, pointing at economic effects.

[56] *2013/743/EC: Council Decision of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC*

Strength	European Innovation Scoreboard ranking	Importance of this strength for the SME Instrument	Extent to which the SME Instrument builds on this strength
		access to export networks and markets outside Europe.	results, regardless of the target market.[57]
PCT Patent Application	0.622	This is not relevant for potential beneficiaries of the SME Instrument.	Patents are filed when technologies are still at low TRL levels. The SME Instrument explicitly does not target these levels. It focuses on the above 5 levels. In Phase 2 funding scheme beneficiaries must "ensure the possibility to commercially exploit the results (freedom to operate)".
Youth in upper secondary education	0.610	This is an important asset for potential beneficiaries of the SME Instrument. It gives them easier access to well-trained human capital.	The SME Instrument has no explicit relationship with this strength.

Source: European Commission (2016). European Innovation Scoreboard 2016.

The interviews add to these insights that there are three major things that the SME Instrument does that link well to recognised strengths:

- Linking funding to coaching. The availability of competent business coaches throughout the continent, and including their skills into the SME Instrument shows that the SME Instrument makes good use of the capital that is present in the European innovation system. Having a European pool of business coaches and linking to a European knowledge and support network has a significant added value.
- Making use of the Enterprise Europe Network. The Enterprise Europe Network is a unique network of intermediary organisations. In many countries, individual members of the Enterprise Europe Network help their client SMEs get access to the SME Instrument. The potential added value of parts of the Enterprise Europe Network in the selection of SMEs for Phase 1 is brought up in several interviews.
- Building on experience in Member States and regions and helping them improve. Particularly the Seal of Excellence has great added value in terms of building on the strengths of the European innovation system. Several interviewees mention that in particular *"agencies in new Members States use it for policy learning"*.

There is also a clear strength in the innovation system that, according to the interviews, could be better built upon by the SME Instrument. It was stated by several interviewees that not including existing national/regional structures for business support (such as NCPs or EEN) more in the selection process of particularly Phase 1 is a missed opportunity. It was stated by several interviewees that these infrastructures could be used as 'gatekeepers' to make sure that fewer low-quality proposals are submitted, ensuring less administrative burden in European SMEs, and decreasing the work load in EASME.

[57] *2013/743/EC: Council Decision of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC*

I.3.3. Addressing specific stakeholder needs

I.3.3.1. Adequacy of the design of the SME Instrument

The section at hand assesses if the design of the instrument (Single company support vs. consortia; Phased approach vs. openness of phases; Phase 3 activities) is an adequate response to the observations on SME innovation support in FP7.

The SME Instrument seems to include adequate responses to the observations on SME innovation support in FP7. The most attractive features include the fact that SMEI 'support is available to a single company'. In addition, 'the size of the grant', 'the rate of funding' and 'the openness of topics' are also considered as 'very attractive' features. Especially SMEs are very positive about the possibility to resubmit proposals, as well as the time period from application to grant.

The observations on SME innovation support in FP7 are based on the findings in four reports on the FP7 Specific Programmes Cooperation, Ideas, People and Capacities, prepared by external experts, as well as the overall mid-term evaluation of FP7 that was prepared by Technopolis Group and Panteia.

It is beyond the scope of this evaluation to assess all observations in the aforementioned reports. This report focuses on the most significant ones:

1. Large segments of highly innovative SMEs do not participate in FP7.[58; 59]
2. SMEs tended to be involved in FP7 only once, and therefore may have widened their networks thanks to their participation but not deepened it due to missing recurrent participation. [60]
3. The actual role of SMEs in FP7 projects was sometimes more passive than foreseen.[61]
4. SMEs participating in FP7 need better support to exploit results obtained.[62]

The table below explains to what extent the SME Instrument provides an adequate response to the observations made on SME innovation support in FP7.

Table 109 - Extent to which the SME Instrument provides an adequate response to the observations made on SME innovation support in FP7

Observations on SME innovation support in FP7	Response provided in the design of the SME Instrument, under Horizon 2020 Programme.

[58] *Breschi, S., Fisher, R., Malerba, F., Okamura, K., Smid, S., & Vonortas, N. (2012). ICT Network Impact on structuring a competitive ERA. Brussels: European Commission.*
[59] *High Level Expert Group (2015). COMMITMENT and COHERENCE: Ex-Post-Evaluation of the 7th EU Framework Programme (2007-2013). Brussels: European Commission.*
[60] *E.g. Viola Peter (2015). Evaluation report of the FP7 COOPERATION Specific Programme. Brussels: European Commission*
[61] *e.g. Panteia at al. (2014). Performance of SMEs within FP7 An Interim Evaluation of FP7 components. Brussels: European Commission*
[62] *e.g. Kimmo Halme (2015). Summary Report of the Capacities Specific Programme of FP7 for the High Level Expert Group. Brussels: European Commission*

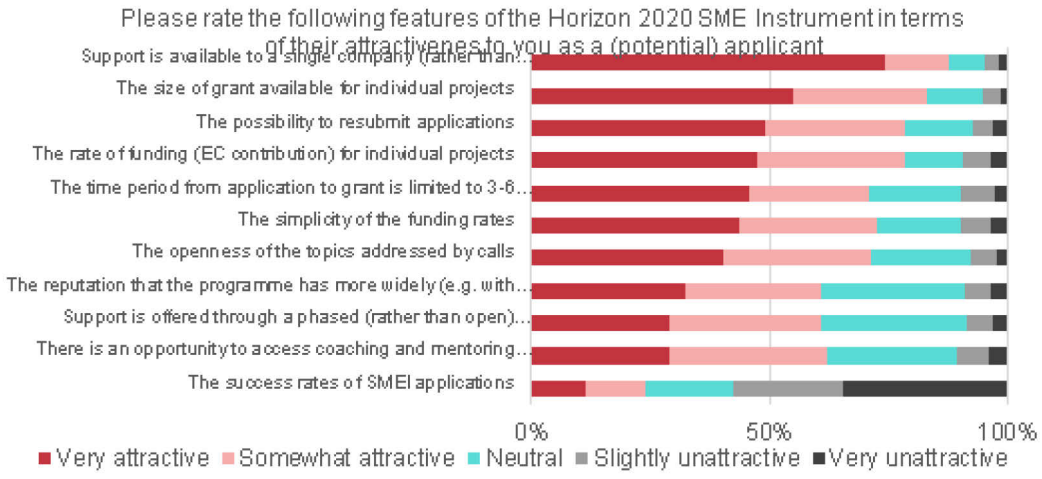
Observations on SME innovation support in FP7	Response provided in the design of the SME Instrument, under Horizon 2020 Programme.
"Large segments of highly innovative SMEs do not participate in FP7."	The observation that large segments of highly innovative SMEs do not participate in FP7 seems to be addressed relatively effectively. The large majority of applicants to the SME Instrument is new to the Framework Programmes.
"SMEs tended to be involved in FP7 only once, and therefore may have widened their networks thanks to their participation but not deepened it due to missing recurrent participation."	It is too early to say if the SME Instrument manages encourages recurrent participation. The phased approach is clearly a potential way to support this, and to deepen involvement of SMEs as it allows for a longer, and well distributed, involvement of an SME in the Framework Programmes. As the projects are mainly single company projects, networking is not an intended objective. Many offers of Phase 3 of the SME instrument (conferences, trade fairs participations, Academy) build on a community of like-minded beneficiaries open even after the end of the grant from the EU. The possibility to engage in the community will likely broaden the network.
"The actual role of SMEs in FP7 projects was sometimes more passive than foreseen."	SME Instrument projects are mainly single company projects. This ensures that SMEs are not pushed into passive roles in projects. RTOs – that often took on a large role in FP7 projects[63] – cannot apply for the SME Instrument. It should be mentioned that SMEs appreciate the fact that support is available to a single company as *Figure 162* shows. Single company support is considered a success according to beneficiaries.
"SMEs participating in FP7 need better support to exploit results obtained."	Phase 1 is partially developed to help SMEs support to exploit RTD results obtained. Especially the fact that the SME Instrument uses a phased approach that allows SMEs to learn more about ways to better support to exploit results obtained should address this particular observation. 60% of the surveyed SMEs support the phased approach, as will be discussed in the next section.

From the above it can be concluded that the SME Instrument expands segments of SMEs that participate in the Framework Programme and their involvement is likely to encourage recurrent participation, due to the phased approach. The instrument has a strong effect on giving the SME an active role, as the beneficiaries are in the 'driving seat' of their projects. And finally, the design of the instrument is focussed on exploiting RTD results better.

The survey asked SMEs about their views on the design of the instrument on other aspects than the three mentioned in the evaluation question. The figure below shows their responses.

[63] *High Level Expert Group (2015). COMMITMENT and COHERENCE: Ex-Post-Evaluation of the 7th EU Framework Programme (2007-2013). Brussels: European Commission.*

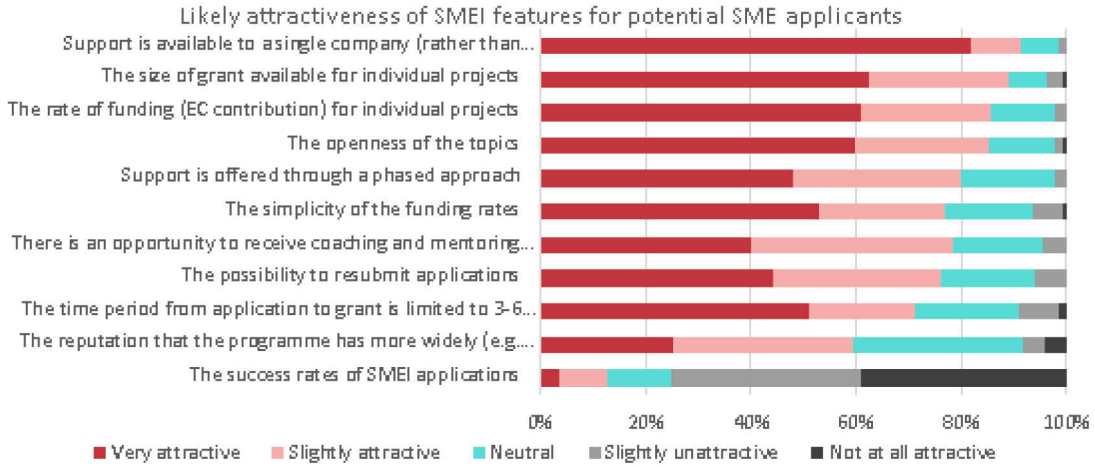
Figure 162 - Attractiveness of the Horizon 2020 SME Instrument to SME applicants



Source: Technopolis, based on SME survey data Sample size: 1,926 – 2,097 (excludes "don't know" answers).

The positive view on the design of the SME Instrument is also supported by intermediary organisations as shown in the figure below. The intermediary organisations state that the most attractive features include the fact that SMEI 'support is available to a single company'. In addition, 'the size of the grant', 'the rate of funding' and 'the openness of topics' are also considered as 'very attractive' features. Like the surveyed SMEs, the intermediary organisations are slightly less positive about the phased approach. The general balance, however, is still positive.

Figure 163 - Attractiveness of SMEI features for potential applicants according to intermediary organisations



Source: Technopolis, based on Agency survey data Sample size: 123 – 137 (excludes "don't know" answers).

In general, the intermediary organisations and the SMEs think alike on the attractiveness of the SME Instrument. On certain aspects their opinions differ. Especially SMEs are very positive about the possibility to resubmit proposals, as well as the time period from application to grant. Intermediary organisations find these features less important than do SMEs. Particularly for high-tech SMEs the speed of decision in their dynamic market situation is essential, something to which intermediary organisations are not equally sensitive.

Intermediary organisations, on the other hand, value especially the openness of the topics, the phased approach, and the possibilities for coaching.

Also the interviewed representatives of the programme committees and advisory groups agree that in comparison with FP7, the current SME Instrument is much more directly targeting SMEs. They indicate that the instrument is capable of attracting SMEs that did not participate in the past. In addition, they appreciate the design of the instrument, while stating that the administrative processes need improvement. All interviewed umbrella organisations are convinced that the SME Instrument is a great improvement compared to FP7.

The interviewees underline the fact that this instrument is specifically designed for SMEs which makes it much easier to understand and access for SMEs. They clearly state that the single company format is a large improvement over forming a consortium or being part of a collaborative research programme. Furthermore, also the time-to-grant of the SME Instrument has improved compared other EU instruments for SMEs in the past; this concerns both the time between submission and grant signature as well as responsiveness to questions. A characteristic quote was: *"The SME instrument is very important to bring in more companies which were not part of FP7"*.

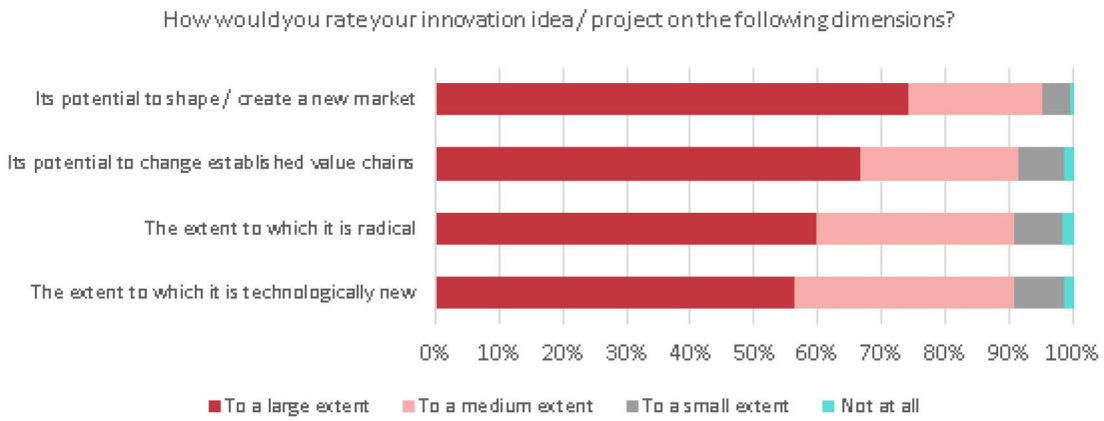
I.3.4. Extent to which the SME Instrument responds to both incremental and disruptive innovation strategies

This section assesses to what extent the SME Instrument responds adequately to both incremental and disruptive innovation strategies.

The SME Instrument is able to respond to different types of innovation strategies, including both incremental and disruptive innovation strategies.

All respondents were asked to rate the innovation idea/project that was the subject of their SME Instrument application across several different dimensions (all relating to its 'disruptiveness'). The responses are summarised in the figure below. A large majority of applicants state that their project has the potential to shape/ create new markets, to change value chains, and is technologically new. Moreover, a majority of respondents finds the innovation projects radical. This indicates that the SME Instrument seems to respond adequately to both incremental and disruptive innovation strategies.

Figure 164 - The extent to which the SME Instrument responds adequately to both incremental and disruptive innovation strategies



Source: Technopolis, based on SME survey data Sample size: 2,296 – 2,356.

Several interviewees state that disruptiveness should not be a goal on its own for the SME Instrument, which is not the case in the set-up of the instrument. All interviewed representatives of the programme committees and representatives of umbrella organisations agree that the evaluation criteria for proposals allow for both incremental and disruptive innovation strategies.

I.4. EFFECTIVENESS OF INNOVATION IN SME

This chapter assesses the progress made by Innovation in SMEs towards achieving its operational and specific objectives.

The short time lapse between the launch of Horizon 2020 in 2014 and this evaluation conducted in 2016 implies that the data availability on concrete outputs and results of the actions in Innovation in SMEs is limited. As shown in Chapter 2, only the SME Instrument 1st Phase projects had concluded their activities at the time of this evaluation and close to all INNOSUP Actions were in the first stages of their implementation. The information reported below is therefore geared (also) to assessing the extent to which the actions funded under Innovation in SMEs have the potential to lead to their expected outputs and results.

This chapter investigates the extent to which the actions funded are reaching – or are about to reach – their expected short-term effects in Section I.4.1. Section I.4.2 considers whether the conditions have been set in place to reaching the expected longer-term results and assess the role of the components in Innovation in SMEs and their specific actions. Section I.4.3 makes some conclusive reflections on the extent to which Innovation in SMEs contributes – and can be expected to contribute – to the attainment of the Horizon 2020 objectives.

Taking account of the different objectives of the SME Instrument and INNOSUP Actions under evaluation, the intervention logic set out in Chapter 1 indicates different expected outputs and results for these two components of Innovation in SMEs as well as different contributions to the higher-level objectives. In the sections below, the two components of Innovation in SMEs are therefore covered separately.

I.4.1. Short-term outputs and results

I.4.1.1. Short-term outputs and results of the SME Instrument

As mentioned above, most of the Phase 1 SME Instrument projects that were assessed for this evaluation had concluded their activities at the time of this evaluation. This section therefore evaluates the direct and indirect effects of this component of the SME Instrument.

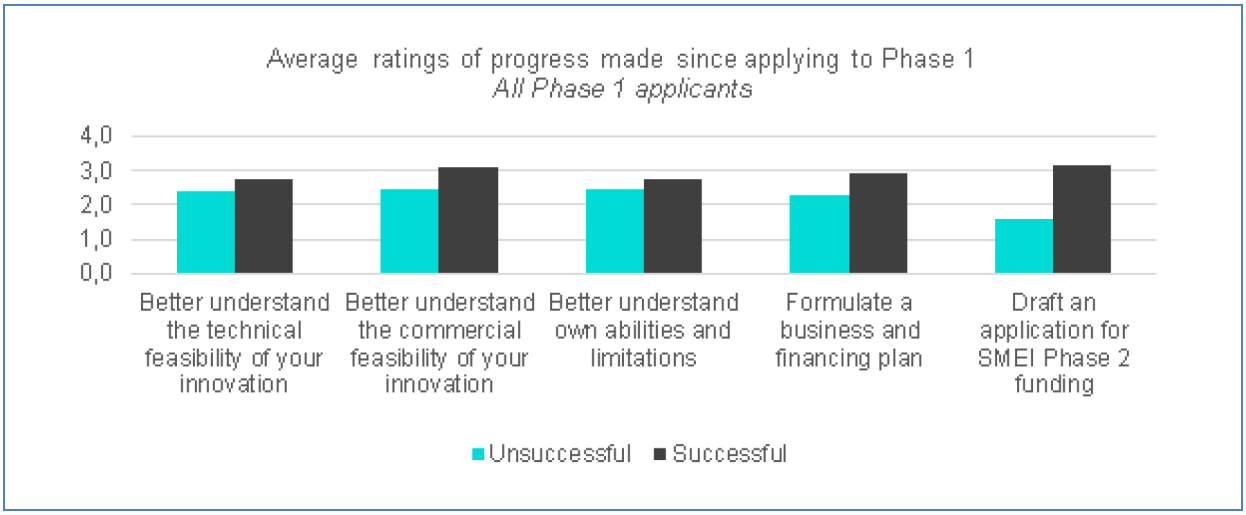
Phase 1 of the SME Instrument is effective in fostering a better understanding of the feasibility of an innovative idea and its development among the beneficiaries. Positive effects were created also on the SMEs' strategic intelligence and their capacity to manage innovation processes.

The integral coaching system set up for both Phase 1 and Phase 2 projects has been an important enabling factor for these positive developments among the SMEI beneficiaries. Clear benefits include e.g. fine-tuning the business plan, and better networking.

Survey results show that the overall feasibility of the innovation ideas/projects was positively assessed in about half of these feasibility projects (Figure 165, below). The previous chapter on relevance, as well as the implementation state of play chapter showed that the SME Instrument can respond to different types of innovation strategies, including both incremental and disruptive innovation strategies and that it can cater the relatively short innovation cycles of SMEs.

Data also show that Phase 1 SMEI funding is effective in enabling beneficiaries to be more certain of the feasibility of their innovations. Only 1.4% of beneficiaries stated that they did not yet know about the technical feasibility of their innovation idea or project, compared with 5% of unsuccessful applicants.

Figure 165 - Ratings of progress made by successful and unsuccessful Phase 1 applicants



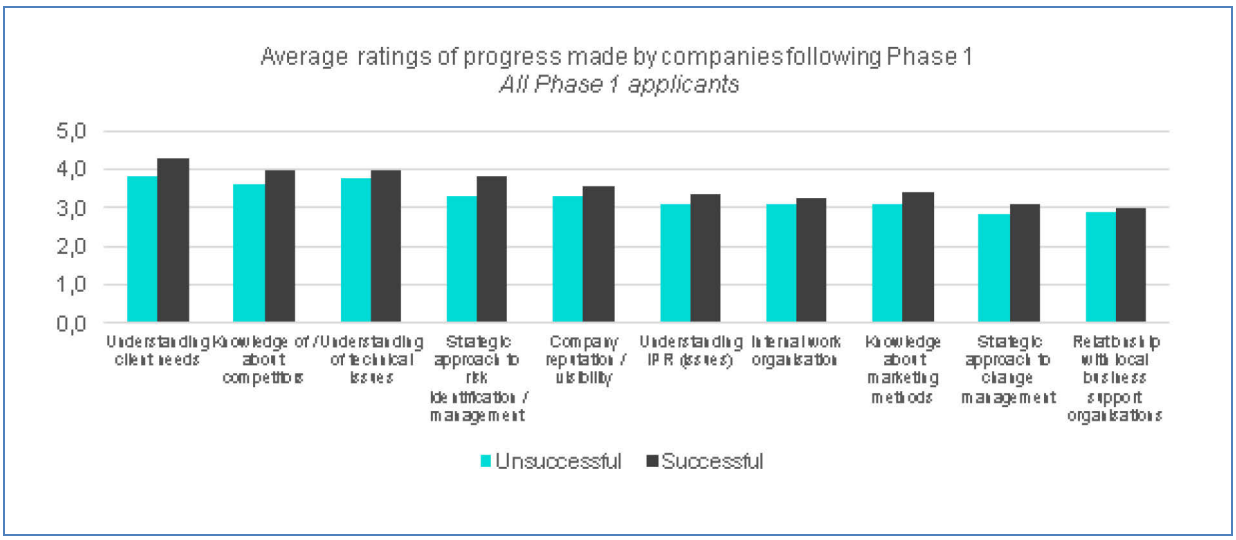
Source: Technopolis, based on SME survey data Sample size: 372 – 376 (successful) 1,152 – 1,161 (unsuccessful) Values: 0 (not at all) – 4 (completely).

In addition to reaching a better understanding of the feasibility of the innovative idea and its development, setting the basis for the formulation of business and financial plans, participation in Phase 1 projects positively impacted also the SMEs' strategic intelligence and their capacity to manage innovation processes.

SME Survey respondents indicated significant progress especially in their understanding of client needs and their understanding of technical issues (indicated by ~40%) as well as in their knowledge of/about competitors. Phase 1 beneficiaries show a steeper growth path than unsuccessful applicants in this context, as well as in their capacity to take a strategic approach to risk identification and management (Figure 166).

Other areas of major improvement were 'innovation project formulation', 'idea management and involvement of staff, clients, and suppliers in innovation' and the 'overall innovation strategy' (indicated by 30% of the SME survey respondents).

Figure 166 - Ratings of progress made by SMEs that applied to Phase 1, by successful/unsuccessful



Source: Technopolis, based on SME survey data Sample size: 373 – 375 (successful), 1,155 – 1,166 (unsuccessful) Values: 0 (no progress) – 5 (significant progress).

Agencies responding to the survey positively assessed the effect of the **coaching system** on the SMEs' abilities to manage growth. Nearly three-quarters of the survey respondents (72%) agreed or strongly agreed with the statement, while just 4% disagreed; a similar number (strongly) agreed that the SMEI integral coaching system provides tangible added value.

Clear benefits of the coaching system, according to interviewed SMEs and intermediaries include: "better networking", "keeping the broader picture in mind", "improving communication" and "fine-tuning the business plan".

These positive assessments are reflected also in the survey conducted by the European Commission (EC) in 2016. The EC identified 1,236 coaching activities that were delivered under the coaching system between June 2014 and September 2015. When asked to rate the usefulness of these activities on a scale of 1 (not useful) and 10 (highly useful), a sample of 495 SMEs gave the activities a mean score of 8.3; 90% of them rated the activities within the 7-10 range. Additional findings from participant feedback at the coaching sessions, as well as a smaller survey of beneficiaries and coaches, also rate the coaching activities favourably. In

terms of the activities' impact, there is some evidence reported on a positive effect of coaching on SMEs' 'understanding of client needs' and their 'strategic management' skills. [64]

It was also expressed the interest in extending the different supports available in Phase 3 to more market-oriented services, in particular to better accompany Beneficiaries into their investors' search and investment strategy.

I.4.1.2. Short-term outputs and results of the INNOSUP Actions

The foreseen outputs for the INNOSUP calls are less tangible than the ones for the SME Instruments as it intends to improve business support to SMEs and create a better market environment for innovative solutions. Generally, the actions are designed to provide opportunities to Member States and regions to enhance their services through collaboration, peer-learning and uptake of new approaches.

It is too early to assess if the consolidated INNOSUP Actions create a performing system for enhancing the innovation capacity of SMEs. Most of the respondents, however, believe that the INNOSUP actions are appropriate.

As mentioned above, most of the INNOSUP Actions were in the first stages of their activities at the time of this evaluation. In most cases, it is therefore too early to judge the actual achievements. Instead, agencies were asked through the survey to assess the **appropriateness**[65] of the INNOSUP portfolio of actions to developing better innovation support for SMEs in the EU. As can be seen in Figure 167, below, the opinion is positive. Most respondents (83%) believe the portfolio of actions is 'somewhat' or 'very appropriate', compared with just 9% who see it as inappropriate. The remaining 9% were neutral.

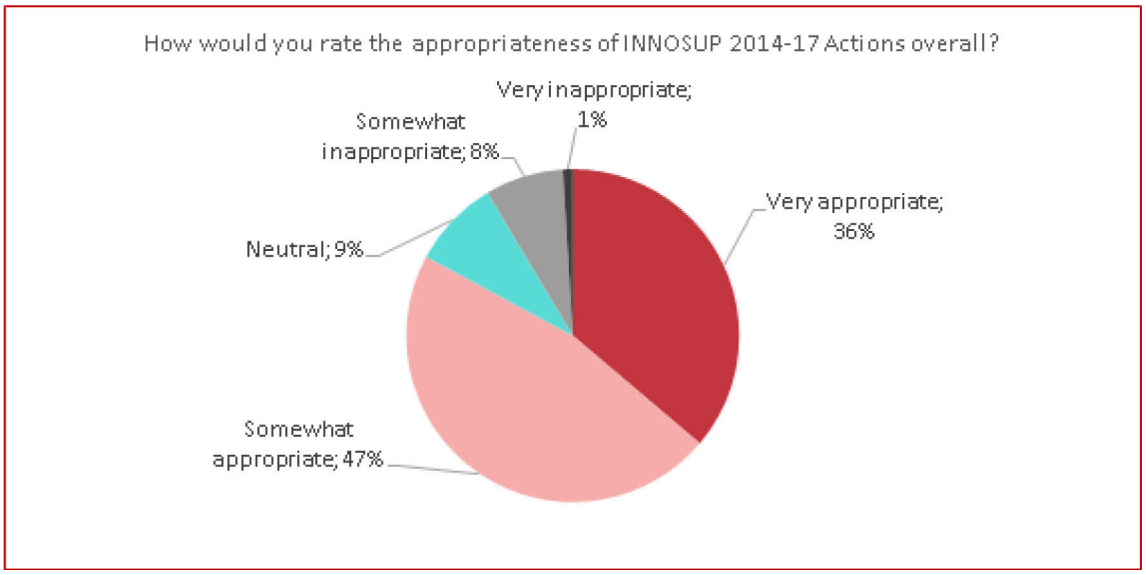
Only two of the nine agencies giving an 'inappropriate' rating to the INNOSUP portfolio further explained their answer and informed that in their opinion, the direct effect on SMEs is minimal, and that local support often already exists.

Some of those who rated the 2014-17 Actions as 'somewhat appropriate' overall, also went on to explain why they could not rate the portfolio as 'very appropriate'. Reasons ranged from a potential duplication of other initiatives to the broad range of activities in INNOSUP creating confusion (and possibly reflecting a lack of clear mission) and fragmentation in the funding, leading to actions too small in scale to have a real impact.

Figure 167 - Appropriateness of INNOSUP Actions 2014-17

[64] *EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*

[65] *The appropriateness questions in the survey give indications to both relevance (see chapter 3) as well as the effectiveness discussed in this chapter.*



Source: Technopolis, based on Agency survey data Base = 115 (excludes "don't know" answers).

I.4.2. Potential for the attainment of the longer-term results and impacts

I.4.2.1. The SME Instrument potential for the creation of the expected longer-term effects

Chapter 1 has listed the expected long-term results and impacts of the SME Instrument as follows:

- Enhanced profitability and growth performance of SMEs by combining and transferring new and existing knowledge into innovative, disruptive or incremental competitive solutions seizing European and global businesses
- Market uptake and distribution of innovations tackling the specific challenges in a sustainable way
- Increase in private investment in innovation, notably leverage of private co-investments and/or follow-up investments

The section below structures accordingly our findings on the potential of the SME Instrument to reach these results.

(a) Enhanced profitability and growth performance of SMEs

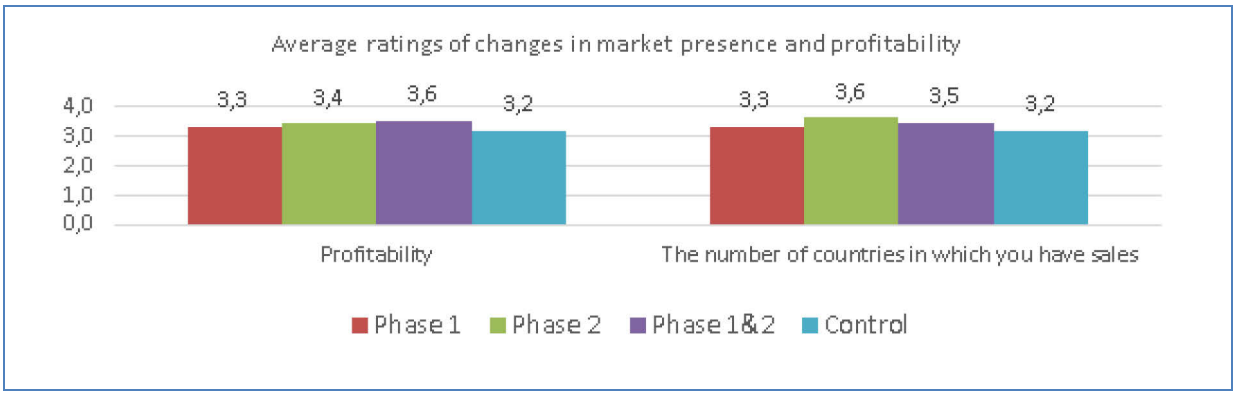
Evidence suggests that the SME Instrument has a good potential to reach its intended effects on the profitability and growth of the beneficiary innovative SMEs.

There are clear indications that SME Instrument beneficiaries realise faster growth paths than control groups and the scale-up of their activities is more likely and/or more significant. Phase 2 beneficiaries that went through Phase 1 report higher profitability, while Phase 2 beneficiaries report stronger market presence, even at the implementing stage of their project.

Beneficiaries of SMEI funding (both interviewees and survey respondents) are in general quite positive on the impact of selected projects on their competitiveness; specific effects on staff numbers, turnover and profitability are more limited, reflecting the recent start of the SMEI activities. Nevertheless, there **are early indications that the SME Instrument projects have a positive effect on both profitability and markets reached.**

SMEs were asked to rate the extent to which their profitability and the number of countries in which their company trades had changed since first applying to the SMEI. Beneficiaries of SMEI funding, both Phase 1 and 2, more often reported positive changes and scored them higher than members of the control group (Figure 168, below).

Figure 168 - Average ratings of changes to market presence and profitability, by SMEI phase



Source: Technopolis, based on SME survey data Sample size: 310 (Phase 1) 99 – 100 (Phase 2) 27 (Phase 1 & 2) 1,314 – 1,327 (control) Scores: 1 (poor rating) to 5 (excellent rating).

The agencies had a similar positive view on the SME Instrument. Two thirds of respondents to the Agency survey (64%) agreed (strongly) with the statement that beneficiaries of the SME Instrument realise a **faster growth path** than non-beneficiaries. Just 2% disagreed, while the remaining 34% were neutral (i.e. neither agreed or disagreed). They were particularly positive on the capacity of the SME Instrument to help **scaling up innovative SMEs' business activities** (83% agreed, including 42% who agreed 'strongly').

Data from the SME survey show that the SME Instrument is particularly effective when it comes to improving the provision of (human and financial) resources for innovation, and the management of innovation projects, i.e. the internal monitoring and reporting (Table 110, below).

Impact of the scaling up related activities is 'more likely and/or more' significant amongst SMEI beneficiaries. Both Phase 1 and Phase 2 of the SME Instrument help SMEs scale up all identified activities, as can be seen in the figure below. Column A of the figure presents the average scale up that the unsuccessful applicants reported since the date of their application on each of the nine activities.66 For both the beneficiaries of Phase 1 and of Phase 2 the evaluators have calculated a 'premium'. This premium is defined as 'the additional increase in absolute terms'. Column B presents the 'premium' of Phase 1 beneficiaries, while Column C presents the 'premium' of Phase 2 beneficiaries.

[66] *On a three-point scale (1: little or no change; 2: improved slightly; 3: improved significantly).*

Table 110 - Difference in average ratings of improvements for control and beneficiary groups

	Average rating for Control Group (A)	Phase 1 beneficiary 'premium' (B)	Phase 2 beneficiary 'premium' (C)
The provision of (financial and human) resources for innovation	1.7	0.5	0.8
Innovation project monitoring and internal reporting	1.6	0.4	0.8
The enterprise's overall innovation strategy	1.8	0.4	0.6
Human resources and recruiting strategy	1.6	0.3	0.6
Idea management and the involvement of staff, clients and suppliers in innovation	1.8	0.4	0.5
The assignment of roles and responsibilities for innovation	1.7	0.4	0.5
Management of intellectual property	1.7	0.4	0.4
Innovation project formulation	1.9	0.4	0.3
IT, data and knowledge management strategy	1.6	0.3	0.3
Average premium/ phase		***0.4***	***0.5***

Source: Technopolis, based on SME survey data Sample size = 1,820 – 1,874 (excluding "don't know").

These findings are supported by the stakeholder interviews. Phase 1 SMEs indicated that their scale-up implied e.g. "crucial support for focusing on product development", "we made a roadmap for the future, including market research and a partner search", "helped focus on commercialisation", "created room for experimentation". Phase 2 has a completely different focus, and to some extent a different target group. Phase 2 SMEs indicated that scale up for them implied e.g.: "support to innovative activities", "made real TRL steps and it opened doors to partners", "both high-level TRL technology development as well as market analysis", "being able to buy expensive required materials and testing".

Several interviewees state that it could further improve its ability to assist highly innovative companies in scaling up their business activities by including a long-term perspective. This perspective is very distinct in Phase III of the US SBIR Programme, which inspired the SME Instrument. Besides stimulating technological innovation, ultimately boosting innovation and growth, it particularly involves providing government agencies with new, cost-effective, technical and scientific solutions to meet their needs.

(b) Market uptake and distribution of innovations

A major objective of the SME Instrument is to accelerate the transfer of research results into commercial products, services or processes.

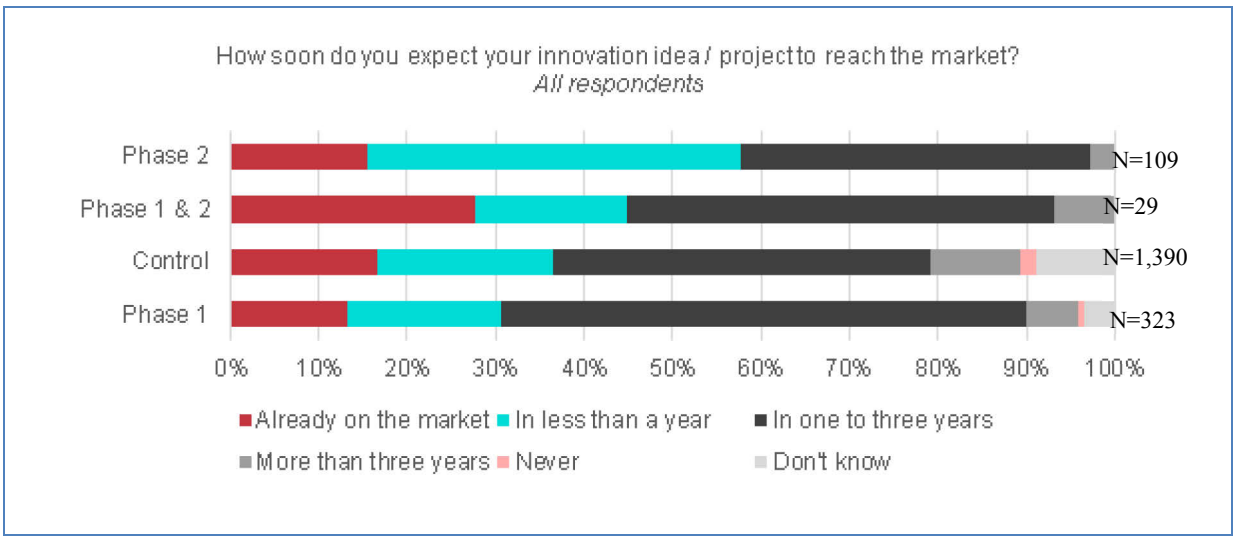
Interviewees, agencies and SMEs surveyed all concord in their assessment that the SME Instrument is an effective tool to speed up the introduction of innovations on the market.

The previous chapter on relevance, as well as the implementation state of play chapter showed that the SME Instrument is able to respond to different types of innovation strategies, including both incremental and disruptive innovation strategies and that it is able to cater the relatively short innovation cycles of SMEs.

Respondents to the SME survey were asked how soon they expected their innovation idea or project to reach the market (Figure 169). Phase 2 appears to be quite effective in this, as more than half (53%) of Phase 2 beneficiaries have already reached the market, or expect to do so in less than one year. A relatively high proportion of beneficiaries of both Phase 1 and Phase 2 together (i.e. those whose project transitioned between phases) reported that their innovation was already on the market (24%).

While recipients of Phase 1 funding reported the lowest proportion of 'already on the market' or 'in less than a year' (a combined 26%), a larger proportion of the control group reported uncertainty about their innovation reaching the market than any other group (7% reported 'don't know').

Figure 169 - SMEI applicant expectations about when their innovations would reach the market



Source: Technopolis, based on SME survey data *Sample size: 29 – 1,390.*

These figures seem relatively positive. Actual market entrance might be a bit later than reported by many SMEs. To control for selection bias, respondents were also asked about the difference made by either being awarded an SMEI grant (successful applicants) or not being awarded an SMEI grant (unsuccessful applicants) in terms of how quickly their innovation would reach the market.[67]

Results are presented in Figure 170, below. These data clearly support the view that both phases of the SME Instrument effectively accelerate the transfer of research result into commercial products, services or processes. For example, 83% of successful applicants to Phase 1 reported that the grant has sped up or will speed up market introduction of their innovation while 71% of unsuccessful Phase 1 applicants believe that not receiving SMEI funding has or will decrease the speed of their innovation reaching the market. In addition,

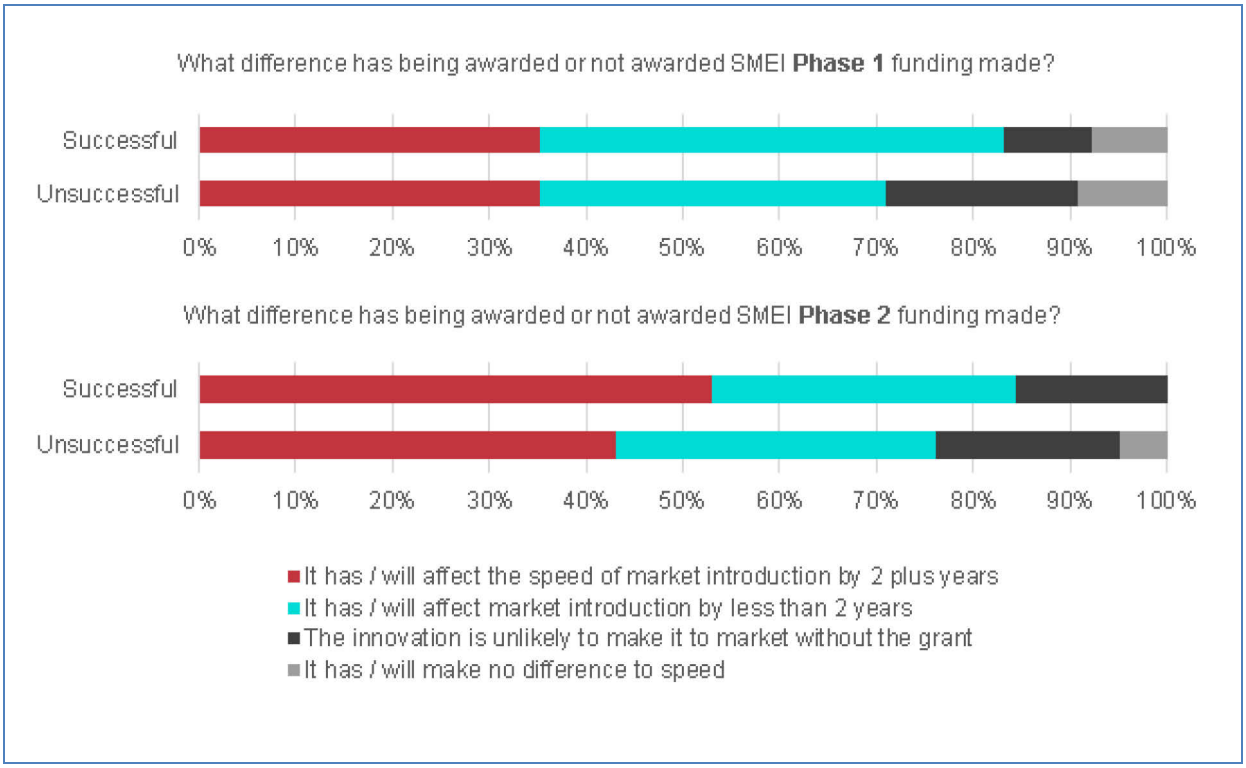
[67] *Successful and unsuccessful applicants were given corresponding options to choose from in answering the question.*

84% of successful applicants to Phase 2 reported that the grant has sped up or will speed up market introduction of their innovation, while 76% of unsuccessful Phase 2 applicants believe that not receiving SMEI funding has or will decrease the speed of their innovation reaching the market.

These findings were backed by the agencies who were asked to agree or disagree with five other statements, which more broadly related to the SME Instrument providing the right opportunities and support to progress innovative ideas amongst beneficiary SMEs.

The responses were particularly positive. More than 80% of respondents agreed that the Instrument 'effectively supports work to bring innovations to market', 'offers the opportunity to develop innovation potential', 'offers the opportunity to capitalise on innovation potential' and 'offers the opportunity to develop innovation management capacity'. Only slightly fewer (70%) agreed that it is an effective way to stimulate innovation.

Figure 170 - The difference made by being awarded or not awarded SMEI Phase 1 funding and Phase 2 funding



Source: Technopolis, based on SME survey data *Sample size: 134 (successful, P2) 1,042 (unsuccessful P1).*

I.4.2.2. Increase in private investment in innovation

(a) SME Instrument funding as a 'quality mark'

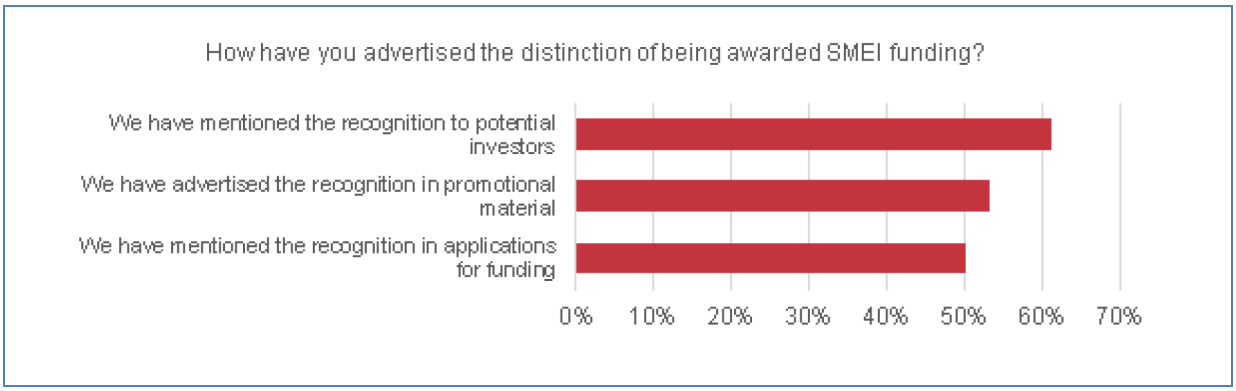
The SME Instrument projects also create several indirect effects for the SME beneficiaries, the most important one being **the prestige** deriving from the successful submission of an innovation project.

A successful application to the SME Instrument is generally considered as a 'quality mark' for the innovation project, especially in the case of Phase 2 projects.

It is expected to facilitate access to funding (loans & equity). There is no indication of a causal relationship between the low success rate of the SME Instrument and its good reputation among public and private funders.

Especially Phase 2 of the SME Instrument provides a quality mark that is explicitly used for marketing purposes by 3 out of 4 beneficiaries; potential investors are the most frequently targeted audience of these marketing activities (Figure 171).

Figure 171 - Advertisement of recognition of SMEI funding award



Source: Technopolis, based on SME survey data Sample size: 433.

The interviews with SMEs confirmed that the distinction particularly works for Phase 2 beneficiaries. Umbrella organisations interviewed agree with the 'quality mark' of Phase 2 of the SME Instrument, but also state that the quality mark can only be maintained if the evaluation of proposals is improved, to ensure that the SME Instrument attracts and selects 'the best' SMEs in the future.

The ToR for this evaluation included the question "In how far is the low success rate a prerequisite for a high reputation of the activity vis-a-vis private and other public investors?"

There is no indication of a causal relationship between the low success rate and a good reputation. For example, nearly all agencies (98%) believe that other public and private investors view a successful application to the SME Instrument as a sign of a good innovation idea or project and a 'quality mark' that facilitates access to funding (loans & equity). However, around three quarters also believe that the Seal of Excellence for unsuccessful (but above threshold) applicants is recognised as a quality label by public and private funding sources in their country. These results suggest that the SME Instrument has a good reputation amongst both SMEs and funders in Europe - for the quality of its selection, and probably despite the low success rates.

The cons of the low success rate (burdens within SMEs, burdens within the Agency) seem to be more prominent than the pros. The low success rate is generally considered a problem that potentially endangers instrument effectiveness as many excellent propositions are not funded.

The low success rate is considered as the least attractive feature of the SME Instrument, both by successful SMEs and by unsuccessful SMEs.

(b) The leverage effect of SME Instrument funding

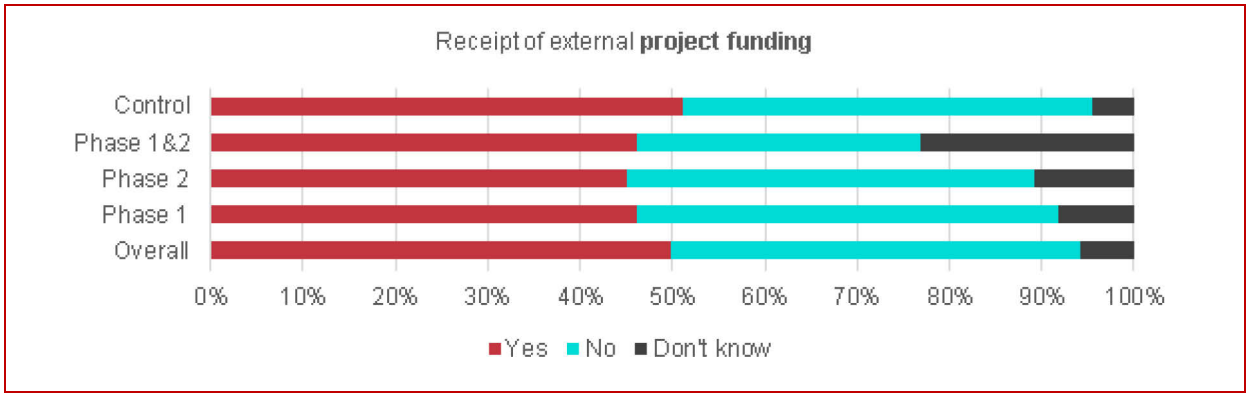
Notwithstanding the effect of the SME Instrument as a 'quality mark', a large majority of beneficiaries are positive about the leverage effect of the SMEI funding to date, and believe that this will further improve in the future.

SME Instrument funding clearly creates a leverage effect in the form of private co-funding of the innovation project. Private investors especially commit to co-financing SMEs that participated in Phase 2 projects. Impacts on additional funding from public sources seem limited in terms of frequency, but the volume of public funding is increasing.

Over 53% of SME survey respondents stated that it already has contributed (to a large or medium extent) to accessing funding. A total of 76% of SMEs believe that the SME Instrument funding will contribute to their ability to access other funding in the future.

Survey data show that non-beneficiaries of the SME Instrument were slightly more likely to have received external project funding (public) than beneficiary groups (50% of respondents, compared with 45%-46%) (Figure 172). This might be because beneficiaries have (part of) funding required made available by the SME Instrument.[68]

Figure 172 - Proportion of SMEI applicants who have received external project funding

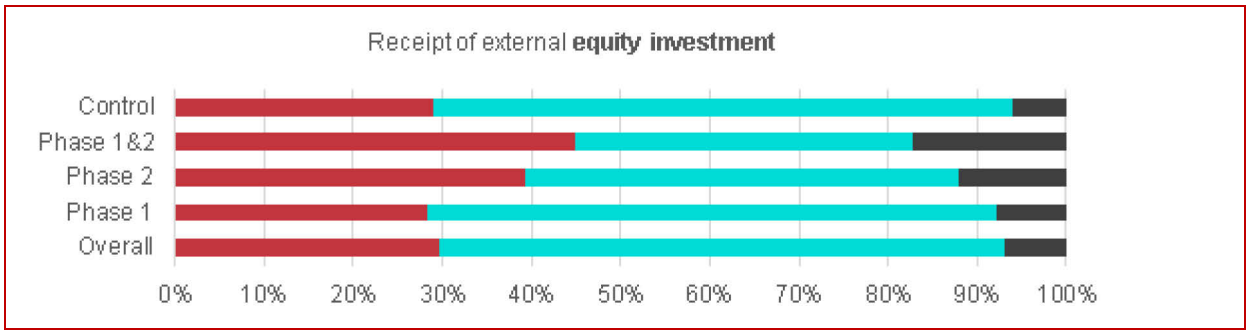


Source: Technopolis, based on SME survey data Sample size: 26 – 1,803.

However, beneficiaries of Phase 2 –and particularly Phase 1 & 2 combined - were much more likely to receive external (private) equity investment than non-beneficiaries or those that had participated only in Phase 1 (Figure 173).

Figure 173 - Proportion of SMEI applicants who have received external equity investments or external project funding

[68] *Additional financing from crowd-funding campaigns is reportedly not widely used among the SME Instrument's beneficiaries, with only 4% of those participating in 2014-15 seeking it out (European Commission, 2016).*

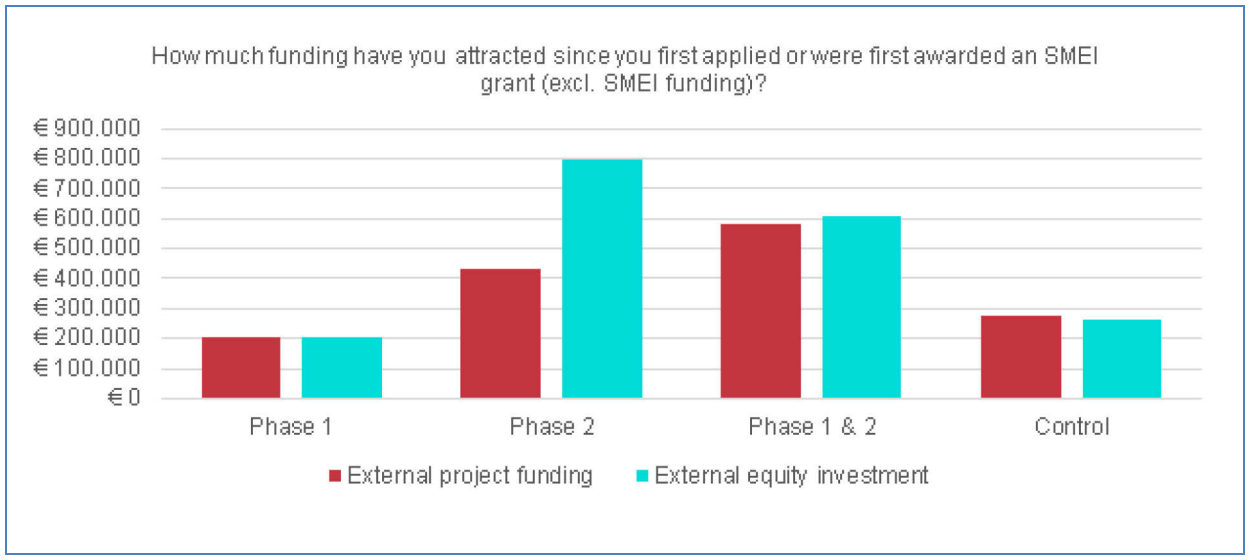


Source: Technopolis, based on SME survey data Sample size: 26 – 1,803.

Respondents were further asked to indicate the scale of funding involved (Figure 174). We have used mid-points[69] to examine the average amount of funding received in both categories. This reveals that beneficiaries of Phase 2 grants (including those who transitioned from Phase 1 to Phase 2) received larger average funding and investment in both external project funding and external equity investment than beneficiaries of Phase 1 only and the control group.

One can therefore conclude that private investors commit to co-financing especially of SMEs that participated in Phase 2 projects. The survey shows there is a clear leverage effect of approximately EUR 800,000 per SME in Phase 2.

Figure 174 - Average amount of funding received by SMEI applicants and beneficiaries since applying



Source: Technopolis, based on SME survey data Sample size: 284 – 293 (Phase 1) 91 – 94 (Phase 2) 20 – 24 (Phase 1&2) 1,229 – 1,293 (control).

Previous work of the European Commission from 2016[70] reveals that among the different themes covered by the SME Instrument, the most successful one at gathering external funding was Health, demographic change and well-being, gathering a total of EUR 271 million. The

[69] *Mid-points were used of the funding bands to estimate the average value of funding received, as follows: €0-50,000 = €25,000; €50,000-€500,000 = €275,000; €500,000 - €2m = €1.25m; €2m - €5m = €3.5m; over €5m = €5m*

[70] *Source: EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*

second most successful was ICT (with EUR 202 million of external funding), followed by Nanotechnologies, advanced materials or advanced manufacturing and processing technologies (EUR 75 million), Energy challenge (EUR 69 million) and Transport and smart cities mobility (EUR 33 million) (European Commission, 2016).

(c) Usefulness of the Seal of Excellence

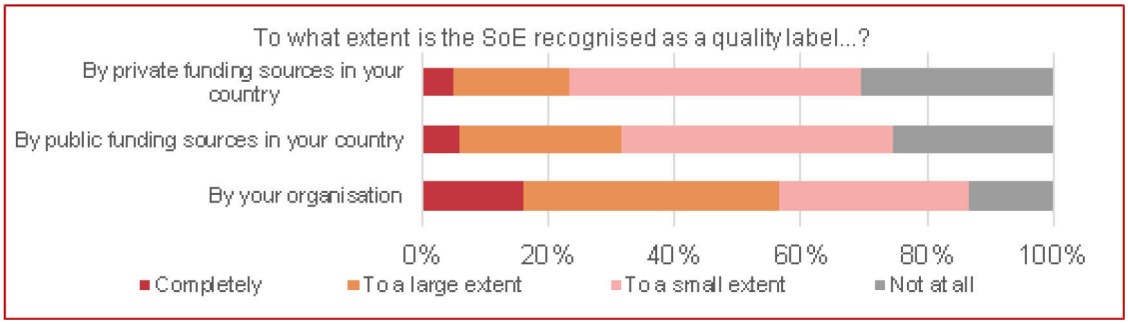
The Seal of Excellence (SoE) is a pilot initiative launched in October 2015 with the intent to offer the opportunity to regions and Member States (and any other interested actor) fully to exploit the outcomes of the SME Instrument proposal appraisal process in their national and regional funding decisions. The SoE is awarded to SME Instrument project proposals that were submitted for funding and passed the selection and award criteria but could not be funded due to budget constraints.

Opinions are divided when it comes to the usefulness of the SoE effectively to influence funding decisions. While agencies indicate a limited influence of the SoE so far, there are signs that this may change in the nearby future. SoE holders display a strong confidence that the Seal makes and will make a difference in funding decisions, be it implicitly or explicitly.

Interviewed members of the Programme Committees and Advisory Groups are sceptical. They indicate that the Seal did not have an ideal start as it was badly communicated in advance by the Commission. Some interviewed agencies also criticised the fact that initially, the wrong impression was given to the SMEs that the SoE would automatically allow for national funding.

Survey data show that while the SoE is recognised as a quality label by most 'to some extent', a strong recognition of the SoE as a 'proof of excellence', thus possibly guiding funding decisions, is indicated by ~60% of the agencies responding (Figure 175). Most important, only about 30% of them see a strong recognition among the public funders in their country; only about 20% see such recognition among the private funders.

Figure 175 - Extent to which SoE is recognised as a quality label by funding and support bodies



Source: Technopolis, based on Agency survey data Sample size: 82 - 113 (excludes "don't know" answers).

Most the agencies responding to the survey (76%) also reported that so far they have not explicitly recognised the SoE as a criterion for funding decisions. However, one-third reported that they planned to do so in the future. Most agencies were also not aware of

national or regional support programmes that explicitly recognise the SoE distinction. Some agencies, however, indicated initiatives in the Czech Republic, Italy, Spain and Sweden.[71] The Horizon 2020 Monitoring Report 2015 confirms that 'SoE friendly calls' have been launched in these countries during 2015. It also informs that the Community of Practice (CoP), set up by DG REGIO for the exchange of know-how and experiences in order to identify the best ways to implement funding schemes through ESIF or other sources in support of high-quality projects with the SoE, saw an increase in memberships from 52 members in October 2015 to 104 in January 2016.

The fact that three out of four agencies reported that that so far they have not explicitly recognised the SoE as a criterion for funding decisions, might indicate that it takes time to get a Seal known to the agency community. It might also indicate that national and regional funding often do not allow a positive discrimination of an applicant.

Despite the apparently limited influence of the SoE on funding decisions so far, holders of the Seal are confident about its future. About 75% believe that having a Seal of Excellence distinction will contribute to future funding decisions 'to a large extent' or 'to a medium extent'.

In fact, the Seal is intensively used by its holders. 81% mention the distinction in further applications for funding, while 49% stating that they had advertised the distinction in promotional material, and 29% had done both. Holders of the Seal of Excellence also indicated other ways in which they had used their distinction, which primarily included use in email signatures, on the company website, at funding events, and in materials for potential partners and customers.

I.4.2.3. The INNOSUP Actions' potential for the creation of the longer-term effects

The INNOSUP Actions are expected to create a longer-term impact on the innovation support system at regional, national and European level, enhancing the capacity to support the innovation capacity of SMEs and market driven innovation.

This section first considers to what extent the entirety of the INNOSUP Actions has the potential to create these expected effects. It then reports on the feedback provided by interviewees and surveyed stakeholders on the effectiveness of two specific strands of actions: the IPR Helpdesk and IPORTA II and the coaching community-building Action.

---

[71] *Apart from references to ERDF Operational Programmes, the following were identified (with often very limited information given):*

- *The JIC-run SME Instrument Brno programme that supports SMEs from South Moravian region developing innovative products that were positively evaluated but not funded under Phase 1 of the Horizon 2020 SME Instrument (https://www.jic.cz/en/sme-instrument-brno/)*
- *The Horizonte Pyme programme, managed by the Spanish Ministry of economy and competitiveness and the Spanish Innovation Agency. Since 2015, SoE holder can bid in calls for this programme. The grants allow the SMEs to conduct the full SME Instrument Phase 1, including requesting the help of business coaches. (http://www.idi.mineco.gob.es/stfls/MICINN/Ayudas/PE_2013_2016/PE_Liderazgo_Empresarial_en_IDi/FICHEROS/Horizonte_Pyme_2016/preguntas_frecuentes_horizonte_pyme_2016.pdf)*
- *Bando Horizon 2020, in Italy. The Tuscany Region has financed enterprises that obtained the SoE in 2015 (€10,000 grant). (http://www.sviluppo.toscana.it/impresaHorizon 2020)*
- *The VINNOVA Runner-up Programme in Sweden, which is funded nationally and targeted exclusively at positively evaluated proposals under Phase 1. VINNOVA invites companies that have scored 13 or above, to apply for the Runner-up programme.*

(a) The portfolio of INNOSUP Actions

The entirety of actions offers a promising pallet of actions to help improve the intermediary learning capacities that should improve this performing system. Jointly they seem to address many of the main challenges that intermediaries face. They potentially help intermediaries improve their skills in the field of major framework conditions such as open innovation; IPR; cross-sectoral industrial value chains; industry-RPO collaborations through effective innovation voucher systems; cluster management; as well as VC and risk finance. In addition, soft skills can be improved for instance in the field of community building, and peer learning.

While it is too early to assess whether the entirety of the INNOSUP Actions have effectively enhanced the performance of the national and regional support systems from this perspective, the information reported in Section I.4.1.2, above, shows that the **potential** of the INNOSUP Actions is clearly **perceived positively**.

Although the INNOSUP Actions are mostly in a very early phase all interviewed project leaders indicated that their projects focus on enhancing learning and development and transfer of good practices. Furthermore, with a few exceptions, most interviewees felt their project had or will have an impact on the service portfolio of their own organisation. Many projects expand, build upon, or consider new activities for the involved parties; interviewees argued that just from experience they will certainly improve. Examples are: *"the project consists of a group of diverse organisations that already provide innovation services to SMEs from which we learn", "we test an open space platform, which implies an upgrade in the type of services usually provided" or "we are learning that with micro-firms, we as agency, have to work more with people than with firms as such; we need to act more as coaches".*

Most interviewed leaders of INNOSUP Actions indicated that their project is novel. A few express that it is mostly novel in the sense of offering services at European level or that it might be novel to some support agencies while not to others. All interviewees argue that their project is/will be transferable and scalable for a wider uptake.

Interviewed stakeholders drew a less positive picture, though. They considered that the design of the INNOSUP Actions presents some important **shortcomings**.

A major critique relates to the increasing breadth of the actions funded, leading to fragmentation. Several interviewees considered that the overarching strategy for the decision-making on the actions to be funded is unclear. They considered also that the balance between continuity and change in the portfolio of actions was getting lost.

Interviewees also expressed their doubts on the potential learning effect of the combined INNOSUP Actions.

- First, the structures for inter-intermediary organisation learning are considered not solid enough which hinders the spill-over of learning effects to other intermediaries, even within the Enterprise Europe Network.
- Second, it is indicated that many Actions individually "*are novel but not needed*", which hinders interest from intermediaries that are not directly involved.
- Third, there are worries about the transferability and scalability of the INNOSUP Actions. Many are "*too theoretical"*, according to interviewees. Lacking

transferability and scalability will also negatively impact learning effects in other intermediaries.

It was noted that a needs assessment amongst the beneficiaries of the INNOSUP Actions would have been beneficial, both in terms of the type of Actions that are most needed as on how these actions would best be transferred to and absorbed by intermediary organisations outside the project teams.

Finally, a clear lack in visibility of the INNOSUP Actions emerged from our evaluation. The entirety of the Actions was not well known among all types of important stakeholders consulted for this evaluation, nor was there a healthy amount of interest in these Actions. This will clearly negatively impact the effectiveness of these Actions.

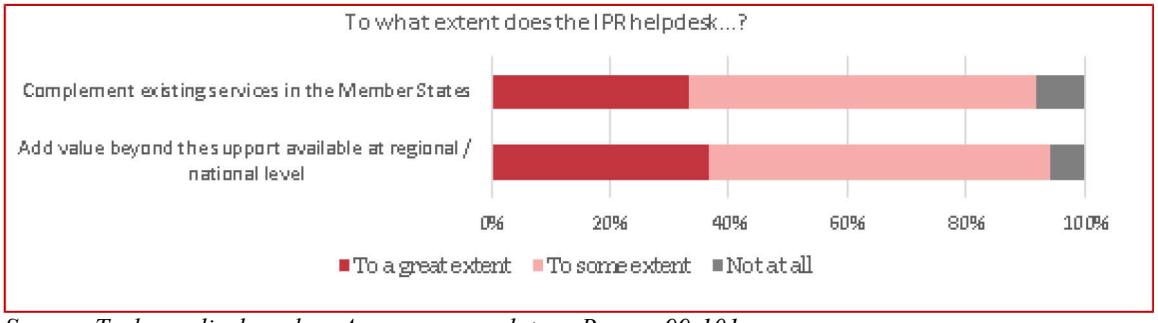
(b) The IPR helpdesk

This section sees if the IPR helpdesk provides a distinguishable service portfolio that adds value to European SMEs.

The IPR helpdesk is judged to provide a distinguishable service portfolio of high quality. Intermediaries are relatively positive about the complementary and added value of the IPR Helpdesk and assess positively especially the effectiveness of the services it provides.

Both the interviewed and surveyed agencies made a positive assessment of the extent to which the IPR helpdesk complements and adds value beyond the existing support and services available at regional/national level in Member States. While the interviewees were particularly positive in their assessment, the surveyed agencies gave a more mixed response. Figure 176, below, shows that while the clear majority of agencies confirmed the complementary and adding value of the IPR helpdesk, about half of them saw a complementary and added value only 'to some extent'.

Figure 176 - The extent to which the IPR helpdesk is complementary and adds value

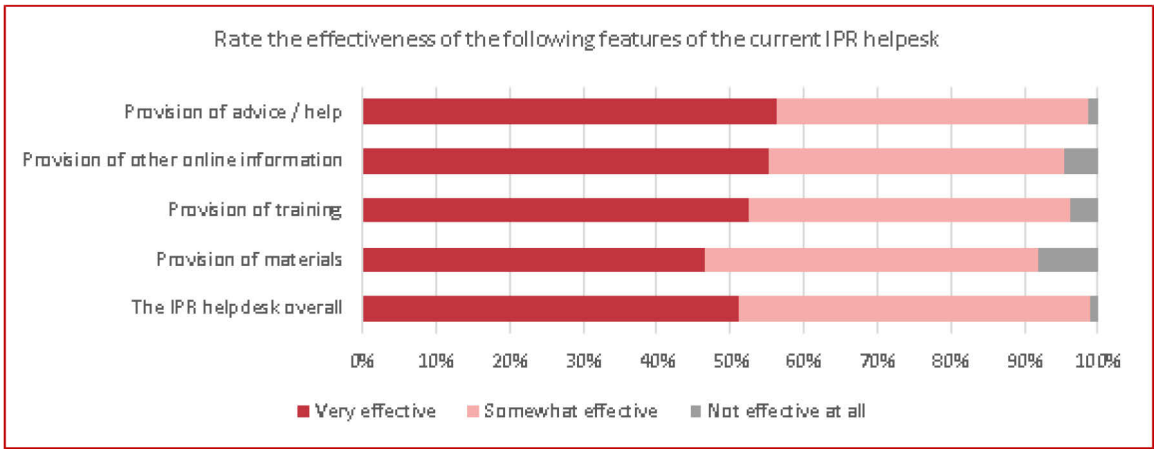


Source: Technopolis, based on Agency survey data Base = 99-101.

The agencies' assessment of the effectiveness of the IPR helpdesk is remarkably more positive. Overall, 51% rated the helpdesk as 'very effective', with a further 48% rating it as 'somewhat effective'. Just one agency reported that it was 'not effective at all'. Similar ratings were achieved for specific features of the helpdesk (Figure 177, below): over half of the respondents rated the IPR helpdesk as 'very effective' in terms of provision of advice and

help, provision of training and provision of other online information. Its effectiveness in terms of provision of materials was rated marginally lower.

Figure 177 - Effectiveness of IPR helpdesk features



Source: Technopolis, based on Agency survey data Base = 80 – 90 (excluding "don't know" answers).

Finally, intermediaries were asked about the extent to which the IPR helpdesk is achieving its overall objective of enabling SMEs to manage, diffuse and valorise Intellectual Property Rights. Nearly all (92%) felt that it was to some degree, including those who felt it was 'to a great extent' (17%). Just 8% of the agencies reported that the helpdesk was not at all enabling SMEs to manage, diffuse and valorise IPR.

(c) IPORTA II

The lack of visibility and awareness on IPORTA II among its targeted audience constitutes a major constraint for the potential of the initiative to reach its expected impacts.

Surveyed agencies were asked about the extent to which they agreed with two statements regarding IPORTA II. They were first asked whether the activities of IPORTA II were complementing the activities of the IPR helpdesk. They were subsequently asked whether there was evidence that the project is improving the quality of IP advisory services available to SMEs, particularly from national IP offices. Most respondents were unable to respond to these questions, but the few that did were, on balance, positive.

(d) The coaching community-building Action

The INNOSUP action 'Community-building and competence development for SME Instrument coaching' started in September 2014. The objective was to empower SME Instrument beneficiaries to develop and implement high-growth strategies. The coaching and mentoring was delivered by a network of business practitioners, in cooperation with the Enterprise Europe Network.

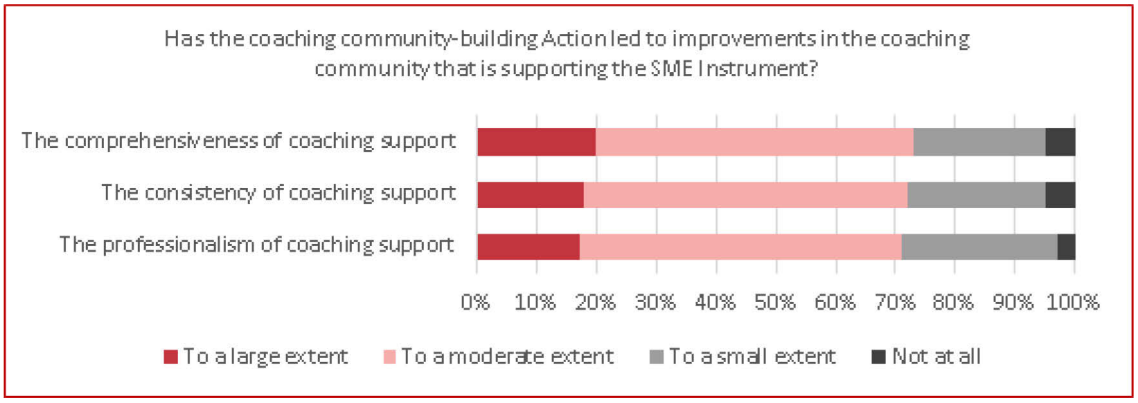
Despite the young age of the project, the feedback from the agencies on the effectiveness of the coaching community-building action is highly positive. The action

led to improvements in the professionalism of coaching as well as in the consistency and comprehensiveness of the coaching support.

Taking into consideration the relatively recent launch of this INNOSUP Action (contract was signed in September 2014), the feedback of the surveyed agencies on the extent that this action led to improvements in the coaching community that is supporting the SME Instrument can be considered as highly positive (Figure 178, below).

Agencies were specifically asked to rate improvements in the professionalism of coaching, the consistency of coaching support, the comprehensiveness of coaching support. At least 70% of the agencies believe that the Action has led to 'moderate' or 'large' improvements in each of these areas.

Figure 178 - Improvements in the coaching community as a result of the community-building Action



Source: Technopolis, based on Agency survey data Base = 100.

I.4.3. Progress towards the overall Horizon 2020 objectives

The main policy objective of Innovation in SMEs for its contribution to the Horizon 2020 objectives consists in the creation of a favourable ecosystem for SME innovation and growth.

As is mentioned in the preceding chapters, the SME Instrument and the INNOSUP Actions were intended jointly to contribute to the attainment of this objective. The section below provides an overview of the effectiveness reached by these two components of Innovation in SMEs, partly based upon the evidence reported above.

I.4.3.1. The overall effectiveness of the SME Instrument

The evidence reported in the sections above draws a strongly positive picture of the (potential) effectiveness of the SME Instrument in reaching its objectives, thus contributing to the Horizon 2020 objectives. The SME Instrument projects have a positive effect on the profitability and growth performance of the beneficiaries, including the markets reached. They are considered an effective tool to speed up the introduction of innovations on the market, thus setting the basis for an accelerated market uptake and distribution of innovations in a longer-term perspective. They have also fostered an increase in private investment in innovation, creating a leverage effect of approximately EUR 800,000 per SME in Phase 2 thanks to the co-funding by private investors (equity investments).

An additional key factor for the programme to effectively contribute to the Horizon 2020 objectives is its capacity to support all types of innovations and to attract the appropriate type of SMEs, especially the young SMEs and start-ups. Evidence reported in the coming sections allows for the conclusion that while the instrument is effective in attracting a significant number of young innovative SMEs, the type of innovation funded was mainly related to product innovation. The previous chapter on Relevance already concluded that the SME Instrument supports both radical and incremental innovations.

(a) Types of innovations supported

This section assesses if the SME Instrument effectively supports all types of innovation including, including service, non-technological and social innovations.

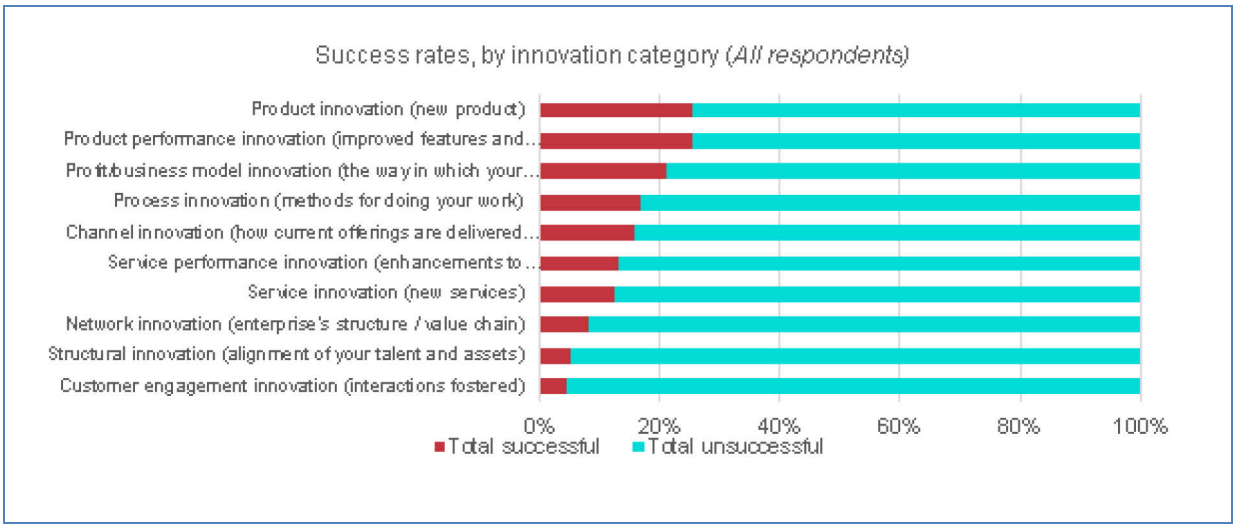
Our analysis shows that the SME Instrument focuses especially on product innovations, product performance innovations, and business model innovation. Service innovations, network innovations, and customer engagement innovations are less supported.

Our survey asked both successful and unsuccessful applicants which category the innovation idea or project behind their SMEI application fitted into. More than half of the respondents (57%) reported that their idea/project was related to a product innovation. Other types of innovation were much less common, for instance, improved features and functionality was reported by 12% and new services by 11%.

Figure 179, below, presents the distribution of successful and unsuccessful applicants over various types of innovation. It shows that the win-rate highly differs from one type of innovation to another. The SME Instrument clearly focuses on product innovations (26% win rate among survey respondents),[72] product performance innovations (26%), business model innovation (21% win rate). Service innovations (13%), network innovations (8%), structure innovations (5%) and customer engagement innovations are less supported by the SME Instrument.

Figure 179 - Success rates of SMEI applicants, by innovation category

[72] *So not normalised for a potential overrepresentation of successful applicants, which causes relatively high percentages.*



Source: Technopolis, based on SME survey data Sample size: 2,363.

(b) Capacity to attract young SMEs and Start-ups

This section assesses if the SME Instrument also assists young ones and start-ups to scale up their business activities.

The SME Instrument is intensively used by start-ups, especially the Phase 1 strand. The characteristics of Phase 2, in terms of e.g. time-to-grant and cashflow constitute a hindering factor for a more intensive participation of start-ups in that component of the instrument.

The SME Instrument is intensively used by young SMEs and start-ups. In 2016 the Commission[73] showed that a full 85% of the SMEs using the Instrument's coaching offer were at a pre-industrialised stage in their life-cycle – 28% of them at the seed stage[74]; 35% at the project-to-project stage[75]; and 22% at the upscaling stage[76] – while only 15% were industrialized – most of them at the expansion stage[77] of their life-cycle. Start-ups were most prominent in ICT (ODI), while NMP topic gathers the highest share of older and larger companies.

The EASME in 2016 disaggregated SMEs participating in the SME Instrument between 2014 and 2015 according to their size, age and economic sector. Its main findings include the following key points:[78]

---

[73] *EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*
[74] *at which an SME has a concept and is looking for its first clients and first round of financing.*
[75] *at which an SME already has several customers and is developing its project directly through these*
[76] *at which an SME is starting to segment potential client groups, adapting their product to these and organising its supply chain, production and distribution and reach economies of scales.*
[77] *at which a business is conquering new markets, growing internationally, and starting to delegate management and control, human resources functions, and to develop new partnerships.*
[78] *EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*

- **Size.** Micro-sized enterprises accounted for 60% of beneficiaries under Phase 1 (and 48% of those under Phase 2). Small enterprises accounted for a further 29% of beneficiaries under Phase 1.
- **Age**. Phase 1 participants were evenly distributed according to their age between those which had been in operation for 0-3 years (35%), 4-10 years (33%) and 11 years or more (30%). The same was broadly true under Phase 2, which had equivalent shares of 24%, 40% and 35%, respectively.
- **Sector.** The biggest share came from the Manufacturing sector (29.3%), followed by Professional, scientific and technical activities (20.6%), and then ICT services (20.4%). There were no significant differences in the sectoral mix between the two phases, though manufacturing enterprises accounted for a slightly bigger share under Phase 2, while ICT services enterprises were slightly more prominent under Phase 1.

Agencies interviewed share the idea that Phase 1 projects are especially useful for young micro-sized SMEs. However, they also indicated some factors that may hinder participation by start-ups, especially in Phase 2. The SME Instrument requires a significant cash-position from its beneficiaries as the chances for success are small, the time-to-grant is relatively long, and the co-funding required from the beneficiary is significant. They considered that the combination of these requirements constitutes a key bottleneck for many start-ups.

I.4.3.2. The overall effectiveness of the INNOSUP Actions

The effectiveness of the INNOSUP Actions in contributing to the envisaged changes in the EU innovation support system is less clear. The evidence reported above shows that while the appropriateness of the actions is overall judged positively, there are several factors that seem to hamper the full attainment of the INNOSUP Actions' expected effects. These include the increasing breadth of the actions, the fragmentation and perceived lack of an overarching strategy, and especially the lack of visibility of the actions among the targeted stakeholders.

I.5. EFFICIENCY OF INNOVATION IN SMES

This chapter addresses the efficiency evaluation criteria: How efficient is the implementation of the SME-instrument and of the activities under 'Innovation in SMEs' of Horizon 2020? - The question consists of examining the level of resource use (inputs) required to produce outputs and generate effects. The assessment of the efficiency will focus on processes and procedures of implementation of calls, proposal evaluations and management of selected projects. The first part presents the commitment of the available budgets of both the SME Instrument and the INNOSUP Actions. Section I.5.2 presents the efficiency in reaching out to target groups. Sections I.5.3 discusses various implementation aspects of efficiency.

I.5.1. Commitment of available budget

I.5.1.1. Commitment of available budget for the SME Instrument

This section examines whether the budget of the SME Instrument available in 2014 and 2015 was committed.

The SME Instrument was able fully to commit the available budget in the 2014/15 calls

The analysis of available data up to July 2016 confirms that the SME Instrument fully commits the available budget, which had been a small concern with the conception of the programme's support for SMEs, as compared with FP7, and the transfer of administrative responsibility from REA to EASME.

Table 111, below, shows the total indicative budgets for 2014-2015 period, allocated and budgeted by thematic. Such presentation shows how was distributed the indicative budget of the SME instrument. The table also highlights the three thematic where the budget committed was more than 105% of the indicative budget. There are three sub-topics where the committed budgets were markedly different to the indicative budget: 'SME boosting biotechnology-based industrial processes driving competitiveness and sustainability' (136%), 'Resource-efficient eco-innovative food production and processing' (133%) and 'Innovative mobile e-government applications by SMEs' (122%).

Table 111 - Activities and allocated indicative budget dedicated to the SME Instrument for the programming period 2014-2015

Activities 2014-2015		**Total indicative budget 2014/15 (in €m)**	**Budget committed 2014/15 calls (in €m)**	**Share of indicative budget committed**
Information and Communication Technologies	ICT-37-2014/2015 Open Disruptive Innovation Scheme	88.00	88.9	101%
Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing	NMP-25-2014/2015 Accelerating the uptake of nanotechnologies advanced materials or advanced manufacturing and processing technologies by SMEs	45.60	46.9	103%
	BIOTEC-5-2014/2015 SME boosting biotechnology-based industrial processes driving competitiveness and sustainability	6.20	8.4	136%
Space	SME-SPACE-1-2014/2015 SME Instrument	17.05	16.7	98%
Health, demographic change & well-being	PHC-12-2014/20153 Clinical research for the validation of biomarkers and/or diagnostic medical devices	€111.1m	€110.4m	99%
Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bio economy	SFS-8-2014/2015 Resource-efficient eco-innovative food production and processing	€27m	€36m	133%
	BG-12-2014/2015 Supporting SMEs efforts for the development- deployment and market replication of innovative solutions for blue growth	€9m	€8.9m	98%
Energy Challenge /	SIE-1-2014/2015	€68.7m	€68.2m	99%

Activities 2014-2015		Total indicative budget 2014/15 (in €m)	Budget committed 2014/15 calls (in €m)	Share of indicative budget committed
Secure, Clean and Efficient Energy	Stimulating the innovation potential of SMEs for a low carbon and efficient energy system			
Smart, green and integrated transport	IT-1-2014/2015 Small business innovation research for Transport	€74.8m	€73m	98%
Climate action, environment, resource efficiency and raw materials'	SC5-20-2014/2015 Boosting the potential of small businesses for Eco innovation and a sustainable supply of raw materials	€36m	€39m	108%
Europe in a changing world – inclusive, innovative and reflective Societies	INSO-9-2015 Innovative mobile e-government applications by SMEs	€4m	€4.9m	122%
	INSO-10-2015 SME business model innovation	€11m	€11.1m	101%
Secure societies – Protecting freedom and security of Europe and its citizens	DRS-17-2014/2015 Protection of urban soft targets and urban critical infrastructures	€14.4m	€13.9m	97%
Total indicative budget		**€512.9**	**€526.4m**	**103%**

Source: European Commission. Horizon 2020 Innovation in SMEs Work Programmes 2014-2015 and CORDA (July, 2016).

I.5.1.2. Commitment of available budget for the INNOSUP Actions

This section examines whether the budget of the INNOSUP Actions of the 2014-2015 Work Programme was committed.

The budget for the INNOSUP Actions under the 2014-215 Work Programme was fully committed.

Table 112, below, shows the budgets committed (EC Contribution) for the different activities in the calls under the 2014-2015 Work Programme. In total, they amounted to 119% of the indicative budget for the INNOSUP Actions overall for 2014/15.

Table 112 - Activities and allocated indicative budget dedicated to the INNOSUP Actions for the programming period 2014-2015

Activities 2014-2015	Number of proposals selected	Budget committed (EC Contribution) in 2014/15 calls (in €m)
Community building and competence development for SME Instrument coaching	1	€0.8m
IPR helpdesk	1	€4m

IPorta 2	1	€3m
European label for innovation voucher programmes	1	€1.5m
Professionalisation of open innovation management in SMEs	1	€1.7m
Capitalising the full potential of online collaboration for SME innovation	2	€1.6m
Cluster facilitated projects for new value chains	5	€21.7m
Peer learning of innovation agencies	21	€1m
Capacity-building for national contact points (NCPs) for SMEs and access to risk finance under Horizon 2020	1	€2m
Total budget committed		€37.4m
Total indicative budget		€31.5m
Share of total indicative budget committed		119%

Source: European Commission. Horizon 2020 Innovation in SMEs Work Programmes 2014-2015 and additional desk research (limited data availability of CORDA data on INNOSUP Actions).

I.5.2. Efficiency in reaching out to target groups across the EU

I.5.2.1. SME Instrument outreach

In designing the new SME Instrument, close attention was given to wider stakeholders – taking into account the recommendations around widening participation. Past evaluations concluded that SME-specific measures were delivering substantial value, however, most also remarked on the extent to which most Europe's global population of dynamic smaller businesses remained unaware of the support available. The economic crisis underscored the critical importance of this segment of the business community, for improving productivity and securing Europe's future position in several emerging industries. In response, the SME Instrument increase the programme's effectiveness as an innovation support measure, and efforts redoubled to raise awareness amongst the segment of businesses with the potential to deliver major innovations and export-led growth. Most Member States concurred with this logic and have also redoubled their own efforts to alert SMEs to the opportunities.

EASME's analysis of the first two years of SME Instrument implementation[79] showed that the typical supported SME has been on the market for 10.8 years, has an annual turnover of EUR 4 million and employs 21 people. "There are differences among the Phases, though, with Phase 2 attracting more 'mature' SMEs (i.e. on the market for 4-10 years) than Phase 1 (40% and 33% of SMEs funded, respectively); Phase 1 also attracts a larger share of micro-sized SMEs (1-9 employees) than Phase 2 (60% and 48%, respectively).

Start-ups, i.e. SMEs with up to 3 years' activity, constituted 35% of the SMEs selected for Phase 1 and 24% of those selected for Phase 2 in the 2014/15 cut off dates. The capacity of the SME Instrument to attract start-ups varies depending on the sector. EASME report stated that the ICT topic had the highest shares of start-ups in 2014-2015 (46% in Phase 1 and 35% in Phase 2) while the NMP topic, instead, had the highest share of companies with more than 11 years of trading, both in Phase 1 (42%) and Phase 2 (56%).

[79] *European Commission (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*

Evidence suggests that the SME Instrument is reaching a relatively high proportion of its target SMEs in only a limited number of countries. This conclusion arrives by estimating penetration rates for each EU28 country.

These penetration rates fall well below the EU28 average in 10 Member States, which are disproportionately, the EU-13 countries. This suggests there is more work to do to raise awareness about the SME Instrument in most countries, and possibly to look more closely at the communication strategy and messaging about success rates and benefits.

The Regulation (EU)1290/2013indicates that the SME Instrument was intended to reach 'high growth potential, export-oriented, innovative SMEs'. Even though the target SMEs are described in slightly different ways across various sources,[80] all agree that the target group is innovative, growth ambitious, risk-taking SMEs.

To test the extent to which the SME Instrument succeeded in reaching such target profile, it was needed to estimate the global population. For this purpose, it was necessary to first define this rather unique group within available European statistics in order to determine the total population of high growth innovators. This **reference population** would allow to estimate the SME Instrument's 'penetration rate'.

There is no perfect solution. There are substantive data available on high-growth enterprises, with an "average annualised growth in the number of employees greater than 10% per year, over a three-year period, and with ten or more employees at the beginning of the observation period" (Eurostat, 2016). However, these statistics include a mixture of older firms in traditional sectors as well as younger, technology-driven ones.[81] This group is also referred to as 'the crucial 6%' of high-growth firms (in the UK) according to NESTA.[82]

Another possible approach is to think about 'strategic innovators', for which "innovation is at the heart of these firms' competitive strategies"[83]. According to a study from Arundel and Hollanders (2005), 'strategic innovators' account for up to 10% of EU firms, though this figure varies greatly across countries.[84] Their size may vary across sectors given their major

[80] *According to European Commission website "the SME Instrument addresses the financing needs of internationally oriented SMEs, in implementing high-risk and high-potential innovation ideas". Furthermore, the Work Programme 20014-2015, states that the instrument "is targeted at companies that need SME Instrument funding as core part of their business strategy to launch a high-potential innovation." Finally, The European Commission's (2016) report "Catalysing European innovation" (which documents the first two years of implementation of the SME Instrument 2014-2015) identifies highly innovative and highly risky SMEs as the target group of the SME Instrument.*

[81] *OECD (2002) "High-growth SMEs and Employment". https://www.oecd.org/cfe/smes/2493092.pdf.*

[82] *NESTA (2014) Increasing 'The Vital 6 Percent: Designing Effective Public Policy to Support High Growth Firms" https://www.nesta.org.uk/sites/default/files/working_paper_-_increasing_the_vital_6_percent.pdf.*

[83] *JRC (2016) "Modes of Innovation: Evidence from the Community Innovation Survey": According to this document strategic innovators are those for whom "innovation is at the heart of these firms' competitive strategies. They have introduced a product or process innovation that has been developed at least partly in-house, they perform R&D on a continuous basis, they have introduced at least one product that is new to their market, and they are active in national or international markets. These firms are the source of many innovative products and processes that are adopted by other firms in their domestic economies and internationally".*

[84] *Arundel, A. and H. Hollanders (2005), "2005 European Innovation Scoreboard". Brussels: European Commission, DG Enterprise, 2005.*

differences in the rate of technological change.[85] Note that both beneficiaries and unsuccessful applicants that responded to SME instrument's surveys stated their ideas had the potential to shape or create a new market with a potential to change established value chains in a either radical and / or technologically new manner (98% and 91% respectively); This indicates that virtually all applicants were companies that would consider themselves as 'strategic innovators'.

Since no up-to-date information is available on 'strategic innovators' for the EU-28, high-growth enterprises were taken as proxy, which provides a similar percentage of companies. Information from Eurostat (2006) was used and combined it with data on the number of SMEs according to data from the latest *SME Performance Review* (2016) to arrive to grossed-up estimates.

The 'penetration ratio' is then calculated as the ratio between the total number of SMEs applying to the instrument and the target number of SMEs (in thousands). It is understood as the number of SMEs reached per 1,000 of the target population. This is a conservative view of the programme's success in raising awareness among its target population, as there will be SMEs that have been made aware of the new instrument and have elected not to submit an application at this time.

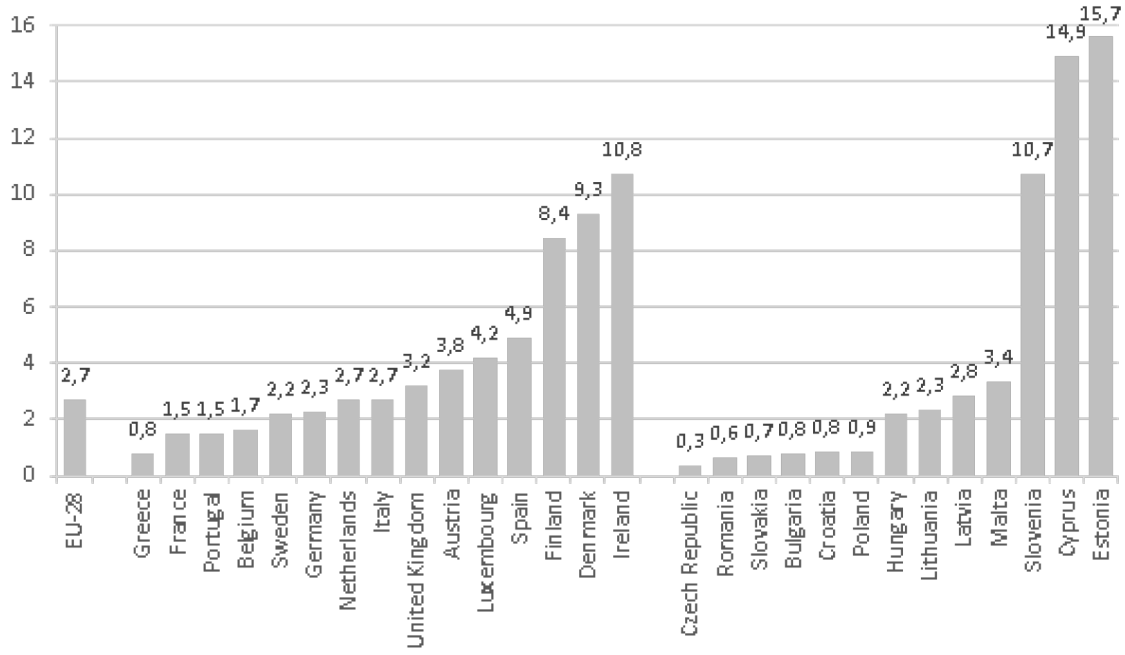
The figure below presents the penetration ratios for each EU Member State. Given the unique geographic scope of the instrument it is difficult to choose an appropriate instrument or programme to use as a benchmark for these results to assess what makes for a 'high' or a 'low' penetration rate. Given the previous remark about the difference between raising awareness and securing applications, a high penetration would be circa 50 per 1000 (=5%), however the penetration rates found in the analysis are a third of that value, across all Member States (MS). Instead, the EU average was used as a comparison point for each MS. The value of 6.7 (one standard deviation above the EU-28 mean) was taken to be high in the context of this analysis. Figure 180 shows the SME Instrument's penetration rates by country, split into EU-15 and EU-13.

The analysis shows that six of the 28 Member States have penetration rates substantially above the average. Those six countries comprise Estonia (15.7), Cyprus (14.9), Ireland (10.8), Slovenia (10.7), Denmark (9.3) and Finland (8.4); they split equally between the EU-15 and EU-13. The penetration rates fall well below the EU-28 average in 10 Member States, which are disproportionately EU-13 countries. The lowest ratios are calculated for the Czech Republic (0.3), Romania (0.6) and Slovakia (0.7).

Overall, the SME Instrument is reaching a relatively high proportion of its target group in only a handful of countries. In some cases, this may reflect the availability of venture capital or funds with similar characteristics at the national level (e.g. The UK and Germany). However, interviews suggest this competition between national and EU support measures does not hold to the same extent for newer Member States where there are fewer local support measures and where they exist they are typically quite small. This suggests there is still more work to do to raise awareness about the SME Instrument in most countries, and possibly to look more closely at the communication strategy and messaging about success rates and benefits.

[85] *European Commission (2008) "Sectoral Innovation Watch Report". Brussels: European Commission, DG Enterprise, 2005.*

Figure 180 - Penetration rates per Member State (SMEs reached per 1,000 of the target population)



Source: Technopolis, based on CORDA data (July 2016), SME Performance Review (2016) and Eurostat (2016).

The evaluation was also concerned to understand the extent to which the SME Instrument had been promoted **too broadly**, attracting the interest of SMEs that do not have the capacity currently to conceive and implement substantive innovations. We took the view that addressing the wrong target groups – or getting the communications message wrong – might result in calls for proposals being heavily oversubscribed with a large proportion of weak or inappropriate proposals. This kind of oversubscription has high social costs and can be damaging on a reputational level, for the programme. Moreover, such a situation would be wasteful administratively too as all applications, both the good and the not so good, must be evaluated properly.

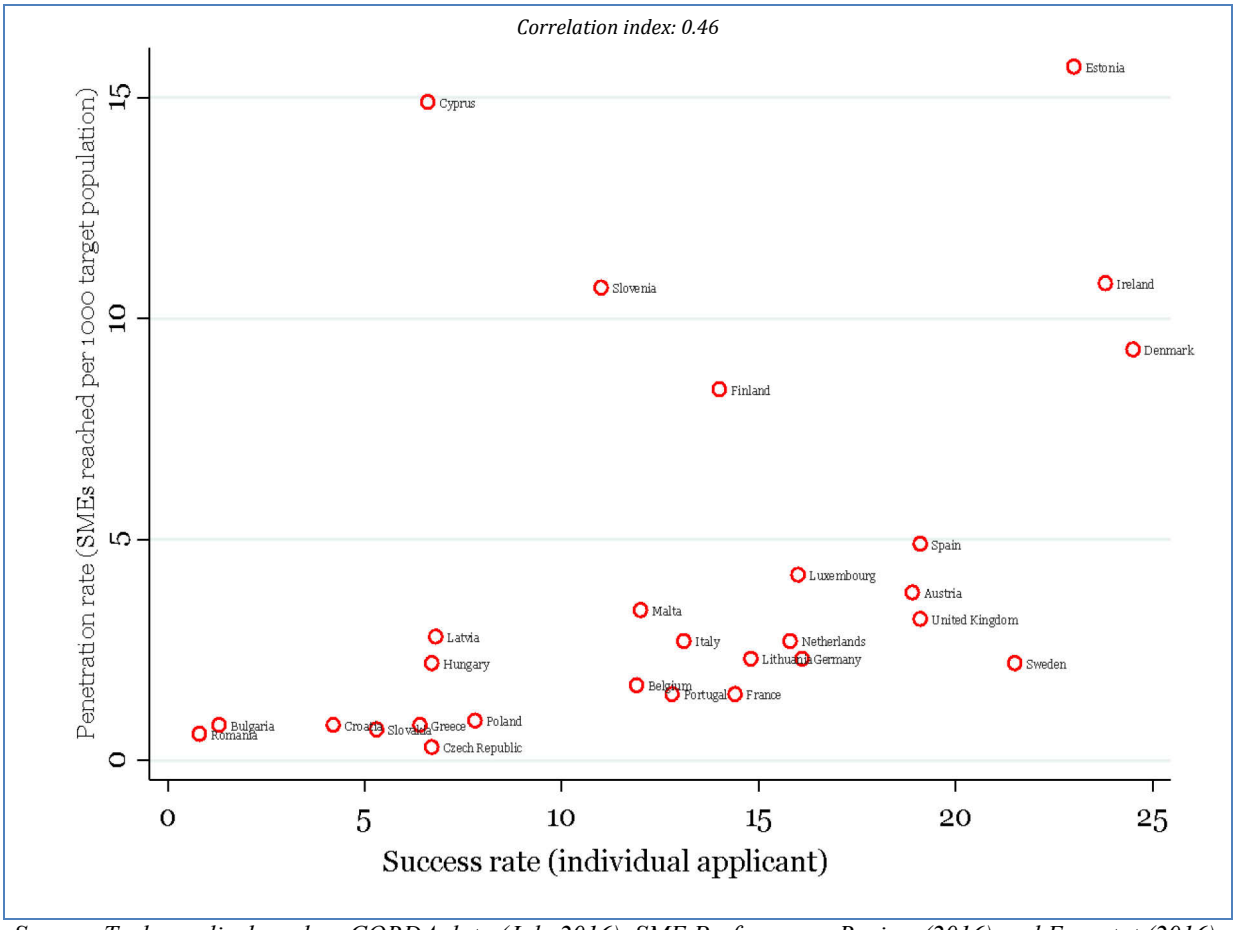
The percentage of proposals that passed the evaluation criteria (and were retained for a final decision on funding) increased over time, in particular for Phase 2. The percentage of retained proposals went from 23% in the first cut-off to 47% in the latest cut-off (April 2016). For Phase 1, this percentage went from 12% in the first cut-off to 16% in the latest cut-off (May, 2016).

The SME Instrument is not increasingly attracting applications from 'inappropriate' SMEs. The analysis also shows that the level of reach-out to the target group correlates with a country's performance in terms of success rates. This evidence suggests the SME Instrument's communication efforts have not resulted in an increase in unsuitable or poor quality applications.

Analysis shows that the upwards trend does not imply that the SME Instrument is increasingly attracting inappropriate SMEs. The data also suggest the SME Instrument's communication efforts have not resulted in an increase in unsuitable or poor quality applications.

Figure 181 shows that there is a strong positive correlation between (i) penetration rate and (ii) success rate (number of SMEs submitting at least one eligible proposal versus number of SMEs that have been successful at least once). The correlation is 0.46. This suggests that the level of reach-out to the target group goes hand in hand with performance in terms of success rates. The correlation is particularly high in Estonia and Ireland where a relatively high penetration rate (above 10 SMEs reached per 1,000 of target population) is met with a high success rate (above 20%). These are two countries where there is an active participation from the National Contact Points (NCP)[86], who are actively engaging the national industrial base (mostly SMEs) and introducing them to the different available schemes in Horizon 2020 (including the SME Instrument). These NCPs not only provide information and broker introductions but also provide an initial pre-screening by virtue of helping SMEs to understand if the instrument is relevant for the needs and development stage.[87]

Figure 181 - Correlation between penetration and success rate



Source: Technopolis, based on CORDA data (July 2016), SME Performance Review (2016) and Eurostat (2016).

Furthermore, the case studies suggest that national and regional efforts play a critical role in directly promoting calls for proposals to the right target audiences and in screening more open enquiries, helping prospective applicants quickly form a view on the relevance of the Instrument to their individual ambitions and capabilities. This engagement goes beyond the good work of the NCP networks and national innovation agencies, with several examples of

[86] *These NCPs are also the Enterprise Europe Network partners*
[87] *Rosemberg, C., P. Simmonds, Wain, M., Nielsen, K. (2016) "Interim evaluation of Ireland Participation in Horizon 2020". Report prepared for the Department of Jobs, Enterprise and Innovation (DJEI).*

countries where consultancy schemes have been used to selectively expand national or regional capacity to raise awareness, frame ideas and develop stronger proposals.

I.5.3. Efficiency of the implementation

I.5.3.1. Efficiency of the implementation of the SME Instrument

This section explores the efficiency of the programme's implementation (in terms of time-to–grant and time-to-inform) and examines the extent to which key indicators are in line with the market's and project holders' needs.

The Horizon 2020 Regulations defined for the SME Instrument a shorter time-to-grant benchmark than for the other initiatives, three months for Phase 1 (90 days) and six months for Phase 2 (180 days) after the cut-off dates.

Performance on time-to-grant has improved significantly, however the latest available data show that SME Instrument target values are not yet met. The time-to-inform has not improved significantly in the past cut-offs.

Based upon available secondary data, the actual time-to-grant reached was slightly higher than expected, i.e. 106 days for Phase 1 (November 2015), and 185 days for Phase 2 (September 2015). The time-to-grant under Phase 2 has made significant advances, however, coming down from 252 days during the first call of Phase 2 in October 2014. There has been a substantial improvement on the 'time-to-grant' performance of the predecessor programme, Research for the Benefit of SMEs (FP7), where the average elapsed time was 11 months.[88]

On average, applicants receive evaluation results and funding decisions (the so-called 'time to inform') within 2 months after the cut-off date. According to the available secondary data, in November 2015 (the latest call for which data are available), the time-to-inform was 56 days under Phase 1 and 75 days under Phase 2. Proposal documents are short and are 3 times longer for Phase 2 in comparison with Phase 1 (broadly 30 and 10 pages, respectively). The time-to-inform has not improved significantly in the past cut-offs. This might be due to the timing scope and the fact that time to inform usually increases towards the end of the year, when expert evaluators are less available due to the holiday season. The figure below shows the developments of the respective indicators over time, and also includes the European Commission's target values.

In the report "Catalysing European innovation"[89], EASME finds that "90% of selected projects are processed within this timeframe. The remaining 10% include projects requiring a different and longer granting procedure (for example when the authorising officer is not within EASME, for security projects and projects above EUR 2.5 million), they require additional security checks or are subject to ethical scrutiny."

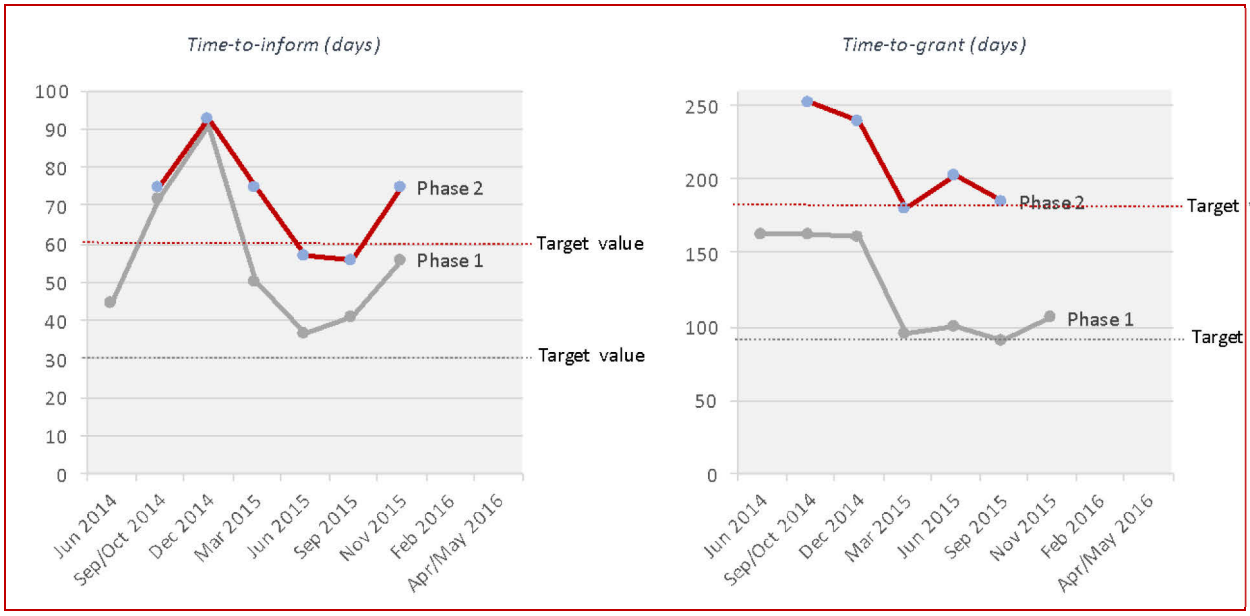
---

[88] *Performance of SMEs within FP7: An Interim Evaluation of FP7 components, Koos van Elk, Jacqueline Snijders, Yvonne Prince, Petra Gibcus, Sophie Doove (Panteia); Paul Simmonds, Katharina Warta, Barbara Good, (Technopolis Group); Sascha Ruhland, Sonja Sheikh (The Austrian Institute for SME Research). May 2014*

[89] *EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*

A relevant question that cannot be assessed with the data available, is to what extent start-ups and other companies with cash flow challenges can manage the current time-to-grant values. Chapter 4 cover potentially other hindering factors for start-up participation, in particular in Phase 2 projects.

Figure 182 - Time-to-inform and time-to-grant, in Phase 1 and Phase 2, by cut-off date

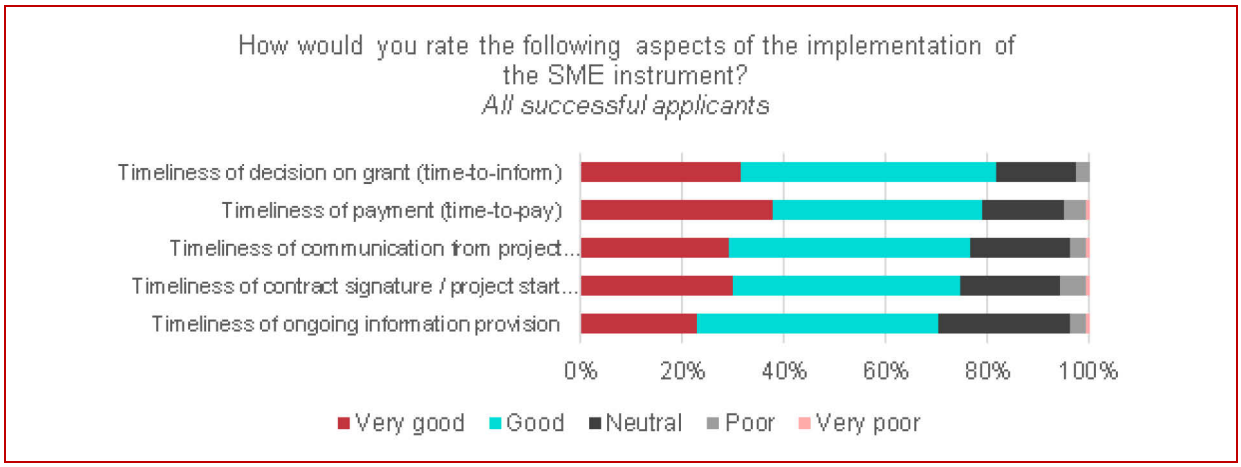


Source: EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015. Note: The time-to-grant is only valid for 90% of the grants issued for any given call.

Even though target values are not always met, more than 70% of SME respondents rated each aspect of timeliness as good or excellent. Overall, 82% of respondents rated the timeliness of the announcement of the decision on the grant as 'very good' or 'good'. The timeliness of ongoing information provision is slightly less widely regarded, with 70% of respondents rating programme performance on this dimension as 'very good' or 'good'. Examining average ratings for each of these aspects shows very little range between the lowest-scoring (3.9) and the highest-scoring (4.1), suggesting that each is viewed similarly positively.

Interviews with applicants found similarly positive views. In general, both applicant SMEs and other stakeholders are rather positive about the SME Instrument's administrative arrangements and implementation. It is considered good, also in comparison with other parts of Horizon 2020.

Figure 183 - Timeliness of the SME Instrument's administrative arrangements



Source: Technopolis, based on SME survey data. Sample size: 453-456.

I.5.3.2. Appropriateness and efficiency of the evaluation system and the quality of information

This section reviews the appropriateness and efficiency of the evaluation system; and the quality of information.

The evaluation system has several strong points, including the short and well-structured proposal, clear evaluation criteria and a good balance of both technical and commercial criteria. The application template and evaluation criteria would be strengthened with the addition of a section and criterion relating to the applicant's management capacity and technical skills and business expertise. This is the acid test for investors. Several stakeholders argued for the introduction of a face-to-face interview, to improve the ability of evaluators to spot the proposals / SMEs with the greatest potential.

Applicants would welcome a return to more comprehensive and proposal-specific feedback, to improve confidence in decision-making and to support learning and stronger resubmissions. Both suggestions have merit, however, they would have negative implications for the cost and timeliness of the evaluation process.

Information provision is regarded as timely and clear among both successful and unsuccessful applicants, according to the surveys. There is however a relatively high level of dissatisfaction with the quality of the feedback received on their proposals. Unsuccessful applicants were critical about the feedback they had received, saying it was rather generic and that it had not been particularly useful in guiding re-submissions.

The SME Instrument was designed expressly to be more SME-friendly than its predecessors, with simpler financial and administrative requirements, shorter proposals, and faster turnaround times. Earlier evaluations have concluded that the administrative arrangements and metabolic rate of the Framework Programme's SME-specific measures were a poor fit

with the modus operandi of most innovative SMEs; the arrangements were narrowing the field as regards the size of the pool of prospective applicants and possibly also reducing the effectiveness of the financial support provided. The SME Instrument therefore has sought to match the shorter innovation cycles in SMEs while also running with a simplified and resource-efficient management system, especially for Phase 1 funding, where administrative demands have been set at a level corresponding to the smaller risks/funding involved.[90] This use of proportionality in programme design is welcomed.

The evaluation methodology should be judged in terms of its ability to identify 'good' proposals among the target population in the most cost-efficient way. The evaluation criteria seem to be well suited to gauge the proposals in terms of their level of innovativeness.

The proposals are short (10 pages for Phase 1, 30 pages for Phase 2) and present information covering a series of important perspectives: the technology, market knowledge, commercialisation plan, and the financial angle. The content mirrors the style and information requirements found in the kinds of business plans or pitches commonly used by banks or investors when considering making a loan or investment.[91]

Proposals are evaluated by four independent experts. Evaluators are expected to have good experience in a range of the SME Instrument's core topics.[92] The individual experts are identified through a call for expressions of interest, where potential evaluators register their interest and submit their CVs for consideration.

The evaluators look at three criteria: impact, excellence, and implementation.

Scores are given in the 0-5 range. For Phase 1, the threshold for individual criteria is 4. The overall threshold, applying to the sum of the three individual scores, is 13. For Phase 2, the threshold for impact is 4. The threshold for the other 2 criteria is 3. The overall threshold, applying to the sum of the three individual scores, is 12. Each evaluator works independently; there is no contact between the four evaluators during the course of the evaluation.[93]

In general **interviewees**, both agencies and SMEs, are critical about the evaluation process. The background of the evaluators is not considered clear enough. Also the focus of their specific assignment lacks some transparency about whether it should be on technological aspects of the proposal or on market potential. There is an open question about the extent to which a single expert could reasonably be expected to have a sufficient command of the subject to be able to pronounce on both the technological and market potential. Other interviewees mention that too many projects are funded while remaining too technically immature to realistically have any prospect of gaining early market traction.

Various interviewees also criticised the evaluation methodology as currently lacking a realistic market-oriented approach. A face-to-face discussion with applicants has been suggested as a lacking essential element. This negatively impacts the quality of the assessments, as currently implemented with no consensus and on an arithmetic line. That is particular relevant in Phase 2 which allocated budget can reach more than EUR 3 Millions.

[90] *http://ec.europa.eu/research/participants/data/ref/Horizon 2020/other/legal/unit_costs/unit-costs_sme-ph1_en.pdf*
[91] *EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*
[92] *Experts are selected in accordance to the Database of experts, registered by sector and knowledge.*
[93] *EASME (2016) Catalysing European innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015.*

Argument was that identifying the most promising innovators and innovation opportunities is very much easier when proposals or business plans can be debated. It gives evaluators range for questions on their strategic and financial path to reach the market /or create one and similarly allows SMEs the chance to "*adequately justify why funding is important*", particularly in Phase 2 of the SME Instrument.

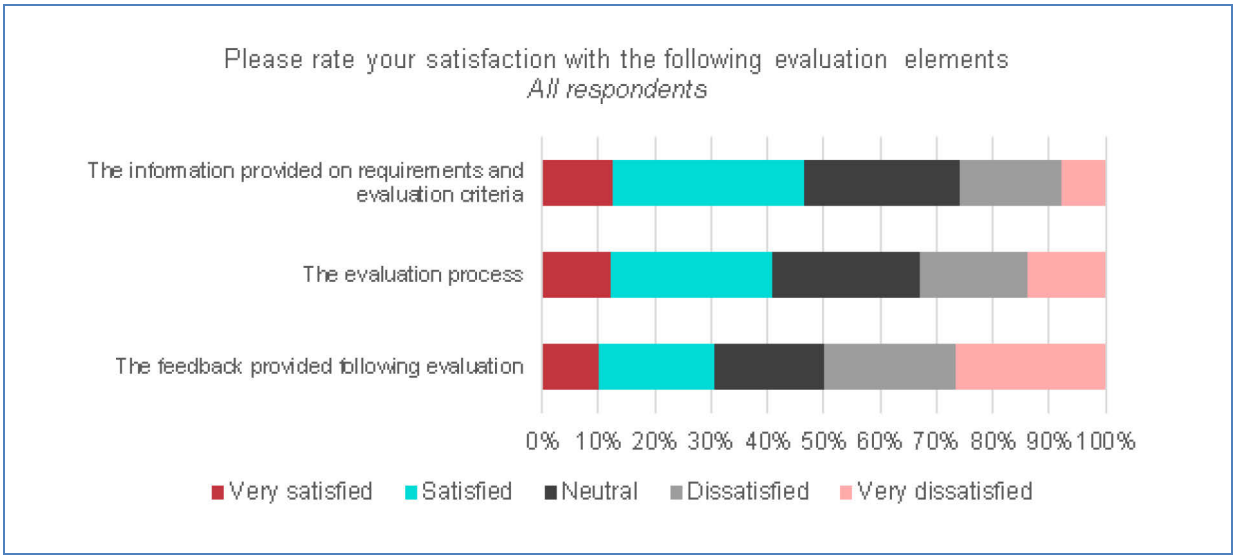
Venture capitalists and other investors will tend to insist on several face-to-face meetings before making their decisions on which opportunities to back; their final investment portfolios may look rather different to the initial selection of possible investments, arrived at through a paper-based evaluation. As one moves closer to market, it makes more sense to combine paper-based assessments with personal interviews to identify the best sub-set of businesses with the ambition and wherewithal to commercialise their technological developments in innovative solutions that have the potential to go to scale. This is not an approach that is followed anywhere else within the industry and applied research elements of Horizon 2020.

The cost and logistics would be substantial and would move things in the opposite direction to the Commission's widely endorsed commitment to simplification. Notwithstanding this important reservation about the practicalities of such a change, the evaluation team believe the final evaluation of the SME Instrument should return to this question: how did the portfolio perform in the round; could the evaluation process have done a better job of spotting the 'winners' at the application stage?

Proposals are not required to elaborate on quality of the team involved or the type of skills available within the company. Consequently, the evaluators do not score proposals on this dimension; there is no assessment of the applicant's management capabilities, which most VCs –for their Phase 2 like investments- would see as being the single most critical success factor (as well as clearly addressing a market of a good sizes). Business skills and a market-oriented positioning are essential quality investors will assess in their final test, and as such it would be helpful if the SME Instrument were to add this element into the evaluation methodology going forward.

The **respondents to our beneficiary survey** were less negative about the evaluation process, which is perhaps as one might expect, given many had successfully navigated that process (Figure 184). Information provided on requirements and evaluation criteria was rated best in terms of satisfaction among SMEI applicants (47% reported being either 'very satisfied' or 'satisfied' with this aspect). Applicants were least satisfied with the feedback provided following evaluation, and the evaluation process itself. 31% reported being 'very satisfied' or 'satisfied' with the former, and 41% with the latter.

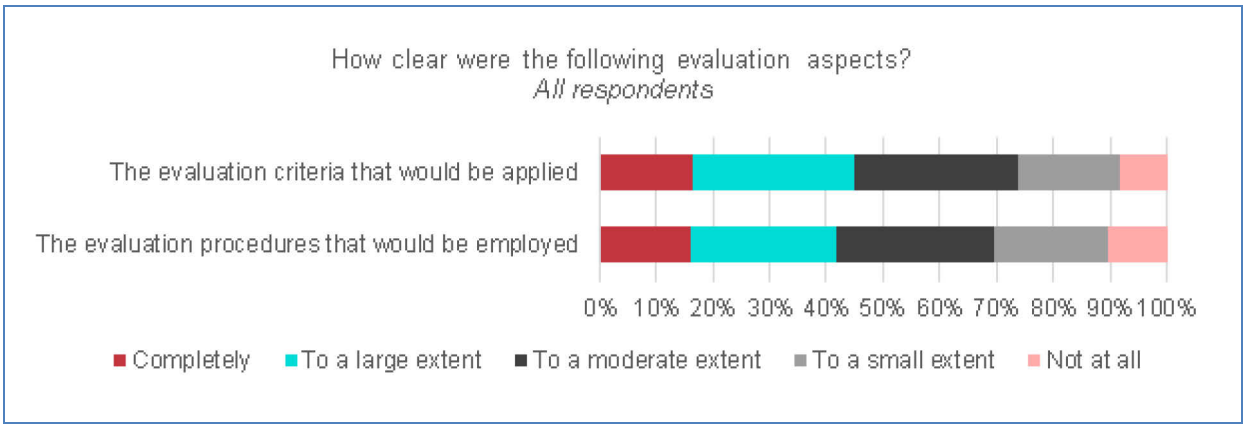
Figure 184 - Applicants' satisfaction with elements of the SMEI evaluation process



Source: Technopolis, based on SME survey data. Sample size: 1,179 – 1,823 (excluding "don't know").

Respondents, both successful and unsuccessful, were asked to rate the clarity of two of aspects of the evaluation process in the figure below. Less than half of respondents rated these as either 'completely' clear or clear 'to a large extent', suggesting that applicants feel that they do not fully understand how their proposals are appraised. This the evaluators understand is in part the result of the Commission's efforts to streamline and systematise the process, whereby the evaluation feedback is now rather more generic and often just a narrative description of the score. Historically, feedback would have been much more specific. People find the specific and comprehensive feedback more instructive (understand what to do differently next time through; helpful for learning) and more reassuring (clearer as to exactly why their offer wasn't judged to be good enough).

Figure 185 - Clarity of SME Instrument evaluation aspects



Source: Technopolis, based on SME survey data. Sample size: 1,800 – 1,820 (excluding "don't know").

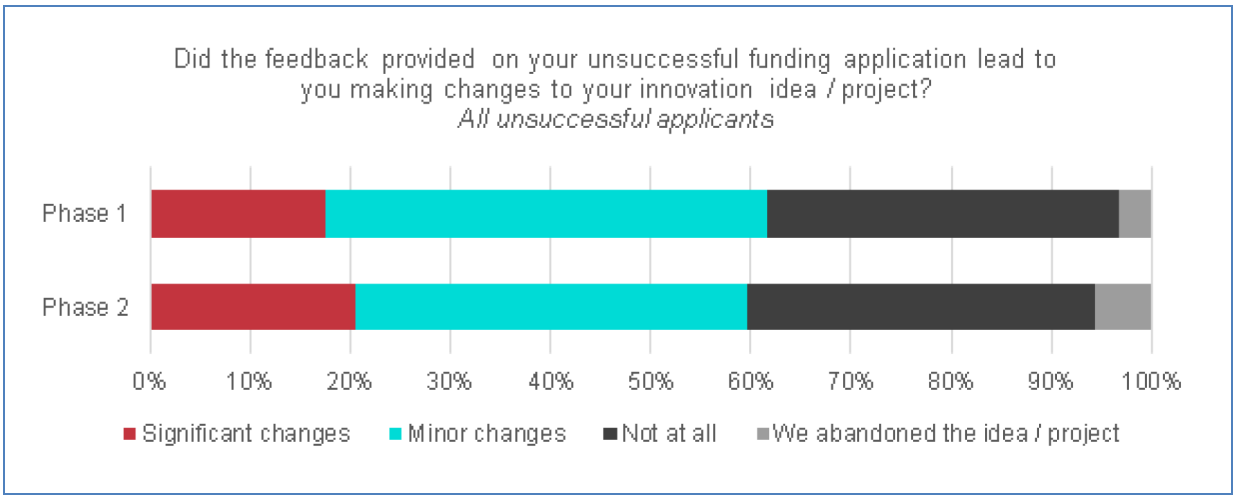
Comparing the satisfaction rates of beneficiaries and unsuccessful applicants shows the largest difference is in satisfaction with the feedback provided following evaluation and the evaluation process itself (Figure 186). This means that on average, beneficiaries rated these two elements significantly higher than unsuccessful applicants.

Regarding quality of information, respondents, both successful and unsuccessful, were asked to rate the clarity of information regarding several aspects of the application process. On

balance, information provision during the application process is regarded as clear. 81% of respondents rated the clarity of applicants' eligibility to participate as 'completely' clear or clear 'to a large extent'. Similarly, 75% rated the requirements for application as 'completely' clear or clear 'to a large extent', and 67% stated the same of the clarity of the topic to which they applied.

Regarding feedback information, the large majority of unsuccessful proposals do not use it to significantly change their proposals. Impact of feedback from evaluators is very limited. Respondents that had applied unsuccessfully to either Phase 1 or Phase 2 were asked whether the feedback they received on their application led to them changing their innovation idea or project. The figure below confirms such analysis.

Figure 186 - Outcome of feedback to unsuccessful proposals submitted



Source: Technopolis, based on SME survey data *Sample size: 120 (Phase 1), 1,222 (Phase 2).*

The responses also show an appetite for fuller, more informative feedback. A large number of respondents called for more depth in the feedback given, and more precision/specificity in the comments, when any, provided by evaluators. A small number of respondents mentioned the need for more timely feedback, which would allow them to act more quickly (e.g. fixing and resubmitting).

Most comments were concerned with the consistency of evaluation. Some respondents indicated that they had re-submitted proposals based on evaluator feedback, and received different -and sometimes contradictory- feedback. Several respondents suggested that direct interviews in cases where the applicant is over the evaluation threshold might suitably mitigate perceived evaluator subjectivity. But again, this may lead to an unduly costly process, while adding little value; it is in the nature of competitive funding for the evaluated to criticise the evaluation methodology and especially where there was a near-miss.

SMEs surveyed also emphasised the importance of evaluators having technical knowledge and experience that are specifically relevant to the proposals they evaluate. Commentators rarely have a good or specific view of the competences of the pool of evaluators and nor do they have line of sight to the specific experts that reviewed their proposals.

The Commission services may wish to revisit the issue in future, looking more closely at the level of evaluators' adequate competences. Also it may appear useful to run some statistical

analyses of scoring patterns versus success rates by types of evaluator (e.g. technical or commercial focus; level of experience; proximity to the field or sector under review; etc.).

I.5.3.3. Appropriateness and efficiency of the non-restriction of resubmissions and of direct access to phase 2

This section assesses the appropriateness of non-restriction of resubmissions and of direct access to Phase 2.

Regarding non-restriction of resubmissions, the evidence shows that resubmissions to Phase 1 do lead to increased chances on average, indicating that SMEs might go through a learning curve for Phase 1. However, this learning effect is not evident in the case of Phase 2 proposals where the chances of being successful do not increase over time.

Direct access to Phase 2 has proved to be appropriate, with a high proportion of proposals passing the evaluation criteria (higher than for Phase 1), whether they were wholly new applications or had progressed from an earlier Phase 1 study. That said, proposals submitted to Phase 2 that were based on work supported through a Phase 1 grant, do have a higher probability of being retained on average. This suggests there is some added value for SMEs in participating in Phase 1 as preparation for Phase 2.

(a) Non-restriction of submission

The SME Instrument allows companies to resubmit previously unsuccessful proposals, suitably enhanced in line with the evaluators' feedback, for evaluation in later calls. Each submission is evaluated independently of any prior submission. The SME Instrument introduced this rule to allow SMEs to go through a learning process and thereby arrive at stronger proposals and better projects.

The analysis of CORDA (in Chapter 3) shows that up to July, 2016, resubmissions account for 38% of all submissions. The large majority (86%) of resubmissions are resubmitted once or twice. Resubmissions in Phase 1 increase the chance of being selected.

Evidence suggests that SMEs might go through a **learning curve** in Phase 1. However, this is not the case in Phase 2.

The relevant success rates for each submission type under both phases are summarised below. Success rate in Phase 1 rises from 6.5% to 10.6% by the second submission and gradually increases to a maximum of 14.0% by an SME's fifth submission before falling slightly thereafter. Under Phase 2, however, the success rate falls from 10.6% to 5.0% for SMEs

submitting for the second time and remains around 5.5% for the third and fourth submission before reaching a maximum of 9.5% for the fifth submission.[94]

These findings are supported by interviews with various stakeholders. Commission officials indicated that "*Non-restriction of resubmissions only occasionally leads to better projects. But too often, we see SMEs submitting two, three or four times for Phase 2. Their proposals are not per se good and improve only marginally.*".

Findings regarding the rather generic quality of the **feedback provided** may be a factor here, with SMEs possibly failing to grasp just how far away their proposal was from securing a grant. Ideally, a more fulsome explanation of the specific shortcomings would allow bidders to understand exactly the things they need to do to have a realistic chance of success in future competitions. It seems unsure at this stage that this more comprehensive approach to evaluation feedback will become reality, however, there may still be value in developing one or two additional generic feedback statements for use by evaluators, which would provide applicants with adequate information for the applications'authors to reasonably develop the unsuccessful proposal into a winning bid in a future call.

(b) Direct access to Phase 2

The SME Instrument allows SMEs to submit a proposal directly to Phase 2 without the requirement to have held a related Phase 1 grant.

Some Commission representatives and other stakeholders indicated that direct access to Phase 2 is somehow problematic. They considered that too often, Phase 2 applicants are too immature, and lack the absorptive capacity. According to several interviewees: *"they clearly miss the innovation management experience that Phase 1 can offer to them". "Of course, having the instrument open is important, but Phase 1 makes SMEs better prepared for Phase 2."*

The evidence indicates that SMEs that submitted proposals only to Phase 2 tended to submit relatively more often successful proposals (see the table below). However, the SMEs that submitted proposals to both Phase 1 and Phase 2 had an even higher percentage of proposals retained. This suggests that the perceptions of Commission representatives are partly correct: SMEs that applied to **both phases** prepared better proposals. At least on paper, this implies that they are more able to demonstrate their suitability to undertake an innovation project.

Nevertheless, the level of retained proposals in Phase 2 from those directly submitting to Phase 2 is quite high, suggesting that it attracts a considerable share of 'mature' applications. As timeliness is essential with innovation, not allowing applicants with a more matured high growth potential to submit to Phase 2 directly could mean an essential loss of time to put their innovations into the market.

Table 113 - Proposals submitted and retained, by application journey

Application journey	Number of (eligible) submitted proposals	Percentage of proposals above threshold (funded and

[94] *The latter is not included in the analyses as the number of observations is too small (cf. European Commission (2016). "Catalysing European Innovation: EASME's report of the first two years of implementation of the SME Instrument 2014-2015". P. 19.*

		no funded)
SMEs that only submitted proposals to Phase 1	19,856	15%
SMEs that only submitted proposals to Phase 2	5,950	33%
SMEs that submitted proposals to both	2,020	52%

Source: Technopolis, based on CORDA data (July 2016).

I.5.3.4. Seamless support from successful completion of Phase 1 to phase 2 support

This section assesses whether the implementation achieves a seamless support from successful completion of Phase 1 to phase 2 support. Findings are based on secondary data, on interviews, and on surveys to SMEs.

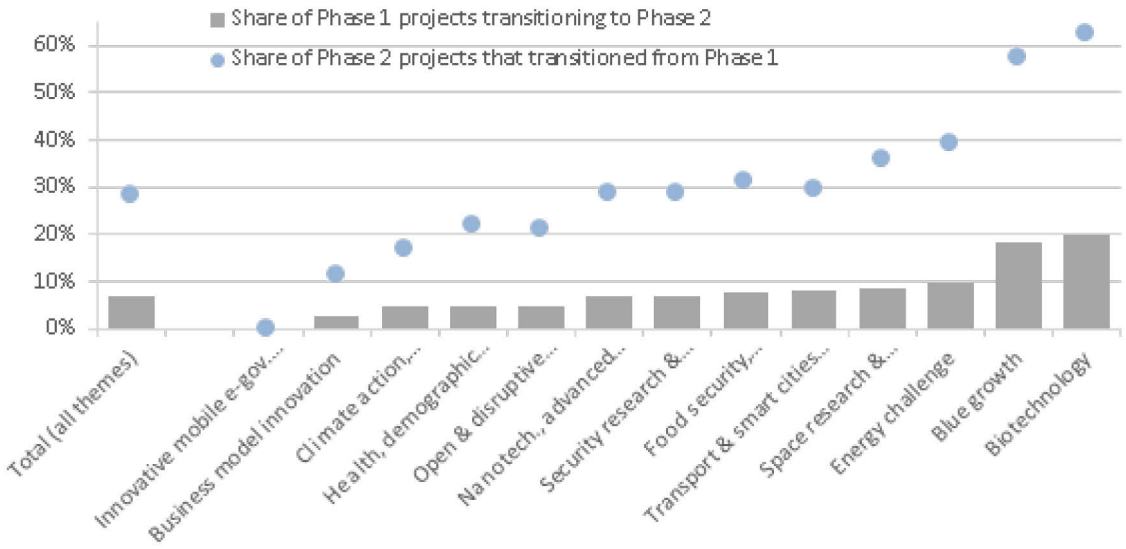
Only a very small number of SMEs managed a transition from Phase 1 to Phase 2. 105 individual projects have successfully changed from Phase 1 to Phase 2 until September 2016. In general, the SMEs appreciate the transition process. Especially the relative speed of it, and the efficient documentation required are well received. Uncertainty is a key issue for SMEs going from Phase 1 to Phase 2.

Current analysis shows that 105 projects have successfully transitioned from Phase 1 to Phase 2 until June 2016. Under both phases of the SME Instrument, these project pairs currently amount to 210 projects (105 under Phase 1 and 105 under Phase 2), accounting for 11.2% of the total across both phases.

Overall, only 7% of the funded projects under Phase 1 have therefore been successful in transitioning through to Phase 2. Likewise, a full 28.2% of the projects under Phase 2 transitioned directly from a feasibility study awarded under Phase 1. Conversely, roughly three quarters of the projects under the SME Instrument related only to Phase 1: 1,394 projects, accounting for 74.5% of the total across both phases. A much smaller number of projects related only to Phase 2: 267 projects, accounting for 14.3% of the total across both phases. The figure below, summarise the key information for each thematic of the SME Instrument.[95]

Figure 187 - Share of projects transitioning between phases, by theme

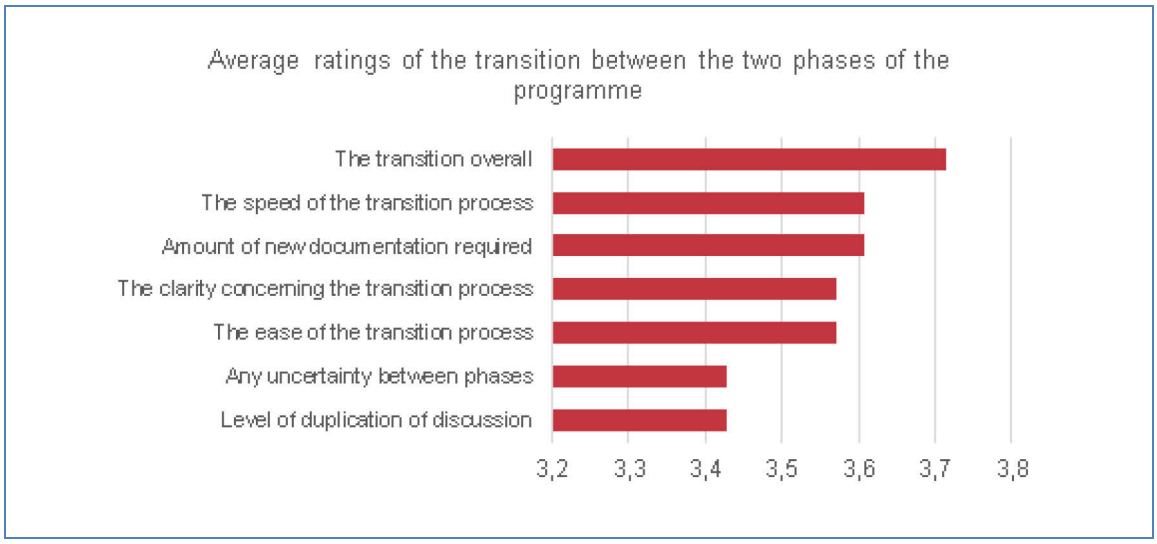
[95] *Note that seven project pairs do not appear under the same theme in Phase 1 as they do in Phase 2, such that the number of transitioning projects under each phase is not equal in the case of every theme. The project 'HEATSENS_S', for example, appears in the Biotechnology theme under Phase 1 (project no. 672221) but in Nanotechnologies, advanced materials or advanced manufacturing and processing technologies under Phase 2 (733617). Six additional project pairs display this same sort of discrepancy, while the other 98 project pairs identified above appear uniformly in the same theme under both phases.*



Source: Technopolis, based on CORDA data (July 2016).

The very small numbers of SMEs that have managed to get into Phase 2 from Phase 1 were asked about different aspects of the transition between the two phases of the SMEI (Figure 44). In general, funded SMEs appreciate the transition process. Especially the relative speed of it, and the efficient documentation required are well received. Uncertainty, as a result of low success rates for Phase 2, is a key issue for SMEs going from Phase 1 to Phase 2.

Figure 188 - Rating the transition between Phase 1 and Phase 2



Source: Technopolis, based on SME survey data Sample size: 28 Scores: 1 (poor rating) to 5 (excellent rating).

Interviewed SMEs also indicated that the process from Phase 1 to Phase 2 is generally perceived as *"easy"* and *"a procedure without specific difficulties"*. In actual practice Phase 1 allows for a good preparation for Phase 2, according to the interviewed SMEs: "most of what was necessary was prepared in phase one".

EASME indicates that SMEs tend to be better prepared to apply for Phase 2 after completing Phase 1. Also, Phase 1 appear to some extent as a preparatory phase to Phase 2 for some beneficiaries. They noted that "*some companies realise that they are not yet ready for Phase 2, as a result of their phase 1 work"* but also that *"Some phase one companies are already*

successful after phase one, and don't need Phase 2. But, it is difficult to say whether the SME Instrument has been important, or whether things would/could have happened anyway." Interviewed SMEs stated that the speed of the process is relatively high as within a year a company can move from Phase 1 to Phase 2.

However, interviewees feel that the option for directly applying to Phase 2 is not a bad thing, as although the success rate is very low the SMEs that secure a grant seem well organised and ready.

I.5.3.5. Appropriateness and efficiency of the Key Account Management & coaching system, as well as community animation and creating links to investors & clients

This section assesses the appropriateness of the Key Account Management & coaching system; as well as of the community animation and the ability of the SME Instrument to create links to investors & clients.

There is a high-level of satisfaction among beneficiaries with Key Account Managers and coaches. Regarding community animation and creating links to investors & clients, even though SMEs that are satisfied outnumber those that are not, the number of neutral responses is by far the largest on all aspects.

This may be because Phase 3 was still in start-up phase at the time the study was conducted. The SME Instrument's objectives on creating links to investors & clients have not yet been put fully into practice.

The SME Instrument provides beneficiaries with the opportunity to receive up to 15 days of business coaching. In each region, there is a Key Account Manager (KAM) to help beneficiaries identify the specific challenges they may face, with this diagnosis being used to agree their coaching needs and to select relevant coaches.

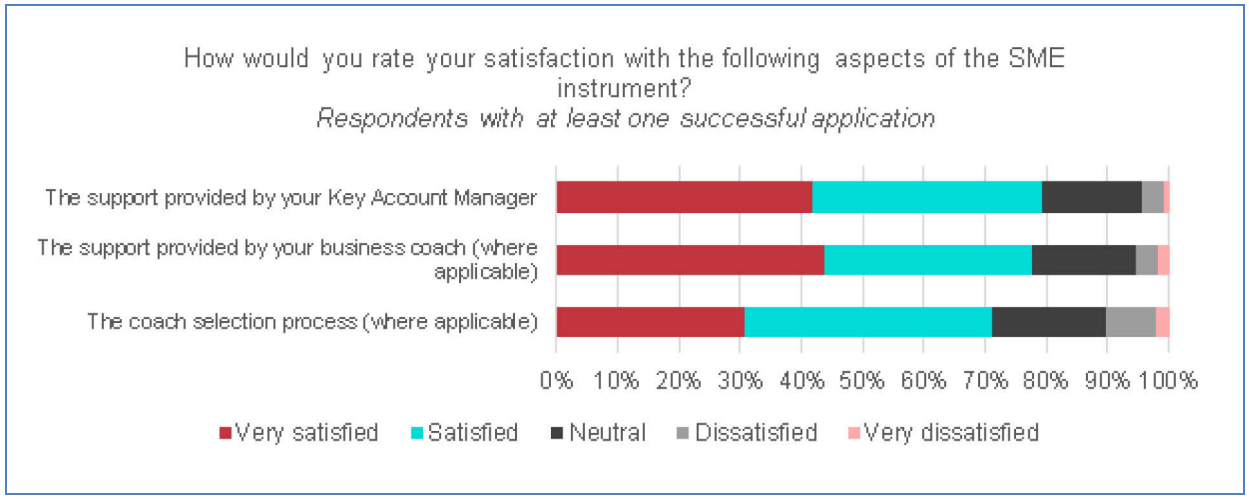
Satisfaction with KAM is high among SMEs. We asked beneficiaries in Phase 1 and in Phase 2 to rate their satisfaction with several aspects, including three aspects that are of note to the Key Account Management & coaching system: the support provided by Key Account Managers, the support provided by business coaches, and the coach selection process. These were rated very highly by respondents, 79% of whom reported that they are 'very satisfied' or 'satisfied' with the support provided by their KAM. The support provided by a business coach was rated highly by a similar proportion of respondents (78%). The coach selection process was well regarded to, in most cases, however there was a small proportion of respondents that expressed dissatisfaction with the selection process. The distributions are summarised in the figure below.

The beneficiaries were asked to what extent the coaches had contributed to any areas of positive change in their management of innovation processes. The responses were again positive, with a majority reporting some positive influence – 39% reported that EEN or SMEI Coaches had had 'a major influence', and 44% reported 'some minor influence.'

Furthermore, beneficiaries were invited to single out any aspects of the SME Instrument's implementation arrangements that judged to have been particularly effective. Over 70 individuals offered suggestions, largely focused on the support available to beneficiaries from SME Instrument staff, EASME and local agents. These included the availability and flexibility of Key Account Managers, good and positive communication with Project Officers, the support available on technical issues from Project Managers and local agents, support on communication and events from EASME, and the speed and helpfulness of the helpdesk.

The SME Instrument aims to build a community of innovative SMEs and offer facilitated access to risk finance, to facilitate the commercialisation of the innovation. Numerous activities are organised to build a community of SMEs. Examples are the SME Instrument Innovators Summit for grant holders (October 2016, attracted over 400 SMEs), trade fairs, coaching offers, the SME Instrument Academy, and several other networking opportunities. Investors are invited to get involved as much as possible in these community animation efforts.

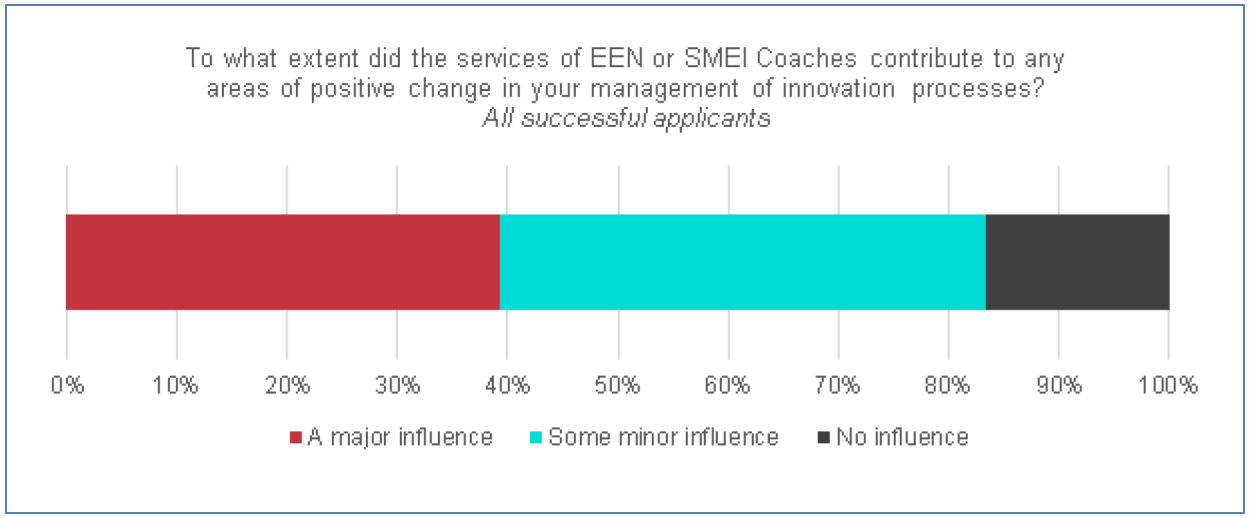
Figure 189 - Satisfaction ratings for KAM and Coaching aspects of the SMEI



Source: Technopolis, based on SME survey data Sample size: 337 – 422 (excluding "don't know / not applicable).

The same group of successful SMEI applicants were asked to what extent the EEN or SMEI Coaches had contributed to any areas of positive change in their management of innovation processes. The responses were positive, with a large majority reporting some positive influence – 39% reported that EEN or SMEI Coaches had had 'a major influence', and 44% reported 'some minor influence'. This is shown in the figure below.

Figure 190 - Ratings of the contribution of EEN and SMEI Coaches to positive management of innovation process changes



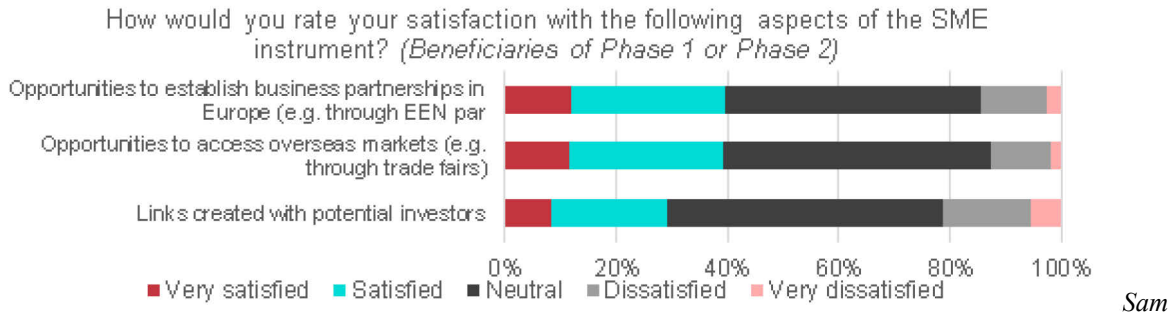
Source: Technopolis, based on SME survey data.

Beneficiaries that have had at least one project, in either Phase 1 or Phase 2, were asked how they would rate their satisfaction with several aspects related to community animation and creating links to investors and clients – as presented below. Even though 'satisfied' SMEs outnumber dissatisfied SMEs number and proportion of neutral responses is by far the largest for all aspects of the SME Instrument's implementation. Beneficiaries are most likely to be dissatisfied with the programme's ability to broker introductions to potential investors, which might in part be because many of the Phase 3 activities had yet to get fully underway at the time of the evaluation, due to an unavoidable delay in the related tender procedure. From this

perspective, the SME Instrument has rather more work to do going forwards to improve its community-building in general and its facilitated access to investors.

Figure 191 - Satisfaction ratings for community animation aspects of the SME Instrument

Source: Technopolis, based on SME survey data



Sample size: 337 – 422 (excluding "don't know / not applicable).

Finally, respondents that had had at least one successful application were invited to describe i) any other areas of SMEI implementation that were particularly positive, and ii) any other areas of SMEI implementation that were particularly negative.

Positive aspects largely focused on the availability and flexibility of Key Account Managers, good and positive communication with Project Officers, the support available on technical issues and local agents, support on communication and events from EASME, and the speed and helpfulness of the helpdesk. Negative aspects largely focused on administrative issues, and not on the Key Account Management & coaching system.

I.5.3.6. Appropriateness of INNOSUP Actions instruments and procedure

This section sees if the instruments and procedures of INNOSUP Actions (Call for proposals / tender / different tender procedures) were appropriately chosen.

Surveyed Intermediary agencies stress the appropriateness of instruments and procedures for implementing the INNOSUP Actions. Instruments and procedures have been appropriately chosen. There is sufficient room to tailor procedures to the objectives of the actions.

Procedures of INNOSUP Actions (Call for proposals / tender / different tender procedures) are described in Annexes B and C of the Innovation in SMEs Work Programmes. Exceptions are implemented for specific actions, e.g. the requirement that a specific part of the budget is allocated to SMEs, while in others cases the applicants should be NCPs. There is room for the Commission and Member States to tailor procedures to the objectives of the actions.

The Agencies surveyed have had the opportunity to apply for most INNOSUP actions. They were asked whether they felt that the choice of instruments and procedures for implementing the INNOSUP actions had been appropriate. The very great majority of respondents (90%) felt the choice of instruments and eligibility criteria had been appropriate for the particular

actions. Only one of the agencies that felt the choice was inappropriate took the opportunity to explain why, suggesting that it attracted new consortia that "can write proposals well, but have no legitimacy or local role in supporting SMEs to innovate or internationalise".

I.6. COHERENCE OF INNOVATION IN SME

The evaluation of coherence involves looking at how well or not the various components of an intervention operate together to achieve its objectives. The Better Regulation Guidelines distinguish between 'internal' coherence, i.e. coherence within an EU intervention, and 'external' coherence, i.e. how the actions relate to other initiatives with similar objectives.[96]

In this section the internal coherence of Horizon 2020 is first considered in terms of the positioning of the SME Instruments and the INNOSUP Actions in relation to the other initiatives in the FP (Section I.6.1). The external coherence in terms of their positioning related to other EU funding initiatives is then evaluated in Section I.6.2.

I.6.1. Internal coherence

I.6.1.1. The SME Instruments

The SME Instrument is a new instrument in the policy mix of the Framework Programmes, soundly inspired by the US Small Business Innovation Research (SBIR) programme. It is one of the demand-side actions introduced under Horizon2020 Programme to enhance market uptake of innovations. Other demand-side actions with similar objectives that were introduced under Horizon 2020 are 'Access to Risk Finance' and 'Fast Track to Innovation' (FTI). Eurostars, a joint-Initiative regulated by Art 185 TFEU Member States-EC was introduced under FP7 was continued also under Horizon 2020 within Innovation in SMEs. Due to its particularity, Eurostars is not assessed under this report. However, the table below presents the main characteristics of these Horizon 2020 instruments.

Table 114 - Main characteristics of the demand-side instruments in Horizon 2020 with similar objectives

Intervention	Aim	Thematic focus	Target groups	EC Contribution
Access to Risk Finance	To stimulate more investment in research and innovation, notably by the private sector	In general open	Implemented by intermediation of banks (MidCap Guarantee, SMEs Guarantee) or financial intermediaries (Early stage instruments). MidCap Growth Finance is a direct support scheme to SMEs	Amounts vary between actions.
Fast Track to Innovation (FTI)	Reduce time from idea to market, stimulate the participation of first-time applicants to EU research and innovation funding, and increase private sector investment in research and innovation.	Open within Societal Challenges and LEITs	Consortia comprising between three and five legal entities established in at least three different EU Member States or countries associated to Horizon 2020. Industry must cover at least half of	<€3m

[96] *European Commission. Better Regulation Guidelines, SWD (2015), 111 final*

Intervention	Aim	Thematic focus	Target groups	EC Contribution
			beneficiaries, or at least 60% of the budget. FTI is not restricted to SMEs.	
Eurostars	Support R&D performing SMEs by creating an easily accessible and sustainable European R&D support mechanism; encouraging these SMEs to create new economic activities based on R&D results and bring new products, processes and services to the market faster than would otherwise be possible; promoting technological and business development and internationalisation.	In general open	A consortium typically comprises 3–4 partners (3.3 is the average consortium size) including an R&D-intensive SME as lead applicant and other SMEs, as well as large firms, universities or PROs in about one third of the projects.[97]	Funding varies between countries

Source: Technopolis, forthcoming

These demand-side actions have in common the policy objective to encourage firms to take bigger risks or to do R&D activities with high spill-overs. However, they differ from each other in the nature of their support provided (grants, loans etc.), the focus of the intervention (i.e. the intended beneficiaries), and/or the governance structure and geographical scope.

The SME Instrument is clearly complementary to the other demand-side instruments in Horizon 2020. It responds to different needs and addresses the European challenge of reaching larger market uptake of innovations from a different angle and in a different manner. While in some cases overlaps between the instruments may exist, these are of a limited nature. A stronger coordination between the SME Instrument and Access to Risk Finance would be beneficial.

The SME Instrument is complementary to the **Access to risk finance Instruments** because it provides a different type of support to the SMEs at a different stage of the innovation process. The SME Instrument aims at filling the gap in funding for early-stage high-risk research and innovation through staged support covering the whole innovation cycle. The Access to Risk Finance instruments specifically focuses on overcoming deficits in the availability of debt and equity finance for R&D- and innovation-driven companies and projects at all stages of development. One complement the other. One could precede the other.

Also, some synergies have been created, specifically regarding Phase 3 of the SME instrument where links to the Access to risk finance instrument are foreseen to facilitate access to private capital (for example through a ring-fenced volume of financial resources for SME Instrument beneficiaries). According to the EIB, cooperation and coordination between the two Work Programmes/activities can be improved and extended, though, and it is unclear to what extent there is overlap in terms of beneficiaries. It could favour SMEs in

[97] *Makarow, Marja et al. (2014). Final Evaluation of the Eurostars Joint Programme. European Commission*

positioning their innovation in their sectors, with a quicker "Valley of death". Also, such enhancement would support the sustainability of their market-based viability. Assessment of investment readiness and beneficiaries capacity to navigate into the business competitive ecosystem confirms such interviewee's statement.

In relation to the **Fast-Track to Innovation (FTI)** pilot scheme as well as **Eurostars**, the complementary nature of the SME Instrument is predominantly in its specific focus on supporting individual SMEs.

- The aims and scope of the *Fast-Track to Innovation (FTI)* pilot scheme are similar to those of the SME Instrument's second phase. Both instruments provide flexible support for innovation activities aiming at speeding up the time from idea to market. Target groups are significantly different, though. FTI focuses on consortia, whereas the SME instrument focuses on individual applicants. It is not restricted to SMEs, and also allows large industry to participate. FTI and the SME Instruments are implemented by the same unit in EASME, and proposals are appraised by the same evaluators
- Also in the case of *Eurostars*, the aims are somewhat overlapping with those of the SME Instruments. Like the SME Instrument the thematic focus is open. However, Eurostars involves consortia of SMEs and other research and innovation actors, with the intent to stimulate international cooperation and provide an opportunity for SMEs to combine and share expertise and benefit from working beyond national borders. The two instruments differ also in their governance structure and geographical scope. Eurostars is an intergovernmental initiative (a public-public partnership), co-funded by the Eureka member countries. Unlike the SME Instrument project, Eurostars projects are transnational, and involve at least two partners from two different Eurostars member countries

Taking a broader perspective this analysis also considered to what extent the SME Instrument is complementary to the core funding instrument of the Framework Programmes, i.e. the collaborative research projects, and to the Marie Skoldowska Curie actions (MSCA) - in terms of its contribution to the achievement of the Horizon 2020 policy objectives. The table below lists the main characteristics of these Horizon 2020 funding instruments.

Table 115 - Main characteristics of the collaborative research projects and MSCA in Horizon 2020

Intervention	Aim	Thematic focus	Target groups	EC Contribution
Collaborative projects	Those of the three pillars, excellent science, LEIT, and the Societal Challenges.	Differs per scheme, yet generally not open	At least 3 legal entities from EU Member States or Associated countries. Not restricted to SMEs.	€2–5m to the entire consortium
Marie Skłodowska Curie actions (MSCA)	To support the career development and training of researchers – with a focus on innovation skills – in all scientific disciplines through international and inter-sectorial mobility.	In general open	For ITN, RISE, COFUND, and NIGHT targets groups are all legal entities. For IF target groups are individual researchers.	Funding varies between actions

Source: Technopolis, forthcoming

The SME Instrument and the **Marie Skłodowska Curie actions** (MSCA) under Horizon 2020 have in common the delivery of support for innovation capacity building. Data also show that SMEs are making use of the opportunity that the MSCA provides for the hiring of researchers with adequate skills that can contribute to their company growth. The Second Horizon 2020 Monitoring Report 2015 informs that in 2014/15, 8.9% of the signed grants were to the benefit of SMEs.[98] Nevertheless, the aims and nature of the support delivered in the two instruments are different. Key elements of the MCSA, such as transnationality, intersectorality and interdisciplinarity are additional to the basic principles of the SME Instrument. In addition, in most cases the high TRL levels that characterise the SME Instrument do not constitute the core focus area for the researchers hired. The SME Instrument and MSCA are therefore complementary in their contribution to the Horizon 2020 policy objective of fostering innovation in European SMEs, addressing SME needs in this context in a very different manner.

The SME Instrument is clearly complementary to the **collaborative projects** in its contribution to the attainment of the 'close-to-market' objective of Horizon 2020. The collaborative projects are open to SMEs and attract a considerable number of them - especially the Innovation Actions. In the LEIT actions, for example, SMEs accounted for 30.9% of participations in 2014/15[99]. The policy objectives of the collaborative projects to some extent overlap with those of the SME Instrument, with the exception of the projects funded under the Excellent Science pillar. Thematic focus is open, like that of the SME Instrument. However, target groups and much broader in the collaborative projects (all legal entities), and consortia are required.

From an SME perspective, the collaborative projects and the SME instrument therefore offer different opportunities, especially in terms of knowledge sharing (the essence of 'collaborative' research) and in the nature of the research conducted (i.e. the TRL levels).

The SME Instrument is complementary also to the main funding instruments under Horizon 2020, i.e. the collaborative research projects, and to the MSCA in its support to fostering among the European industry actors, and specifically SMEs. It is fully focused on contributing to the 'close-to-market' objectives of Horizon 2020. It provides support to innovation projects at TRL6 or above, thus complementing the collaborative research instruments where the major focus is on TRL6 and below.

As mentioned in above, the SME Instrument was introduced with the specific objectives to help fill the gap in funding for early stage high-risk research and innovation, to stimulate breakthrough innovations, and to increase private-sector commercialisation of research results. The SME Instrument explicitly targets innovation projects that have reached TRL6 as a *minimum*, complementing the collaborative research instruments (Research and Innovation Actions and Innovation Actions) where research is conducted up to a *maximum* of TRL6[100].

The design of the SME Instrument is therefore fully focused on the close-to-market objectives of Horizon 2020. SME Instrument activities within the Societal Challenges priority are

[98] *European Commission (2016). Horizon 2020 Monitoring Report 2015. European Commission*
[99] *European Commission (2016). Horizon 2020 Monitoring Report 2015. European Commission*
[100] *Horizon 2020 Work Programme 2016-2017, General Annexes*

intended to cover the full range of research and innovation activities, including innovation-related activities such as piloting, demonstration, test-beds, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. Specific implementation aspects within the specific objective LEIT are similar and focus on the integration of individual technologies; demonstrations of capacities to make and deliver innovative products, systems, processes and services; user and customer pilots to prove feasibility and added value; and large-scale demonstrators to facilitate market take-up.[101]

The external experts of the Independent Investment Expert Group assessed all projects in both Phase 1 and Phase 2 and found that ~70% of the Phase 1 and Phase 2 projects were at TRL6, while ~20% of projects in both phases were at TRL8 or TRL9. They considered that only 10% of Phase 1 projects and 6% of Phase 2 projects were below the minimum required TRL6.[102]

The close-to-market objectives of Horizon 2020 are put in practice in the evaluation process of the proposals by using (1) economic impact, (2) excellence in innovation, and (3) quality and efficiency of the implementation as key criteria. Economic impact is made operational in five elements that all focus on the close-to-market objective of Horizon 2020. These are: expected market impact; users/markets; company; exploitation of results; and IP, knowledge protection and regulatory issues.[103]

In general, SMEs participating in the SME Instrument are also relatively investor-ready. A previous analysis of investment readiness[104; 105] among SME instrument beneficiaries showed that 28% of SMEs in Phase 1 are 'ready' for investment. The majority of beneficiaries are 'almost ready' for investment (62.3%). The remaining 9.2% are not ready for investment. For Phase 2, SMEs are almost equally distributed between ready and almost ready SMEs. None of the SMEs from Phase 2 were assessed as not being investment ready.[106] There were differences reported between call topics, but these were small. These figures show that the SME Instrument manages to attract SMEs that are capable of operating close to the market.

SME Instrument focuses on strategic innovators, and intermittent innovators.[107] These are about half of innovative firms in all sectors, except in the energy sector. In energy, the very large majority of innovators are technology modifiers, and adopters. This would theoretically make the energy sector less equipped for the SME Instrument. In addition to that, the energy sector is characterised by long value chains (which also goes for transport), and a high capital-intensity, and infrastructure dependence which result in a strong power base of large incumbents.[108]

---

[101] *2013/743/EC: Council Decision of 3 December 2013 establishing the specific programme implementing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decisions 2006/971/EC, 2006/972/EC, 2006/973/EC, 2006/974/EC and 2006/975/EC*

[102] *Independent Investment Expert Group (2016). Assessing the Investment Potential of SMEs emerging from Phase 1 and Phase 2 of the SME Instrument. European Commission. p. 78*

[103] *Lai, Natasha (2014). The SME Instrument of Horizon 2020. Presentation on behalf of EASME.*

[104] *The concept of Investment Readiness Level (IRL) is used frequently in the financial communities and transcends the Technology Readiness Level. It was developed by Steve Blank and allows a structured assessment of closeness to the market.*

[105] *See also: Spath, D., Warschat, J., Gomeringer, A. and Rummel, S. (2012) A technology readiness level approach for the evaluation of technology driven concepts, Manchester.*

[106] *Independent Investment Expert Group (2016). Assessing the Investment Potential of SMEs emerging from Phase 1 and Phase 2 of the SME Instrument. European Commission*

[107] *As technology modifiers and adopters per definition do not perform R&D.*

[108] *Europe INNOVA (2008). SECTORAL INNOVATION WATCH SYNTHESIS REPORT: What is the right strategy for more innovation in Europe? Drivers and challenges for innovation performance at the sector level.*

I.6.1.2. Internal coherence of the INNOSUP Actions

The INNOSUP Actions have as core objective to improve the framework conditions for innovation; target participants are the innovation policy makers and agencies at the national and regional levels. INNOSUP actions are therefore supposed to result in specialised support services for policy makers (agencies) at the national and regional levels, established at European level to complement existing national and regional services. INNOSUP actions are designed to provide opportunities to Member States and regions for collaboration, peer-learning and uptake of new approaches to enhance their SME services.

The question that was posed in this context, i.e. whether the actions address challenges that could not equally or better be addressed in other parts of Horizon 2020, is closely related to the overall structure of Horizon 2020 on the one hand, and the governance of innovation at the national or regional level on the other.

Taking account of the systemic – and therefore cross-sectoral - nature of the challenges that the INNOSUP Actions intend to address as well as the profile of the targeted beneficiaries of these actions, our conclusion is that under Horizon 2020, these activities are best implemented in the context of Innovation in SMEs.

INNOSUP Actions address challenges that are of a systemic nature, related to the framework conditions for innovations in the EU Member States. In essence, these challenges are therefore cross-sectorial by nature. Under Horizon 2020, only Innovation in SMEs focuses on innovation in a fully cross-sectorial manner; the activities in the two potentially relevant Horizon 2020 pillars, i.e. Industrial Leadership and Societal Challenges, focus on specific areas of technological innovation and innovation related to specific societal challenges. Funding the INNOSUP Actions under these pillars would therefore imply an explicit technological or societal challenge focus of the actions, which would not be fit for purpose.

A second element relates to the targeted audience of the INNOSUP, i.e. the national/regional policy makers and agencies responsible for innovation. The natural counter-part of these actors at the European level for issues related to framework conditions for innovation would be DG GROW, similar to DG Research acting as natural counter-part for the national research ministries or research councils.

In fact, EU initiatives with a similar focus on supporting national policy makers in their efforts to improve their research systems have been and are currently being managed by DG R&I. These initiatives have been enforced in the context of the European Research Era through the set-up of the ERAB ((formerly CREST) and its peer reviews, as well as through the launch of the Open Method Coordination (OMC) activities under FP7. They are currently continuing under the Horizon 2020 Policy Support Facility.

I.6.2. External coherence with other EU funding programmes

This section assesses the external coherence of Innovation in SME with other EU funding programmes, in particular COSME and the ESIF. Under COSME potential coherence with internal activities of EASME are also briefly touched upon.

There is a good level of coherence between the SME Instrument and the COSME programme, with synergies created by making use of the EEN to ensure access to the SME Instrument business innovation coaching and mentoring services. There is room for a stronger coordination with the COSME financial instruments. There is a potential coherence with the work that is being done within EASME to improve the quality of the Enterprise Europe Network.

There is a potential for the creation of synergies between the European Structural & Investment Funds (ESIF), in particular the European Regional Development Fund (ERDF) Interreg programmes, and the INNOSUP Actions. This would allow further strengthening the support for capacity-building and project development among SMEs. It depends on individual Operational Programmes how these are exploited.

I.6.2.1. Coherence with the COSME programme

The COSME programme has four specific objectives:

1. To ease access to finance for SMEs (e.g. the financial instruments under COSME)
2. To help SMEs access to markets and internationalise (e.g. the Enterprise Europe Network)
3. To create a favourable environment for enterprises and support their competitiveness
4. To promote entrepreneurship (e.g. Erasmus Young Entrepreneurs)

The table below presents some basic characteristics of the COSME programme.

Table 116 - Main characteristics of the COSME programme

Intervention	Aim	Thematic focus	Target groups	EC Contribution
COSME	To support the creation and growth of SMEs and to promote competitiveness of EU entrepreneurs and entrepreneurship.	In general open	Depends on the specific objectives, but in general innovation agencies and intermediaries.	Depends on the actions

Source: Technopolis, forthcoming

The COSME programme does not include actions with an objective and similar focus to the **SME Instruments**; there is therefore no overlap in the activities funded. Both interventions also operate in a complementary manner to support the overarching policy objective of strengthening the competitiveness of SMEs and creating a favourable ecosystem for SME innovation and growth.

Coherence has been created in particular between the Enterprise Europe Network's activities under COSME and the SME Instrument business innovation coaching services. The Enterprise Europe Network provides access to these services in all European regions and they are delivered by specialised staff of Network partners and dedicated (private sector) coaches.

However, a reflection similar to the one related to the coordination between the SME Instrument and the Access to Risk Finance, as mentioned in internal coherence 'section, can be made also for COSME. The potential for a stronger coordination with its financial instruments, including the Equity Facility for Growth (EFG) and to some extent the Loan Guarantee Facility (LGF), could be considered; however, it is important to note that COSME financial instruments are dedicated to companies, in general, and their financial instruments do not target innovative companies per se and up to a limited amount for innovative SMEs.

A positive assessment regards the **INNOSUP Actions** and its complementarities and potential overlaps with the COSME actions. INNOSUP Actions as well as COSME actions target intermediary organisations, and many target beneficiaries of the INNOSUP Actions may also be involved in the Enterprise Europe Network that is funded under COSME. In the 2016-2017 Work Programme at least 7 INNOSUP Actions explicitly aim at strengthening SME support capacity within the Enterprise Europe Network. This implies clear synergies between the two.

EASME, on the other hand, pursues a similar goal of supporting the EEN in enhancing its performance to deliver top quality services to SMEs and build expertise through a well-developed Learning & Development (L&D) Strategy. EASME's L&D resources are much smaller, so the risk of overlap is limited. There is a potential to create more coherence with the work that is being done within EASME to improve the quality of the Enterprise Europe Network. The evaluation indicates that this is not yet fully exploited.

I.6.2.2. Coherence with the European Structural & Investment Funds (ESIF)

Articles 20 and 21 of the Horizon 2020 Regulation as well as Article 37 of the Rules for Participation highlight the potential for creating synergies between Horizon 2020 and the ESIF.

In the context of the Innovation in SMEs, the potential synergy between the INNOSUP Actions and ESIF consists in their indirect support to SMEs for capacity building and by providing opportunities for project development. There is a potential for synergy between the INNOSUP Actions and those of the European Structural & Investment Funds (ESIF) in particular in the context of the European Regional Development Fund (ERDF) Interreg programmes that also focus on mutual policy learning and exchange of 'good practices' as is recognised for instance under INNOSUP-05-2016-2017 (Peer learning of innovation agencies). The ESIF – if regional Operational Programmes foresee it - funds technology transfer and university-enterprise cooperation primarily benefiting SMEs; cluster support and business networks primarily benefiting SMEs; and support to research and innovation processes in SMEs (including voucher schemes, process, design, service and social innovation). INNOSUP Actions aim at building capacity within these beneficiaries.

Total ESIF funding in this realm will be EUR 16.5 billion in the current programming period. As the size of these ESIF projects generally exceeds that of individual INNOSUP Actions, and as the INNOSUP Actions are aimed at cooperation between existing clusters, the risk of overlap is limited.

I.7. EU ADDED VALUE OF INNOVATION IN SME

This chapter discusses the EU Added Value (EAV) of the SME Instrument and of the INNOSUP Actions. Section I.7.1 introduces some key figures on the EAV of the SME Instrument. Section I.7.2 explores to what extent the SME Instrument has an impact on

national support schemes. In Section I.7.3 the extent to which EAV plays a role in the evaluation procedures is assessed. Section I.7.4 explores the EAV of INNOSUP Actions.

I.7.1. SME Instrument and EU Added Value

This section assesses the extent to which the SME Instrument is providing support to Europe's high-growth potential SMEs that goes beyond the possibilities on offer through the innovation support measures of individual Member States and regions. The answer to the question draws on each of our data collection exercises, including desk research, interviews, surveys and the five case studies.

This analysis suggests that SME Instrument provides support that goes beyond the innovation support existing schemes at Member States' orregions' levels.

SME Instrument has several important qualities that set it apart from much of the support available at national level. It is unique in its combination of significant project volumes, its c open call, tailored to the needs of SMEs in all possible sectors (with a thematic matrix), and it does not require collaborative research projects and RTO/ university involvement. Furthermore, the SME Instrument is also unique in its conditions (e.g.possible monopartner grants), and does not have a direct focus on FDI or exports unlike some national programmes.

Beneficiary survey shows the SME Instrument has several qualities that set it apart from much of the support available at national level; however around 60% of responding SMEs were aware of alternative national or regional innovation-support measures for SMEs. A majority of interviewees was aware of schemes providing advice and financial assistance relevant to different phases of the innovation lifecycle, with broadly similar feedback about the availability of SME support measures for feasibility studies and demonstration. The survey results do suggest that the SME Instrument offers greater added value for SMEs based in EU-13 Member States. The provision of grants – rather than loans – is also judged to be of considerable added value by SME respondents in many countries, where repayable loans are common.

Table 117 presents analysis of survey responses for each of the 12 countries where 50 or more responses were obtained. It is sorted on column two, the proportion of respondents that stated that they were aware of existing national measures that support SMEs with the development and appraisal of innovation concepts.

When examining the respondents in each category by country, the Scandinavian countries featured prominently. Respondents in Finland (55%), Norway (58%) and Sweden (56%) indicated the presence of national funding equivalent to Phase 1 of the SME Instrument. Respondents in Denmark (57%), Finland (53%) and Sweden (58%) most reported the presence of national funding equivalent to Phase 2 of the SME Instrument.

The results suggest there is less support available for SME innovators at the local and regional levels, as compared with nationally, however, there is clearly some analogous activity in most

Member States. In several cases, notably Italy, regional SME support measures are mentioned more often than national innovation support measures.

Table 117 - Countries with national, regional or local funding equivalent to SMEI phases

Country (with at least 50 answers)	Concept and feasibility assessment		Innovation development and demonstration	
	Yes, National	Yes, Local or Regional	Yes, National	Yes, Local or Regional
Norway	58%	17%	49%	15%
Sweden	56%	10%	58%	5%
Finland	55%	13%	53%	9%
United Kingdom	49%	11%	42%	9%
France	46%	21%	48%	14%
Denmark	44%	11%	57%	7%
Germany	36%	16%	36%	19%
Spain	33%	15%	36%	12%
Netherlands	28%	23%	38%	22%
Slovenia	22%	12%	33%	17%
Greece	19%	6%	20%	5%
Italy	16%	25%	22%	30%
Average	***39%***	***15%***	***41%***	***14%***

Source: Technopolis, based on SME survey data. Response sizes vary by country and support: 50 – 355 (Phase 1); 48 – 369 (Phase 2).

In addition to surveying beneficiaries, the evaluators surveyed SME Intermediaries inviting them to provide their views on the overall added value of the SME Instrument. We obtained similar feedback from this group of organisations: the majority is aware of SME support measures at the national or regional level. Nonetheless, the very great majority of intermediaries believe the SME Instrument does add value over and above these national measures.

The majority of responders (64%) agreed that SMEI fills a gap in funding for early stage/higher risk research and innovation, while only 14% disagreed. The remaining 14% remained neutral (i.e. neither agreed nor disagreed). They were also asked about the extent to which the SME Instrument is adding value above and beyond what could be achieved otherwise, for example through existing national and regional support offers. All but one respondent (99%) believed it was adding value to some degree (14% to a small extent, 30% to a medium extent, and 54% to a large degree).

SME Intermediaries were also asked to identify the specific national or regional innovation support schemes that SMEs can make use of. This resulted in a long-list of 43 schemes that are comparable in some way to the SME Instrument.

The study team reviewed a selection of these schemes in detail, to determine the extent to which these initiatives are wholly or partially analogous to the SME Instrument. This

benchmarking helped to establish several important characteristics that distinguish the SME Instrument's offer to Europe's SMEs. It is important to note that the collection of SME schemes identified are quite diverse, so one cannot say there is a single quality that differentiates national SMEs support measures from European support measures. Notwithstanding this cautionary note, there are patterns that point to important distinguishing features:

- National and regional support measures often have limited budgets supporting relatively small numbers of projects, where the SME Instrument has the funds to support significantly higher volumes of project activity (even when adjusting for the structural differences between a national or European scheme). This means a greater proportion of Europe's innovative small businesses have opportunities to secure financial support and thereby increase the likelihood of fully realising their growth potential
- National and regional support measures are more likely to focus on certain priority domains, whereas the SME Instrument is largely open thematically and as such is relevant to the growth ambitions of any innovative SME
- National and regional support measures are more likely to focus on one aspect of the innovation lifecycle, where the European Commission has understood from past evaluations the need for the SME Instrument to adopt a more integral approach and provides a portfolio of tailored instruments addressing the variable needs of SMEs across the innovation lifecycle
- National and regional support measures sometimes only provide advice rather than financial assistance or where they do provide financial assistance it may be in the form of repayable loans. The SME Instrument by contrast provides grants for feasibility studies (Phase 1) and development work (Phase 2), in recognition of the financial constraints faced by most small entrepreneurs. While loans ease cash flow, their longer-term financial implications can be off-putting to some prospective applicants (possibly even those with the strongest propositions)
- National and regional support measures are more likely to have a fixed term and one or two calls for proposals, where the SME Instrument has rolling submissions that fit more closely with the time pressures smaller businesses
- National and regional support measures may include certain conditions, including for example a requirement to collaborate with other SMEs (or with RTOs, or universities). The Horizon 2020 SME Instrument does not impose such additional requirements. Indeed, the programme has simplified its rules in comparison with earlier SME-specific measures (e.g. FP7) to maximise its relevance and accessibility to high growth potential businesses

Interviewed stakeholders agree with the above-mentioned statements, and stress that only a limited number of Member States have the resources to put up Phase 2-like instruments. Even if such instruments would be operational in more Member States, it is not seen as an issue, *"as long as the SME Instrument is complementary with most (other) Member States"*. In terms of cooperation the interviewees explain that currently there is little to no cooperation with the national/regional level beyond the Seal of Excellence. Some however argue that *"Member States lack the absorptive capacity for cooperation as they only work with small support mechanisms (max. EUR 70k)"*.

The Appendix B (related to Case studies) presents a look at the extent to which the SME Instrument is providing a new means for the target group of growth ambitious SMEs in the five case study countries.

In case one wants to assess to what extent funding possibilities are provided by the MS and regions, the case studies cannot be used to complement the findings in Table 117.[109] Alternatively correlations between the selected projects under Phase 1 and Phase 2 can be investigated, by EU Member State per million inhabitants as presented in the State-of-Implementation chapter and alternatives at country level as presented in Table 117. That comparison covers Denmark; Finland; France; Germany; Greece; Italy; Netherlands; Slovenia; Spain; Sweden; and the United Kingdom.

Availability of national level support is negatively correlated with submissions to Phase 1 and Phase 2, which indicates that the SME Instrument is complementary to existing funding at national level. In turn, availability of regional level support is positively correlated to submissions to Phase 1 and Phase 2, which indicates that the support is complementary.

There is relatively high positive correlation between availability of support for Concept and feasibility assessment at regional level and submissions to Phase 2 (the correlation is equal to 0.43). This could indicate that availability to regional support that is similar to Phase 1 could support the preparation of Phase 2 proposals and projects, however, it is not possible (or even adequate) to draw any causal relationship based on these figures. There is, in turn, a weak negative correlation with availability of national funding (the correlation is equal to -0.21), but given the number of observations a weak correlation should be taken with even more caution.

I.7.2. Impact on national and regional SME support schemes

This section of this report explores the extent to which introduction of the SME Instrument at EU level impact on the design of national & regional SME support schemes. The findings are based on surveys, on interviews, and on case studies.

There is no evidence that the introduction of the SME Instrument at EU level has had a substantial impact on the design of national & regional SME support schemes.

However, there is some evidence that introduction of the SME Instrument had had an impact on the design of SME support possibilities within the individual intermediary organisations.

The effectiveness chapter already showed that there is a small number of national and regional SME support schemes that build upon insights provided by the Seal of Excellence award. Case studies indicate that improving of national & regional SME support due to the SME Instrument is discussed in at least one country.

To assess in how far the introduction of the SME Instrument at EU level impacted the design of national & regional SME support schemes, the survey asked intermediaries whether there

[109] *Combined coverage of Table 117 (the requires: n>50) and the case study countries is limited to UK, Sweden, Germany, and Spain, of which only Germany and Spain can be compared.*

were other external sources of funding that aim at supporting projects proposed for SME Instrument funding. Only 14% of the agencies suggested there had been any such impact – mostly pointing to schemes that had been established or modified to recognise the Seal of Excellence.

Several respondents suggested that schemes had been developed and modified with the SME Instrument in mind (i.e. to better align with or complement this scheme), but provided no more specific details. A couple of respondents suggested similar adjustments would take place soon – but that plans were still in development.

Respondents were also asked more specifically whether the introduction of the SME Instrument had had an impact on the design of SME support possibilities within their own organisation. Nearly half (44%) said that there had been some impact, which most commonly related to either the introduction of new activities and services to target and support potential SME Instrument applicants,[110] or the introduction of new Key Account Manager Services, linked to SME Instrument support.

These views are supported by interviewed stakeholders, who in general indicate that they are not aware of impacts on national & regional SME support schemes. Thus it seems that there is no crowding out effect by SMEI nor a significant leverage effect mobilising additional funding resources at national, regional or local level.

The Annex presents a look at the extent to which the SME Instrument has had an impact on the design of national & regional SME support schemes in the five case study countries.

I.7.3. The role of EAV in the SME Instrument evaluation system

This section explores the extent to which the evaluation system sufficiently considers that projects to be supported have or create a European added value. Findings are based on surveys, interviews and case studies.

The EAV of the project plays a small role on the overall evaluation criteria (circa 4%). Interviews with the European Commission indicate that this is sufficient.

European Added Value is considered in the evaluations of both Phase 1 and Phase 2 proposals. Under the impact criterion, four aspects are to be considered. These are (1) the extent to which the outputs of the project would contribute to the expected impacts mentioned in the work programme under the relevant topic; (2) enhancing innovation capacity; (3) strengthening the competitiveness and growth of companies and create new market opportunities; (4) address issues related to climate change or the environment, or bring other important benefits for society.

The third aspect (Strengthening the competitiveness and growth of companies and create new market opportunities) consists of two components. The first component asks of the proposal

[110] *E.g. awareness raising, targeted promotion, training, proposal writing guidance and other support to the preparation for application*

that European Added Value "has been taken into account in the following aspects: a) the assessment of the market, b) the analysis of the competition, c) the impact on EU/global challenges". This is the only occasion where EAV is mentioned. It is fair to assume that EAV therefore forms 50% of the weighing of the third aspect of the impact criterion. This is one of twelve aspects of proposal evaluations in Phase 1 and Phase 2.

This means that EAV of the project could constitute a merely 1/24 of the evaluation score (=4.17%). This is confirmed by European Commission interviewees: "*The evaluation system does not per see value EAV. That is not the purpose of the system"*

The Annex presents some insights on how the evaluation system considers that projects have an EAV according case study interviewees.

I.7.4. European Added Value of the INNOSUP Action

This section assesses the European Added Value of the consolidated INNOSUP Actions. As indicated by the Commission in its Better Regulation Guidelines, EAV is difficult to assess in the early years, particularly of the early changes are related putting in place a policy framework, as is the case with the INNOSUP Actions. The INNOSUP Actions are too heterogeneous and too young to assess impact in EAV terms in detail.

The potential EU Added Value of the consolidated INNOSUP Actions is evident, even though it is too early to assess if the activities have a structural impact on national and regional level funding programmes and support systems.

It is too early to say if all tools developed will be effectively available to all Member States and Associated Countries. Publically available CORDIS data suggest a wide variety of countries and types of organisations participating in the INNOSUP Actions, which is an important indication that the tools developed will be widely available. There might be individual INNOSUP Actions that (potentially and partially) overlap with instruments implemented by some (larger) Member States.

The large majority of Innovation Agencies indicate that policy learning and experimentation within Member States would have happened less in the absence of the INNOSUP Actions. The services provided directly to SMEs, particularly the IPR Helpdesk, complement existing ones in Member States. They seem to make available new services that were not yet available to most SMEs.

There are clear indications that policy learning and experimentation benefit from the INNOSUP Actions. Our survey results indicate that the great majority (90%) of innovation agencies believe that policy learning and experimentation would happen less without the INNOSUP Actions. That includes 63% who thought it would happen 'to a much lesser extent' if the INNOSUP Actions were not there. Some of these respondents went on to highlight the importance of EU initiatives in terms of providing an impetus, trigger and incentive; providing strength and scale to activities; offering a European network and framework for collaboration; providing additional funding and support that is otherwise lacking; and

encouraging agencies to look outwards, across borders, and to see other agencies as partners rather than competitors.

It is too early to say if all tools developed will be effectively available to all Member States and Associated Countries. It is however clear that all Member States and Associated Countries can participate in the INNOSUP Actions. INNOSUP Actions published as coordination & support actions (sometimes CSA-Lump Sum), research & innovation actions, and innovation actions. That implies that the eligibility criteria (as formulated in Commission notice Nor. 2013/C 205/05) are clear. CSAs, IAs, and RIAs are open to all MS and associated countries.[111]

Publically available CORDIS data suggest a wide variety of countries and types of organisations participating in the INNOSUP Actions. This is an important indication that the tools developed will be widely available, even though it does not assure dissemination to the wider community of innovation agencies. Surveyed agencies indicate that availability throughout Member States and Associated countries can best be guaranteed by making the Enterprise Europe Network responsible (85%), or by having the EU maintain a repository of proven approaches (71%).

Because of the young age of the INNOSUP Actions, it is too early to say of the activities have an impact on national and regional level funding programmes and support systems, opening them for transnational cooperation. One third of the surveyed agencies said there had already been an impact within their organisation, which usually concerned the provision of Key Account Managers (KAM) and general improvements to internal capacities and service offers. Despite the young age of the INNOSUP Actions, the potential EAV is evident. Some clear examples of potential EAV are presented in the figure below.

Figure 192 - Examples of potential EAV of the INNOSUP Actions

- Setting up a European Label for innovation voucher programmes (INNOSUP-4-2014) that add to well-established, yet fragmented initiatives in many Member States. Existing innovation voucher schemes have a geographical limited scope, and are heterogeneous in design. INNOSUP activities aim to bring in cross-country learning and improving common standards/ labels.
- The cluster-oriented actions (INNOSUP-1-2015; INNOSUP-01-2016-2017) that (potentially, partially) have overlaps with instruments implemented by some (larger) Member States.[112] The INNOSUP Actions however aim to bring in the trans-national element that is absent in Member States instruments.

The ToR asked explicitly about the IPR Helpdesk and IPORTA II. As indicated in Chapter 5, innovation agencies are positive about the EU Added Value of the IPR Helpdesk, as well as its effectiveness in several domains. That also goes for other services provided directly to SMEs. Innovation Agencies report that the IPR Helpdesk is both complementary and adding value, above and beyond existing offerings. Overall, 51% rated the helpdesk as 'very effective', with a further 48% rating it as 'somewhat effective'. It is too early to assess the EAV of the new IPORTA II. This suggests that the services provided complement existing

[111] *For CSAs, an applicant must be 'at least one legal entity established in an EU Member State or Horizon 2020 associated country', while for RIAs and IAs, any applicant must constitute at least three legal entities independent of each other, while each of the three must be established in a different EU Member State or Horizon 2020 associated country.*
[112] *Such as French policies on the Pôles de Compétitivité or the German policies on Exzellenzcluster.*

ones in the Member States and in general make available new services where they were not available to SMEs.

I.8. CONCLUSIONS

This chapter presents the main conclusions, strengths, and weaknesses on each of the five evaluation criteria.

I.8.1. Relevance

The European challenges underlying the SME Instrument still prevail. A lack of access to early stage capital and the relative low level of EU performance in breakthrough innovations and commercialisation of research results have not significantly changed since its launch. The SME instrument in its design and implementation clearly contributes to the general objective of making Horizon 2020 Programme more oriented towards innovation and economic impacts. The SME Instrument responds adequately to the observations on SME innovation support in FP7. The SME Instrument effectively reaches SMEs that previously did not participate in EU framework programmes. Over the entire period 2014-2015, 89% of the SME applicants and 83% of those awarded under the SME Instrument were 'newcomers' to Horizon 2020.

The key rationale for the INNOSUP Actions is to develop a strong ecosystem of innovation support to SMEs in Europe. A key challenge that prompted the INNOSUP Action is the dissatisfaction of SMEs with innovation support that they receive. There is no evidence to suggest that this challenge is no longer valid across Europe, albeit that improvements have been reported.

These findings confirm a strong relationship between the needs and problems identified at the launch of the instruments and the EU intervention at the mid-term evaluation.

I.8.1.1. The strengths of Innovation in SMEs

The strengths in relation to its relevance are:

- Well suited to the needs of innovative SMEs and clearly understandable to the intended stakeholders
- Reaching stakeholders that were previously not well represented in EU framework programmes
- The - mainly - single company grant is particularly attractive to the intended stakeholders
- A good interaction between the INNOSUP Actions and the Enterprise Europe Network

I.8.1.2. The weaknesses of Innovation in SMEs

The weaknesses in relation to its relevance are:

- Relevance to start-ups and young companies might be small due to funding requirements, time-to-grant and administrative constraints.
- It is difficult to bring together empirical evidence on the continuing rationale for INNOSUP Actions, as there are limited systematic European wide data on SME

satisfaction with innovation support services and on the quality of the European innovation support eco-system.

I.8.2. Effectiveness

The SME Instrument clearly affects positively the beneficiary SMEs in their capacity to manage the innovation processes, inducing a behavioural change in their approach – including a trend towards more open innovation – and providing them with the strategic intelligence effectively to launch their innovation on the market. The integral coaching system set up for both Phase 1 and Phase 2 projects has been an important enabling factor for these positive developments among the SMEI beneficiaries.

Beneficiaries show a faster growth path than non-beneficiaries and there are clear signs that the SME Instrument assists companies to scale up their business activities. The SME Instrument is effective in accelerating the market introduction of innovations, across Phase 1, and plays an important role in helping innovation projects reach the market.

Particularly Phase 2 of the SME Instrument provides a quality mark, which is explicitly used for marketing purposes by 3 out of 4 beneficiaries. It is clear also that private investors commit to co-financing SMEs that participated in Phase 2 projects. There is a clear leverage effect of approximately EUR 800K per SME in Phase 2.

Opinions are divided when it comes to the usefulness of the SoE effectively to influence funding decisions. While agencies indicate a limited influence of the SoE so far, there are signs that this may change in the nearby future. SoE holders display a strong confidence that the Seal makes and will make a difference in funding decisions, be it implicitly or explicitly.

While it is too early to assess whether the entirety of the INNOSUP Actions have effectively enhanced the performance of the national and regional innovation support systems, the overall opinion of the stakeholders is positive in relation to the appropriateness of the INNOSUP portfolio of actions and their potential effectiveness. The IPR helpdesk is judged to provide a distinguishable service portfolio of high quality. The coaching community-building Action is equally considered positively by the stakeholders concerned in terms of its effects on the coaching community that is supporting the SME instrument

I.8.2.1. The strengths of Innovation in SMEs

The strengths in relation to its effectiveness are:

- The SME instrument clearly contributes to the general objective of making Horizon 2020 more oriented towards innovation and economic impacts and supports the holistic approach to innovation taken by Horizon 2020. It is able to respond to different types of innovation strategies, including both incremental and disruptive innovation strategies.
- Beneficiary SMEs grow faster than non-beneficiaries. There are clear signs that the SME Instrument helps scale up business activities.
- The strong alignment of the SME Instrument with the needs of the SMEs, addressing both the ‘softer’ necessary skills of innovation management capacity (Phase 3) and the implementation of the innovation project.

- An increasing recognition among both public and private funders that a successful application constitutes a 'quality mark' for the submitted innovation project.

I.8.2.2. The bottlenecks/weaknesses of Innovation in SMEs

The bottlenecks/ weaknesses in relation to its effectiveness are:

- Limits to the potential of the SME Instrument fully to attain its objectives are related to its strong focus on the funding of product innovations. Service innovations, network innovations, and customer engagement innovations are clearly less supported by the SME Instrument.
- Implementation state of play of Phase 3 is still limited. Mentoring is not yet fully implemented, and the access to investors is not yet fully operational.
- Factors hampering the effectiveness of the INNOSUP Actions relate to an apparent lack of strategic approach to the design of the portfolio, leading to an increasing breadth of the actions funded. Stakeholders suggest the implementation of a needs assessment to guide the launch of new actions.
- The lack of visibility and awareness, especially in the case of IPORTA II. Urgent action to address this shortcoming would be appropriate.

I.8.3. Efficiency

Efficiency of the SME Instrument is overall positive. That goes for the reach-out of the instrument, and for the implementation. It is too early to assess the efficiency of the INNOSUP Actions.

The SME Instrument is attracting a significant proportion of newcomers to the programme, however, it is reaching a relatively high proportion of its target SMEs in only a limited number of countries. We arrive to this conclusion by estimating penetration rates for each EU28 country. Individual country rates fall well below the EU28 average in 10 of the 28 Member States, which are disproportionately EU-13 countries. This suggests there is still more work to do to raise awareness about the SME Instrument in most countries, and possibly to look more closely at the communication strategy and messaging about success rates and benefits.

On a positive note, the evaluators found that the SME Instrument is attracting applications from appropriate SMEs. Our analysis also shows that success in reaching-out to the target group of SMEs goes hand in hand with national performance, in terms of success rates. This evidence suggests the SME Instrument's communication efforts have not resulted in an increase in unsuitable or poor quality applications. Our case studies suggest that national and regional efforts play a critical role in directly promoting calls for proposals to the right target audiences.

Performance on time-to-grant has improved significantly compared with FP7, yet the latest available data show that SME Instrument target values are not met. The time-to-inform has not improved significantly in the past cut-offs.

Efficiency of the application process is good. SMEs (both beneficiaries and non-beneficiaries) can efficiently submit their proposals, and they are content with the information provided

during the application process. The efficiency effects of the particular aspect of 'non-restriction of resubmissions' are not optimal.

Phase 3 constitutes a small share of the SME Instrument's budget (2%), reflecting its near-to-market activities. Nevertheless, this part of the Instrument plays a role of high relative importance in the context of the increasing determination across the Commission Services to support innovators cross the so-called valley of death. Phase 3 aims to deliver to SMEs what grants alone cannot: it facilitates improved access to private capital through the aggregation of demand and effective accreditation of innovators proposals. In principle, European-level action could transform innovation investment markets, achieving a scale of opportunities that few Member States can deliver. This has the potential to improve deal flow and attract new and bigger investors into the innovation space. Phase 3 also includes support for various preparatory activities, through for example, dedicated investor readiness training or business innovation coaching services to Phase 1 and Phase 2 beneficiaries. These kinds of capability-building initiatives are available at national and regional levels too. While there may be limited European Added Value, innovation management specialists would argue that the efforts to broaden technologists' horizons and develop their commercial and market development skills are best linked with specific innovation projects.

From this perspective, it makes good sense to include such activities within the SME Instrument's standard armoury. Moreover, the use of experienced mentors gives the coaching a degree of flexibility, which means clients are given the exact support they need given their particular strengths (shortcomings) and technology and market needs. This kind of bespoke input is less widespread at the Member State level as compared with more generic products, such as investor readiness training, with the latter being easier to market and deliver (and nearly always adding value).

It is too early to assess the full effectiveness of Phase 3 of the SME Instrument; however, the surveys and stakeholder interviews suggest that beneficiaries value the coaching services.

It is too early to fully assess the efficiency of Phase 3 of the SME Instrument, with a majority of Phase 2 projects still ongoing and some unavoidable delays in launching the access-to-finance support.

It is too early to assess the efficiency of INNOSUP Actions. INNOSUP Actions can improve their reach to target groups across Europe. Only a few INNOSUP Actions are well-known in the target group of intermediaries. This may be a question of communications. Reassuringly, there was more widespread awareness of the 2016/17 INNOSUP Actions Calls.

I.8.3.1. The strengths of Innovation in SMEs

The strengths in relation to its efficiency are:

- SME applicants, both successful and non-successful, praise the efficiency and clarity of the procedures managed by EASME
- There is a high-level of satisfaction among beneficiaries with Key Account Managers and coaches
- Even though the time-to-grant targets (3 months for Phase 1; 6 months for Phase 2) are not met, there are clear learning effects within EASME, which is a good sign

I.8.3.2. The weaknesses of Innovation in SMEs

The weaknesses in relation to its efficiency are:

- The efficiency effects of the particular aspect of 'non-restriction of resubmissions' are not optimal. Current procedures on resubmissions increase chances of SMEs for Phase 1 but not for Phase 2, which suggests a limited learning effect from the feedback of evaluators. So, non-restriction of resubmissions might help the PR of the instrument, but it is not improving proposals in Phase 2. For the large majority of unsuccessful proposals, feedback information from the evaluators did not significantly impact the proposals used for resubmission. The quality of evaluation feedback may be too generic to provide SMEs with the necessary insight to greatly improve their resubmitted proposals.
- Communication to participants can be improved. Even though the European Commission is clear about selection of proposals, to many surveyed intermediaries, SMEs (both successful and unsuccessful), and stakeholders it is not clear on what basis the evaluators come to their decisions. Unsuccessful SMEs are particularly unhappy with the absence of detailed feedback to their proposals.
- The SME Instrument risks allowing SMEs to resubmit proposals that were not funded without implementing substantive changes. The combination of low success rates, overly generic evaluation feedback, and the possibility to resubmit without limitation, might make it cost-efficient for many SMEs to do so. These risks increasing the administrative burden on the Commission Services without clearly improving the quality of the overall project portfolio.

I.8.4. Coherence

The SME Instrument is clearly complementary to the other funding instruments under Horizon 2020, including the other demand-side instruments with similar objectives, the collaborative research instruments and the Marie Skłodowska Curie actions. It therefore addresses the European challenge of reaching larger market uptake of innovations from a different angle and in a different manner compared to the other Horizon 2020 instruments.

A stronger coordination between the SME Instrument and the Horizon 2020 Access to Risk Finance would be beneficial, though, as would be a stronger coordination with the financial instruments under the COSME programme.

Overall, there is a good level of coherence between the SME Instrument, Financial instruments under Access to Risk Finance Work Programme, and also COSME programme, with synergies created by making use of the EEN to ensure access to the SME Instrument business innovation coaching and mentoring services.

Regarding the INNOSUP Actions, a conclusion of the analysis is that under Horizon 2020, these activities are best implemented in the context of Innovation in SMEs. Funding of these actions in other areas of Horizon 2020 would not be fit for purpose, because of the systemic and therefore cross-sectoral nature of the challenges that the INNOSUP Actions intend to address as well as the profile of the targeted beneficiaries of these actions, i.e. national and regional innovation policy makers and agencies.

The coherence with the EEN in general is very good. The EEN and the SME Instrument as well as the INNOSUP Actions clearly strengthen each other. There is a potential coherence

untouched with the work that is being done within EASME to improve the quality of the Enterprise Europe Network. On the other hand, there is a potential coherence with the European Structural & Investment Funds (ESIF). That especially goes for those parts of the ESIF that focus on mutual policy learning and exchange of 'good practices', like the Interreg.

I.8.4.1. The strengths of Innovation in SME

The strengths in relation to its coherence are:

- The design of the SME Instrument is focused on the close-to-market objectives of Horizon 2020. Its uniqueness lies in the focus on specific needs of European innovative SMEsat any step of their innovation cycle.
- Innovation in SMEs is the Horizon 2020 area that provides the best framework for the delivery of support to national and regional policymakers by the INNOSUP Actions in order to improve the framework conditions for innovation throughout the Single Market.

I.8.4.2. The bottlenecks/weaknesses of Innovation in SME

The weaknesses in relation to its coherence are:

- There are signs that cooperation with the EIB on the InnovFin Instruments can be further explored.
- For the INNOSUP Actions, despite the clear coherence with the Enterprise Europe Network, a clear weakness is the lacking coordination with the Learning and Development activities of EASME that target the EEN. Operating together more strongly might improve effectiveness.

I.8.5. EU Added Value

The evidence collected in this evaluation suggests that the SME Instrument is providing support to Europe's high-growth potential SMEs that goes beyond the possibilities on offer through the innovation support measures of individual Member States and regions.

The instrument does not constitute an entirely new means by which to target ambitious SMEs, and our evidence shows that there are instruments in Member States that focus on innovation projects somehow similar to certain aspects of the SME instrument.

However, the SME Instrument has several important qualities that set it apart from much of the support available at national level. The SME Instrument is unique in its combination of significant project volumes, a continuously open call that is tailored to the needs of SMEs, and the fact that it does not require collaborative research projects and RTO/ university involvement. Furthermore, the SME instrument is in many cases distinct in its conditions (e.g. grants instead of loans or conditional grants, as well as Phase 3 activities), and does not have a direct focus on FDI or exports unlike some national programmes.

There is a small number of national and regional SME support schemes that build upon insights provided by the Seal of Excellence award. Even though is no evidence that the Seal of Excellence is used to select SMEs for national or regional funding, there is some evidence that introduction of the SME Instrument had an impact on the design of SME support possibilities within the individual intermediary organisations. Case studies indicate that

improving of national & regional SME support due to the SME Instrument is discussed in at least one country.

European added value of SME Instrument projects weighs only marginally in the SME Instrument application evaluation process. EAV of the project could constitute 4.17% of the total evaluation score. Interviews with the European Commission indicate that this is sufficient.

The potential EU Added Value of the consolidated INNOSUP Actions is evident, even though it is too early to assess if the activities have a structural impact on national and regional level funding programmes and support systems.

I.8.5.1. The strengths of Innovation in SMEs

The strengths in relation to its EAV are:

- Although our evidence shows that there are instruments in Member States that focus on innovation projects somehow similar to certain aspects of the SME instrument. The SME Instrument is unique in its combination of project volumes, openness, rolling submissions, and the fact that it does not require collaborative research projects and RTO/ university involvement.
- The willingness of the European Commission to experiment with new instruments such as both the SME Instrument and the INNOSUP Actions is to be applauded, and not something that is done widely.
- Potential EAV of the consolidated INNOSUP Actions is evident, even though there might be several individual INNOSUP Actions that (partially) overlap with instruments implemented by some (larger) Member States.

I.8.5.2. The weaknesses of Innovation in SMEs

The weaknesses in relation to its EAV are:

- EAV for INNOSUP Actions at the consolidated level is clear. Yet there might be individual actions that potentially overlap with what is done in some Member States.