

A photograph of two scientists, a woman and a man, both wearing white lab coats and glasses. They are in a laboratory setting, looking at a computer monitor. The woman is pointing at the screen while the man looks on. The image is overlaid with a blue geometric shape that frames the text.

COST Strategic Plan

COST 060/17

12 December 2017

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Preamble

The adoption of the COST Ministerial Declaration [1], elaborated by the COST Vision and Strategic Goals [2], during the 2016 COST Ministerial Conference in Bratislava, Slovakia, delivered a strong political mandate for COST for the coming years. The COST Vision and Strategic Goals provides insights into the future direction of COST. The current COST Strategic Plan translates these goals into defined and prioritised operational objectives, expected impact, required activities, tools and potential cooperation partners. The COST Strategic Plan is implemented by an Annual Activity Plan which details the activities in order to realise the expected outcomes and results.

The COST Strategic Plan builds on the COST FP9 Position Paper [3] highlighting the importance of interdisciplinary bottom-up networks as impactful tools to bridge the participation gap and close the innovation divide in Europe while providing opportunities for younger generations. It also follows up on recent developments in research and innovation (R&I) policies at the European level, in particular the DG Research and Innovation's 'three Os' priorities: Open Science, Open Innovation and Open to the World' [4], and the greater focus on impact, as stressed by European Commissioner Carlos Moedas, the 'LAB-FAB-APP' report [5] and the '2017 Tallinn Call for Action' [6].

This Strategic Plan has been prepared in different stages. In January and March 2017, three workshops were organised to collect the views of the members of the COST Committee of Senior Officials (CSO), the Scientific Committee (SC), the European Commission (EC) and the COST Administration. The resulting draft was discussed during the CSO meeting in April 2017, after which a written procedure was launched to collect feedback. During its meeting on 28 June 2017, the COST Executive Board mandated a drafting group with the task of finalising the COST Strategic Plan, building on previous workshops and discussions. The group met four times during August and September 2017 and presented the COST Strategic Plan during the 201st CSO meeting held on 18-19 October 2017 in Tartu, Estonia. During the 202nd CSO meeting in Brussels, Belgium, on 12 December 2017, the Plan was approved by the COST Members. The COST Strategic Plan covers the period from 13 December 2017 until the end of FP9. It is a dynamic document which can be adapted during its lifetime. Of course, as the content and budget of FP9 is not yet known, the COST Strategic Plan is conditional on its compatibility with COST's future tasks and framework within FP9.

Executive summary

COST's interdisciplinary bottom-up networks are effectively bridging the innovation divide and participation gaps in Europe and providing a large spectrum of opportunities for young generations of researchers and innovators. Involvement in COST Actions both anticipates and complements the activities of the EU Collaborative Framework Programme (FP), spreading excellence across Europe and beyond. To continue as the leading networking instrument in the European Research Area (ERA), and in line with the COST Vision and Strategic Goals, COST has defined three priorities for its positioning in the remaining part of Horizon 2020, and in FP9, the next Framework Programme for Research and Innovation: 1) Promoting and spreading excellence; 2) Fostering interdisciplinary research for breakthrough science; and 3) Empowering and retaining young researchers and innovators.

Pockets of excellence can be found everywhere in Europe and COST has the tools and instruments at its disposal to unlock this untapped potential, creating a win-win situation for Europe as a whole. COST encourages participation from all actors, such as academics, non-academics, SMEs, international organisations and public authorities. Participation in COST has led to significant results and follow-up in terms of the number of proposals submitted for collaborative research in Horizon 2020, with a striking success rate which more than doubles the average success rates for these programmes. This underpins the role of COST as a pre-portal for follow-up European funding for research and innovation. By networking researchers and innovators from all career levels, from PhD students to Nobel Prize winners, COST connects complementary funding schemes ranging from Erasmus+ to European Research Council (ERC) grants, facilitating the entry of promising young talents into these schemes.

The COST Strategic Plan defines clear targets and Key Performance Indicators (KPIs) for each Strategic Priority. Several instruments are at hand to monitor and measure the outputs, tangible results and scientific impact of COST Actions. COST will contribute to the European political goal of enhancing R&I excellence, mobilising untapped potential, encouraging openness and thereby boosting European scientific, economic and societal development.

To implement its Strategic Priorities, it will strengthen its core business by expanding the number and reach of COST Actions. New services, including COST Connect and the COST Academy, are provided to strengthen the position of COST and its Actions in the ERA. It also has the ambition, through its community involved in COST Actions, to contribute expertise to science-informed policy advice and the 'Open to the World' policy.

A COST Innovators Grant scheme for exploring innovation potential will be developed to further bridge scientific research performed in COST Actions and marketable applications. Cross-cutting Activities will be deployed to utilise COST's networking instruments for targeting specific policy priorities. COST also recognises a number of opportunities for further contributing to the Spreading Excellence and Widening Participation package in Horizon 2020 and FP9 [7, 8, 9].

There is a strong need for an increase in budget to successfully implement COST's three Strategic Priorities. A financial framework and budget of at least EUR 600 million (EUR 85.7 million per year) will enable up to 75 new COST Actions per call to be initiated, reaching 625 Actions per year with a success rate of 15 % for submitted proposals – at present, 75 % of the proposals rated as excellent cannot be funded due to the lack of budget. With this increase in budget, and in line with the LAB-FAB-APP report, COST will be able to offer enhanced networking opportunities to even more researchers and innovators, making a tangible contribution to bridging the innovation divide and participation gaps in Europe and beyond.

COST: the leading open networking tool in the ERA

For more than 45 years, COST has offered European researchers and innovators a simple and flexible pathway to take part in the best science and technology networks in Europe and beyond. To this end, COST has been providing funding for bottom-up, excellence-driven, interdisciplinary, open, pan-European networks (the COST Actions). These networks enable a very large spectrum of cooperation, including capacity-building and training activities. COST Actions produce a wide range of outcomes ranging from joint publications, to successful proposals to the ERC, or large collaborative EU projects and new technology developments aimed at addressing Europe's societal challenges. COST Actions gather researchers and innovators from all career levels, degrees of specialisation and professional backgrounds, embracing the whole of Europe's cultural diversity and core values.

COST is the longest-running European framework for research and innovation, currently comprising 36 COST Members and 1 Cooperating Member whilst 17 Near Neighbour Countries (NNCs) covering Europe and its adjacent areas are also eligible for funding. The 20 'less-research-

intensive' COST Members are listed as Inclusiveness Target Countries (ITCs, Figure 1, in orange).

Researchers and innovators from all over Europe perceive COST as a unique means for them to jointly develop their own ideas and new initiatives across all fields in science and technology, including social sciences and humanities, through pan-European networking of national- or international-funded research activities. Involvement in COST Actions both anticipates and complements the activities of the EU's collaborative FPs, creating a 'bridge' towards the R&I communities in Europe and beyond. Through its networking instruments (Figure 2), COST promotes breakthrough knowledge in interdisciplinary topics, and spreads excellence across Europe and beyond. COST fosters brain-circulation, especially among younger generations, and offers researchers and innovators multiple possibilities to develop their careers through collaborative networks. COST can also stimulate reforms in national R&I systems. In its essence, COST offers a unique space where people and ideas grow.

36 COST countries:

Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the former Yugoslav Republic of Macedonia.

1 Cooperating State:

Israel.

COST Near Neighbour Countries

Albania, Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Jordan, Lebanon, Libya, Moldova, Morocco, The Palestinian Authority, Russia, Syria, Tunisia and Ukraine.

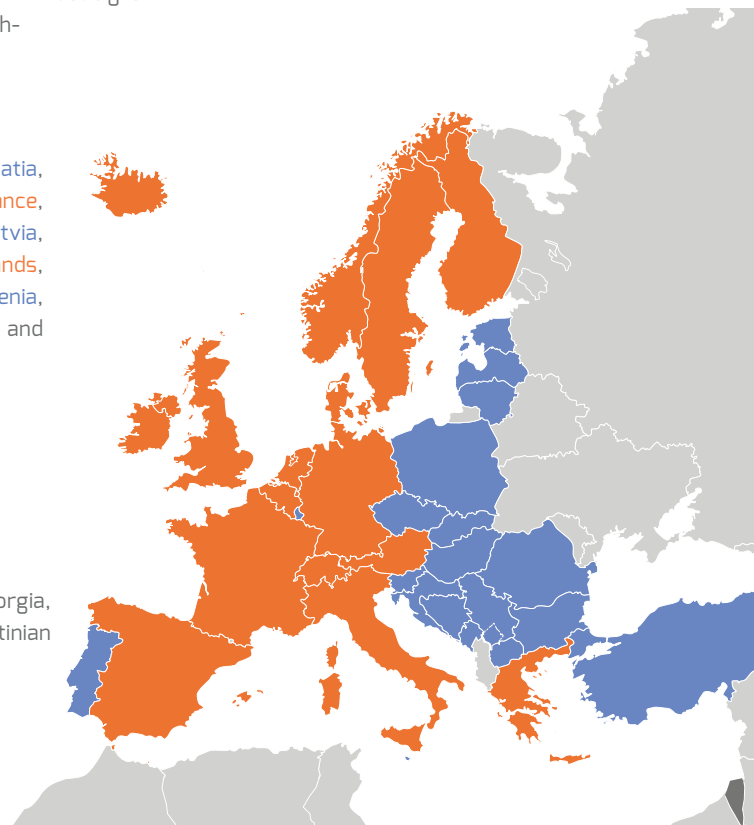


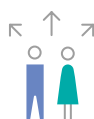
Figure 1: Overview of COST Members, COST Cooperating Member and NNCs. The 20 Inclusiveness Target Countries (ITCs) are marked in blue. The remaining 16 countries are marked in orange. NNCs participating in COST are marked in grey.

In 2016, more than 48 000 researchers and innovators were involved in 352 COST Actions, 258 training schools were organised and 2 705 short-term scientific missions took place (Figure A1). Since the start of Horizon 2020 in 2014, 60 247 participants have been involved in 499 COST Actions, of whom 16 457 have come from ITCs. COST organised

10 229 short-term scientific missions, and 897 training schools have been held since 2014. On average, in 2017, the participation of young researchers and innovators in COST Actions was 40 %, while that of female researchers and innovators increased to 42 %.



Training schools – Intensive training in research and innovation topics within the laboratories and organisations involved in a COST Action.



Dissemination activities – COST encourages and supports Action participants to disseminate the outcome of their research to other COST science and technology networks, the wider scientific community, policymakers, the media, and society at large.



Short-term scientific missions (STSMs) – Exchange visits between researchers and innovators within a COST Action. STSMs enable scientists to visit an institution or laboratory of another COST Member.



Conference grants – Helping PhD students and early-career investigators from participating ITCs to attend international science and technology-related conferences that are not specifically organised by COST Actions.



Meetings, workshops and conferences – Organised by COST Action Management Committees in any COST Member participating in the network. They are open to the whole scientific community.

Figure 2: Overview of COST's current networking instruments.

The role of COST in the ERA: three Strategic Priorities

COST has been nourishing open networks of excellence in all scientific domains, where knowledge is freely shared among all types of specialists, promoting both the traditional academic freedom for curiosity-driven research and technical and market-oriented solutions. It has established itself as a platform where people and ideas can grow, contributing decisively to the internationalisation process of the R&I communities and to significant scientific and technological breakthroughs in Europe and beyond. To continue to be the leading networking instrument in the ERA, and in line with the COST Vision and Strategic Goals, COST has defined three priorities for its positioning in the remaining part of Horizon 2020, and in FP9:

- Promoting and spreading excellence
- Fostering interdisciplinary research for breakthrough science
- Empowering and retaining young researchers and innovators.

Promoting and spreading excellence

Excellence is everywhere. COST's open and bottom-up nature has contributed decisively to creating an attractive ecosystem for all types of researchers and innovators. All participants in COST Actions are real beneficiaries, regardless of their career stage, country of origin or areas of interest. What is also evident is the capacity of COST to operate in an inclusive manner, taking advantage of Europe's diverse, multicultural and highly skilled population. In so doing, COST is connecting Europe's 'pockets of excellence', providing structural support to ERA, widening the R&I base in Europe, and promoting cooperation in science and technology with other countries beyond its current membership. Thus, COST is also instrumental in bridging the R&I divide and participation gaps in Europe.

At the core of COST is R&I excellence. However, at the same time, COST is building a strong critical mass which constitutes an essential precondition for the generation

of breakthrough science. To this end, COST has developed simple and low-barrier processes for universal access to networks of excellence, providing new participants with a highly rewarding start-up package in the R&I world. This concept of mutual benefit is an integral part of every COST Action and highly valued by participants (Quote 1). It is obvious how small communities in geographically dispersed regions benefit from cooperating with experienced and renowned researchers and innovators from leading academic institutions or SMEs. However, it is important to highlight the dynamic equilibrium that is established in any COST Action. Connecting the top performers to others in the same or complementary areas of science and technology maximises the production of new knowledge and, more importantly, breakthrough discoveries.

Under the current FP (Horizon 2020), COST is 50 % funded by the Spreading Excellence and Widening Participation (SEWP) programme and has committed to spend 50 % of the budget to benefit researchers from widening countries eligible under SEWP (equivalent to COST ITCs). For the future programming period (i.e. under FP9), COST is expected to be fully integrated into the SEWP successor programme alongside other instruments such as Teaming and Twinning. Consequently, 80 % of its budget will be devoted to widening actions and 50 % of its budget will be invested in widening countries (ITC).

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“ Innovative ideas will only come if we have a diverse culture. And if we join forces, we will be making bigger progress and deliver something to society. ”

Dr Andreja Kutnar, Associate Professor, Department of Technology, University of Primorska, Slovenia

Quote 1: Example of a personal success story benefiting from participation in a COST Action.

ITCs are dominant actors in various scientific and technological areas, and COST networking activities allow for a healthy knowledge exchange and the consolidation of Europe's top performers in unanticipated R&I domains. Highly skilled human resources are spread across Europe, and top performers can achieve their goals faster by linking them with high-end infrastructures. COST networking

activities encourage brain circulation, and in many cases researchers and innovators return to their institutions of origin, empowered with new ideas and linked into a network that will last beyond the COST Action life cycle. As a result, the mutual benefit driven by COST Actions contributes positively to closing the R&I divide in Europe, and allows for the full realisation of Europe's potential in R&I (Figure 3).

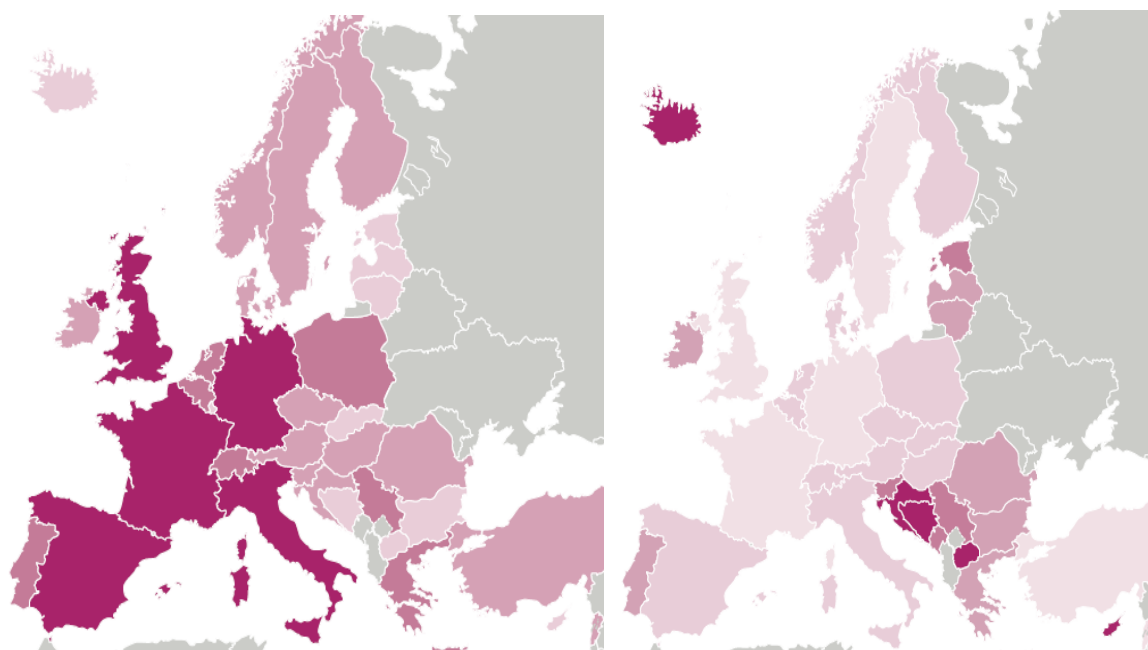
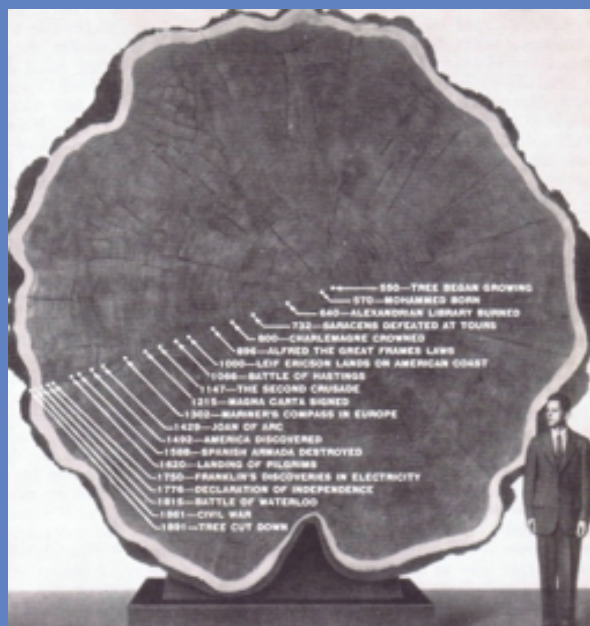


Figure 3: Participation levels of the 36 COST Members and Cooperating Member, based on COST key figures for 2016 presented in Figure A1. On the left, the absolute number of researchers participating in COST Actions is shown. Higher absolute participation levels are marked in darker shades of red. The right-hand map shows the number of participants in COST networking activities compared to the size of the research community (measured in researchers in full-time equivalents, ESTAT). Here, higher relative participation levels are marked in darker shades of red.

Dendrolab, Serbia

The situation for scientists in Serbia is improving, thanks to cooperation and collaboration with their counterparts across Europe. "Since Serbia is still not part of the EU, we have fewer scientific and travel opportunities compared to colleagues from EU countries," says Dr Orlović, Professor at the Faculty of Agriculture and Head of the Institute of Lowland Forestry and Environment at the University of Novi Sad. "Valuable international contacts are the key benefit from our participation in COST Actions", he adds, "especially contacts with scientific institutions in the forestry sector which we would never have been able to get any other way." The Institute has taken part in different COST Actions over the last decade, with the most prized fruit of their endeavours being Serbia's first Dendrolab. This is a laboratory for tree-ring research based around a system called ATRICS that scans tree cores in very high resolution. It was inspired by Dr Stojanović, Researcher at the Institute of Lowland Forestry and Environment at the University of Novi Sad, during his first short-term scientific mission to the Slovenian Forestry Institute in Ljubljana in 2013 as part of the COST Action 'Climate Change and Forest Mitigation and Adaptation in a Polluted Environment'.



Box 1: Success story on how COST closes the innovation divide in Europe.

Participation in COST activities is an entry point to the often more-closed European collaborative research networks, as illustrated in Box 1, saving costs and time to connect with the right partners. Pockets of excellence can be found everywhere in Europe, and COST has the tools and instruments at its disposal to unlock the untapped potential, creating a win-win situation for Europe as a whole.

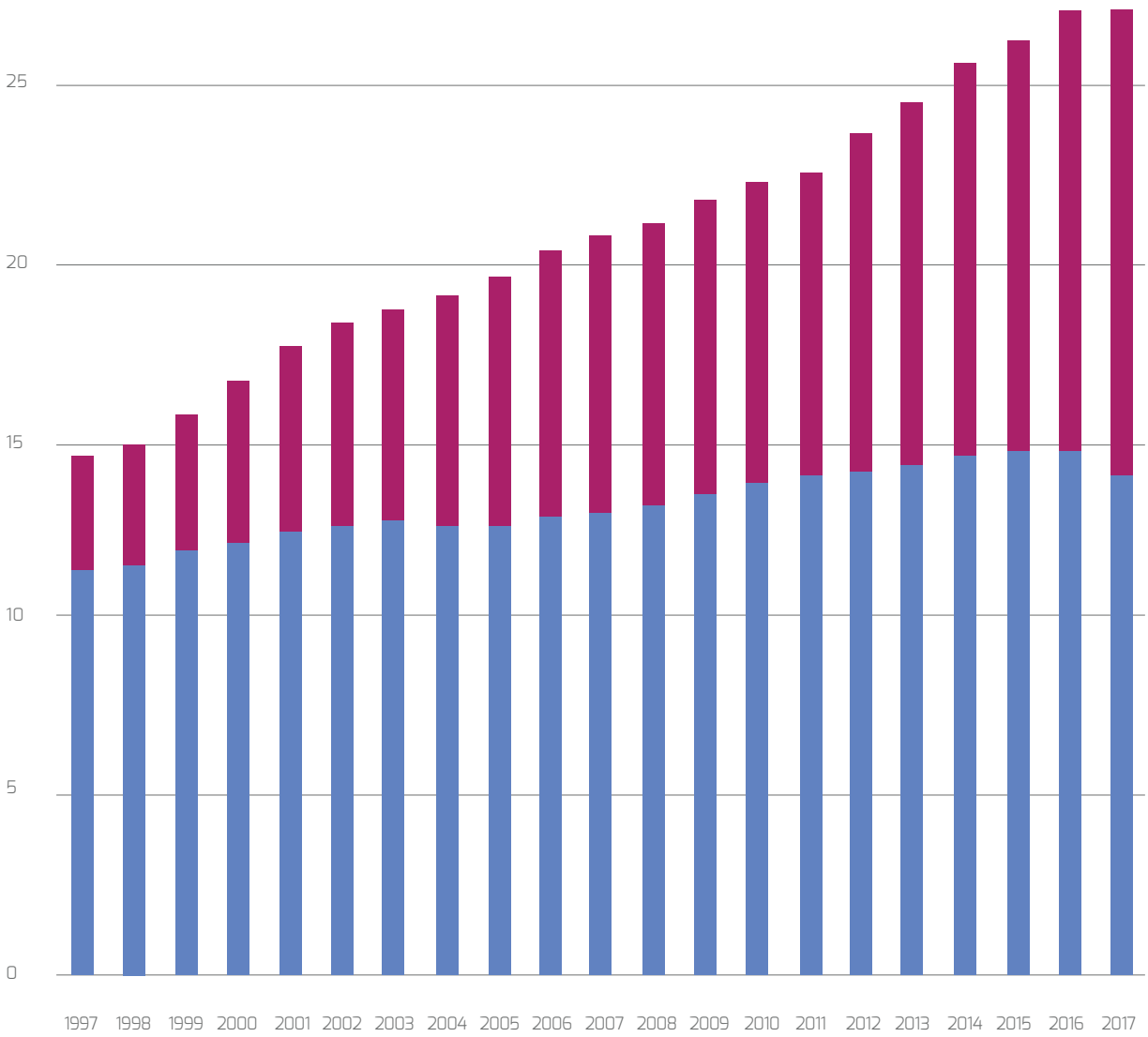
As a contribution to the inclusiveness objectives of the FPs for R&I, COST has been strongly committed to increasing the level of participation by the peripheral regions. This is clearly highlighted in Figure 3 (see above, right). Participation in COST Actions by researchers coming from ITCs is remarkable, reaching on average 10 % of their research communities¹ compared to 2.4 % among the other COST Members. It should be noted that the research communities from the 20 ITCs represent an estimated 20 % of the total number of researchers in the 36 COST Members and Cooperating State. The success of COST is illustrated by the example

of Malta and Cyprus. Both ITCs have record participation levels compared to the size of their communities, with an estimated one in three researchers and innovators benefiting from COST in 2016, although the absolute size of their communities translates into a participation level of less than 50 % of running COST Actions. However, the figures provide a different perspective when the absolute number of researchers participating in COST Actions is shown (see Figure 3 above, left-hand map).

The dimension of the ITC communities is obviously a factor limiting growth in their participation. Nevertheless, COST's continuous efforts to connect researchers and innovators from ITCs are well reflected in Figure 4. At the end of FP7 (in 2013), the average number of countries in a COST Action was approximately 24.5, with 60 % non-ITCs and 40 % ITCs. In 2017, each COST Action had on average around 27.5 countries per Action, with 52 % non-ITCs and 48 % ITCs.

1. EUROSTAT reference to number of researchers in full-time equivalents

Average participation in COST Actions, ITCs and other countries



Other countries Inclusiveness Target Countries

Figure 4: Average number of countries participating in a COST Action from 1997 to 2017. For each year, the number of ITCs (in purple) and the number of non-ITCs (in blue) is highlighted.

Global partnerships

COST contributes directly to the internationalisation process of the R&I communities. COST networks are open to all participants, not only COST Member countries but also the NNCs and International Partner Countries (IPCs) (Figure 5). At its full potential, COST aggregates worldwide contributions and a global exchange of research skills among all its participants, lowering the pressure for the common use of resources and increased mobility of human resources. In July 2017, 275 institutions coming from IPCs participate in

115 running COST Actions (33% of the COST Actions), while 243 institutions from NNCs participate in 112 running COST Actions (32% of the COST Actions). Institutions coming from NNCs receive a top-up on the Action budget to cover the expenses of the involved participants.

With regional and international cooperation high on the agenda, it is foreseen that these numbers will increase, through centralised dissemination of COST in targeted areas of the globe.

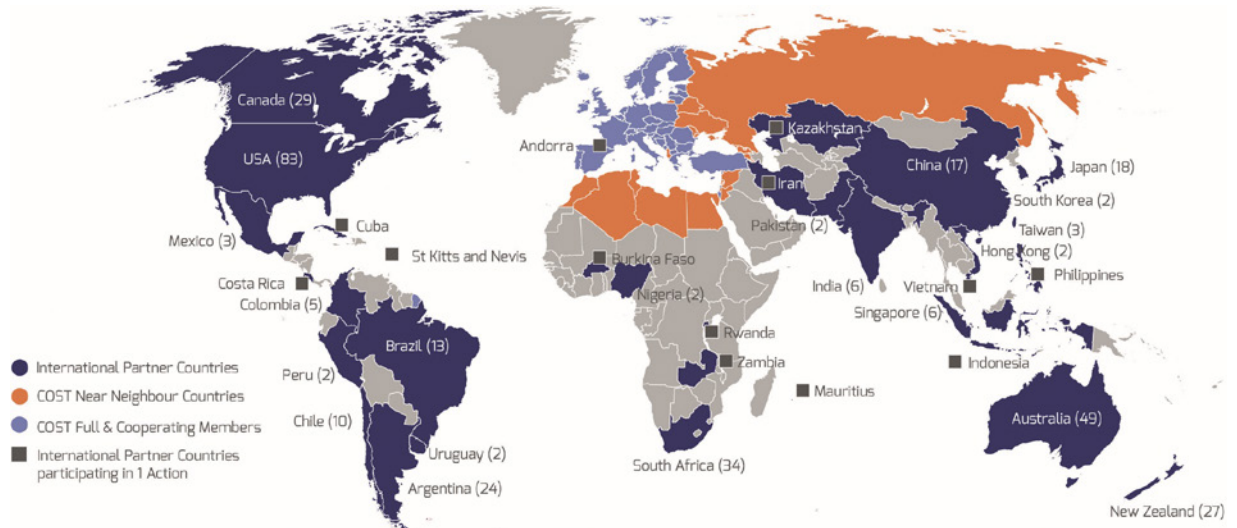


Figure 5: Number of individual participations from IPCs in the activities of running COST Actions (data from the end of 2016): 275 IPC institutions participated in running COST Actions in 2016. Further detailed information concerning the participation of NNCs is given in Figure A2.

Fostering interdisciplinary research for breakthrough science

Cooperation across disciplines and different areas of science and technology are an essential precondition for achieving real breakthroughs in R&I [6, 10, 11]. The interactions and encounters by researchers and innovators from different disciplines leads to the cross-fertilisation of ideas and knowledge that both enrich and foster academic debate. Interdisciplinary research often results in discoveries, innovations and breakthroughs that are crucial in the ambition to boost jobs, economic growth, investments, and improve the quality of life of Europe's citizens and the environment.

COST activities are clear examples of putting the concept of interdisciplinary research into action (Figure 6). Within COST Actions, open networks of excellence are created in all scientific fields and knowledge is freely shared among

all types of specialists. The open and bottom-up nature of COST networking activities gives researchers and innovators freedom of thought and attracts contributions from various science disciplines, providing options for solutions to societal challenges (Box 2). COST Actions are characterised by their pluralism and heterogeneous nature, both in research and innovation fields, participants, and in their activities, as is shown in Figure 6 for 35 newly approved COST Actions following the open call 2016-2. Currently, more than half of the COST Actions are of an interdisciplinary nature, a number that has increased since the launch in 2014 of the bottom-up and open process of receiving and selecting proposals.

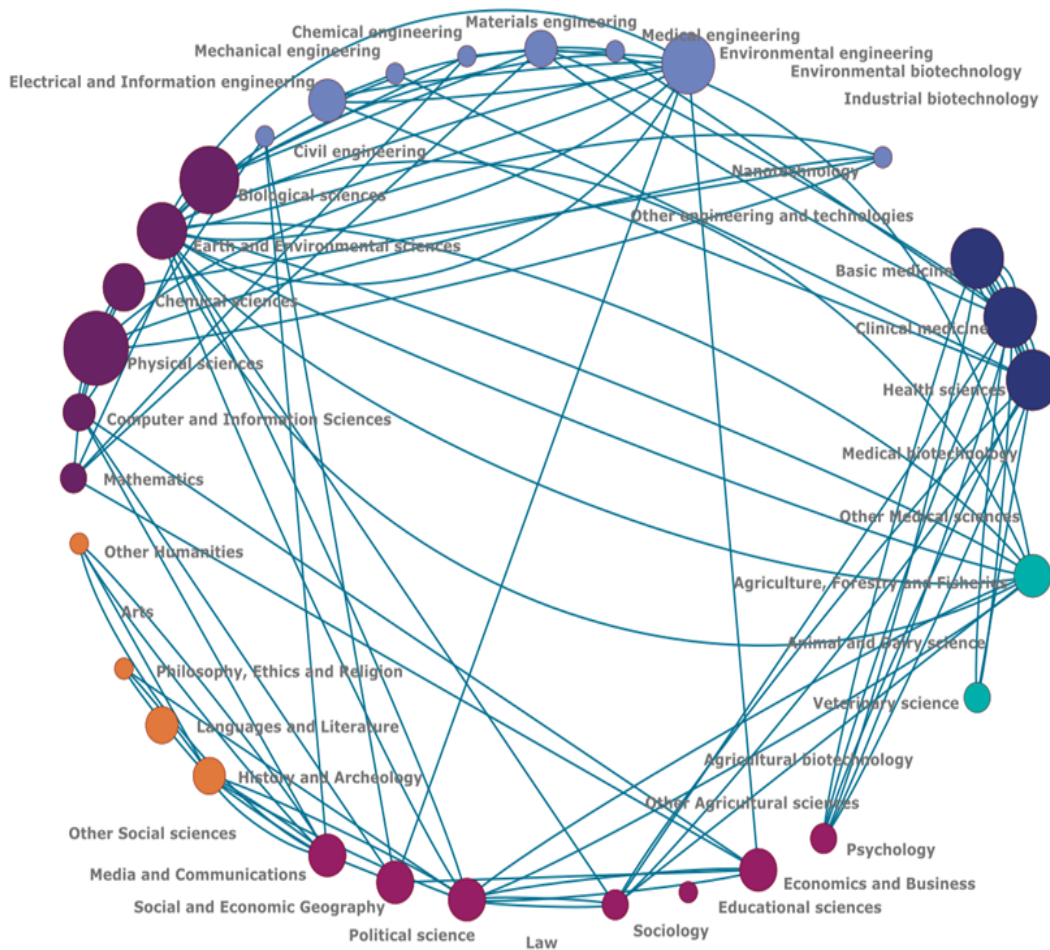


Figure 6: Illustration of the interdisciplinary nature of 35 newly approved COST Actions following the open call 2016-2, where each colour represents a different research field. Figure A3 gives an example of the interdisciplinary nature of an individual COST Action.

MODENA

Nanoparticles are crucial components of our everyday lives. They can be found in medicine, electronics, food, fashion and energy. It is clear that engineered nanoparticles bring significant technological developments and improve the well-being of society. But there are also real concerns that exposure to some of these particles could cause environmental problems and harm human health. The MODENA COST Action has brought key insights into the toxicity of engineered nanoparticles by bringing together scientists from different disciplines – such as toxicology, material science and mathematics. By gathering

interdisciplinary experts, MODENA has raised awareness of the importance of an invaluable tool in nanosafety research: namely, mathematical modelling. This is significant given that the nanosafety community typically includes biologists, and material scientists, rather than mathematicians. These models have now become standard regulatory tools in industries across Europe, which has resulted in new ways of looking at some of the most challenging diseases in the 21st century. For instance, by analysing the toxic nanoparticles associated with serious lung diseases, scientists now have a better understanding of the metrics of toxicity.

Box 2: Success story on how interdisciplinary research is crucial to boost breakthrough science.

Moreover, the added-value of COST Actions is not limited to the networking of scientists from different domains, but also includes networking stakeholders from other sectors. The participation of actors representing the whole production and dissemination of knowledge value chain

is crucial if R&I are aiming for a tangible impact on society at large. Therefore, COST encourages participation from non-academic actors, such as SMEs (as shown in Quote 2), international organisations, public authorities and civil society organisations.



“ Industry needs to cooperate with academia just like in COST networks. Over there, knowledge transfer and getting results to industry happens in real time. ”

Mark de Boevere, Managing Director, Pulsemaster (SME), The Netherlands

Quote 2: Testimony on the importance of cross-sectoral cooperation in research and innovation.

As shown by Figure 7, participation in COST Actions has led to significant follow-up in terms of the number of submitted proposals for collaborative research in Horizon 2020. Even more striking is the success rate of an average of 28 % of these submitted proposals, outnumbering by far the

average Horizon 2020 success rates, which typically are of the order of 10-15 %. This indicates that COST Actions act as a successful pre-portal to follow-up European funding for R&I, contributing to the advancement of breakthrough science.

Horizon 2020 applications reported by finished COST Actions

Total Actions with finished Final Action Report	Submitted H2020 proposals reported	Approved H2020 projects reported	Success rate
62	230	65	28 %

Figure 7: COST acting as a pre-portal for FP funding.

COST also plays an important role in providing input to the priorities of the European Union's FPs for R&I. Through its open, interdisciplinary and bottom-up nature, COST is an effective platform for researchers and innovators to think beyond the current R&I agendas and to identify emerging research topics that sometimes are yet to be addressed in current European funding schemes.

COST also has an impact on national funding schemes. The Czech Republic and Switzerland provide additional, national support for COST Action participants, with a focus on PhD students. These support schemes, for example, provide a budget for personnel costs of the staff assigned to the project, the cost of new equipment, and the cost of subcontracting. This additional funding is intended to

further support researchers and innovators to establish broad international networks, often at an early stage in their career.

COST offers significant value for money and creates a substantial pooling effect of national research budgets. The EU's contribution to COST is EUR 300 million under Horizon 2020, corresponding to 0.38 % of the total FP budget. Since the beginning of Horizon 2020, COST has been able to pool EUR 2.8 billion of national research budgets. Each COST Action has an average yearly budget of about EUR 129 000, which means that with this budget each COST Action can pool more than EUR 2 million of national research budgets each year.

Empowering and retaining young researchers and innovators

Europe is currently building the next generation of researchers and innovators with great potential to contribute to Europe's prosperity. It is crucial to take advantage of the pool of talent that exists among the younger generation by offering career perspectives that will enable them to develop and exploit their full potential (Quote 3). Networks and personal contact with more experienced researchers and innovators will empower young talents and open their career perspectives.

COST is offering networking tools with exactly the same ambition. Participation in COST networking activities allows young researchers and innovators to prepare and empower

themselves with more self-confidence and motivation to stay in Europe for their next career steps in research and beyond. COST also promotes brain circulation within Europe through its short-term scientific missions (STSMs), limiting brain drain from peripheral regions to research-intense regions in Europe. COST's focus on young researchers and innovators also takes into consideration gender balance to ensure equal opportunities and gender-friendly career advancement. Young researchers and innovators are already well represented within the COST Actions, as shown in Figure 8. In both ITCs and non-ITCs, the 26 to 30 year-old group is best represented, and also includes the largest share of female researchers.

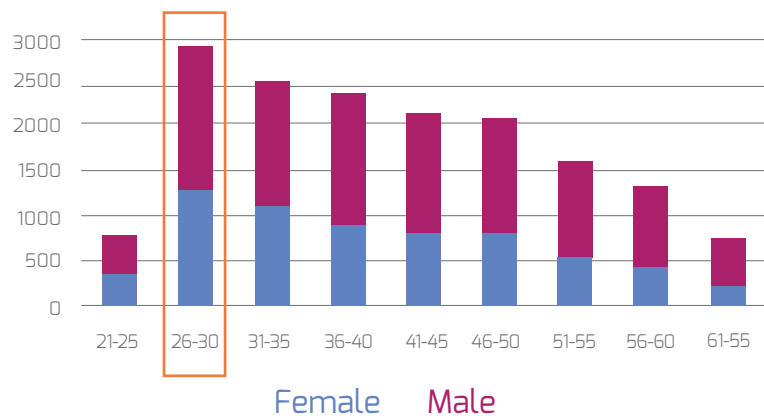
“ I always say that I have learnt more in these 3 years in COST than I would have in 10 years of my career. ”

Dr Lara Pajewski, Researcher, Engineering Department, “Roma Tre” University, Italy

Quote 3: COST has the ambition to boost the careers of young researchers and innovators.



Other Countries



Inclusiveness Target Countries

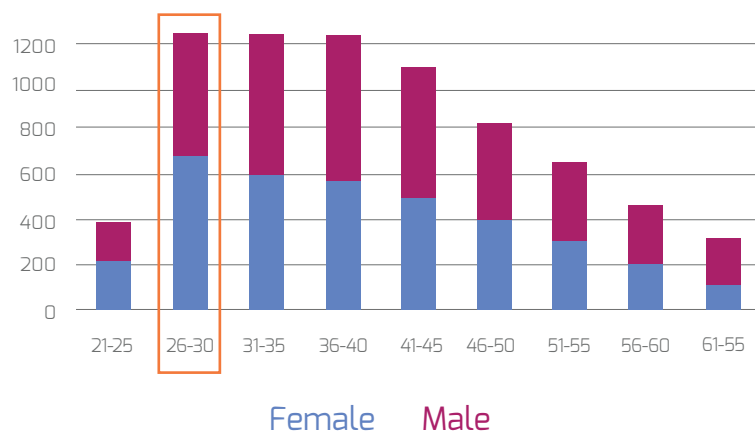


Figure 8: Participation in COST Actions by age group and gender in 2016. Figure A4 shows the steady increase in participation of female management committee members.

It is important for young researchers and innovators to broaden their scope and knowledge beyond their own scientific discipline, and to acquire transferrable and transversal skills. COST Actions gather researchers and innovators from all career levels, from PhD students

to Nobel Prize winners. By networking them, COST also connects complementary funding schemes ranging from Erasmus+ all the way to ERC grants, enabling promising young talents to enter these schemes (Figure 9).

Researchers' career development and complementary funding schemes

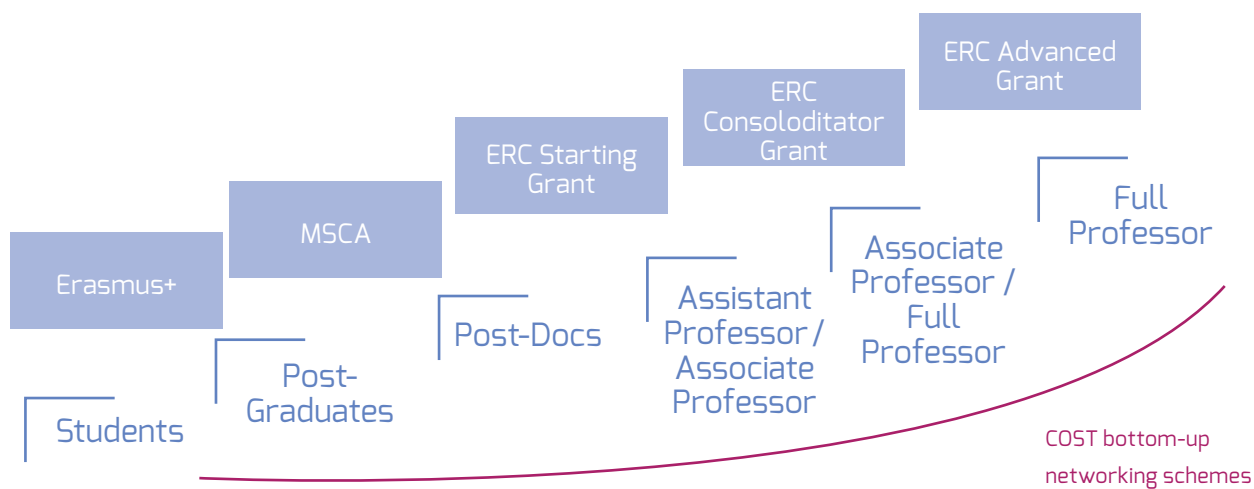


Figure 9: COST connects researchers, from PhD students in Erasmus+ and Marie Skłodowska-Curie activities to ERC advanced grants.

Measuring output, tangible results and scientific impact

Targets and KPIs are defined for each Strategic Priority with a higher ambition level compared to the current situation (Figure 10). COST has several instruments in hand to monitor and measure the impact of its activities:

- Monitoring and Final Assessment tool (MFA): The MFA compares the achievement of the Actions against their objectives and potential impact. The tool gathers information both during and after the lifetime of an Action, including the proposals and collaborations it initiates and the impacts and success stories it achieves. This enables COST to collect the necessary quantitative and qualitative data to monitor progress in terms of KPIs.
- e-COST database: The database, which is available in e-COST and in which every reimbursed participant of the COST Actions is registered, provides important information and data that is crucial for monitoring and measuring several KPIs listed in the table below.
- Surveys (during and after the completion of COST Actions): Impact assessments will be conducted which aim to identify the medium- and long-term impact of participating in COST Actions on researchers' careers and networks. Post-Action surveys will target groups of past beneficiaries of the Actions.

To achieve the desired impact, communications have an important role to play, both within the scientific community and for a wider audience. To implement these communication objectives, COST developed a Communication and Brand Strategy [12, 13] with the aim of informing and reaching out to society, addressing multiple audiences beyond COST Action participants.

Strategic Priority	KPI	Current situation	Target for FP9	Monitoring and measurement
Promoting and spreading excellence	Average percentage of COST Actions in which each ITC participates	60 %	80 % ²	e-COST
	% of research and innovation community in individual ITCs mobilised, if country participates in less than 80 % of Actions (see KPI above)		≥5 %	e-COST
	% of ITCs at proposal level	35 %	≥50 %	e-COST
	% of Action chairs from ITCs	8 %	≥12 %	e-COST
	Number of leadership positions filled by ITC participants per Action	≥1	≥2	e-COST
	% of budget devoted to widening actions	t.b.d. ³	80 %	e-COST
	% of budget invested in ITCs	41 % ⁴	50 %	e-COST
Foster interdisciplinary research for breakthrough science	Percentage of Actions with 2 or more science disciplines represented	45 %	55 %	e-COST
	Average share of non-academic participants per Action	4 %	5 %	e-COST
	Average number of peer-reviewed publications per Action	20	20	MFA
	Number of proposals submitted to FP9 resulting from COST Actions	≥2	≥2	MFA + surveys
	Number of projects granted in FP9 resulting from COST Actions	≥1	≥1	MFA + surveys
Empowering and retaining young researchers	Number of success stories on scientific results and impact	Anecdotal evidence	Anecdotal evidence	MFA + surveys
	Share of young researchers and innovators participating in COST Actions	40 %	50 %	e-COST
	Share of young researchers and innovators in Action leadership positions	10-15 %	15-20 %	e-COST
	Share of young researches and innovators stating that COST has boosted their career	Anecdotal evidence	85 % and anecdotal evidence	Survey

Figure 10: COSTs Strategic Priorities and KPIs.

2. Some ITCs may not be able to participate in at least 80 % of the COST Actions due to the size of their researcher and innovator community. If an ITC does not meet this target, then it must at least mobilise 5 % of its community to participate in COST Actions (see next KPI in the table).

3. Calculation method for FP9 to be defined, subject to further analysis and agreement with the European Commission.

4. Accounted benefit for ITC participants.

Implementing COST's Strategic Priorities

To implement its Strategic Priorities and create maximum impact, COST will strengthen its core business and implement a number of add-on instruments.

Strengthen the core business by expanding the number and reach of COST Actions

COST will continue being the most efficient and user-friendly networking tool for researchers and innovators and will remain the leading tool for science exchange in the ERA. It will strengthen its core business by increasing the number of COST Actions, thereby enhancing the overall capacity and impact of implementing its Strategic Priorities.

To respond to new needs and challenges ahead, COST will deploy virtual and digital networking tools to support its Actions, making it a front runner in transforming the way scientists and innovators meet and collaborate. In addition, COST participants will be systematically linked to online and social networks for researchers, creating opportunities for COST Actions to disseminate their activities and work on an even larger scale. Investments will also be made to further enhance the database of COST Action participants. Furthermore, processes will be put in place to identify the

outcomes of an Action and transfer this knowledge to the wider research community. These specific aspects will serve to both modernise the networking systems and lower the entrance barriers for isolated pockets of excellence.

In the follow-up of a COST Action, the COST Association will accompany the Actions to help them identify and explore ways to continue their networks and/or valorise the results coming from the Action. To ensure the continuation of their networks, COST Actions will be informed about the possibility of setting up a legal structure (e.g. association) which can also facilitate requests for additional funding.

Add maximum value to COST Actions

COST will add value to its core businesses by offering new services that strengthen its position and that of its Actions in the ERA (Figure 11). These services will be available for participants in all COST Actions. COST will establish partnerships with other research and innovation stakeholders creating a unique network and offering a wide range of opportunities for researchers and innovators across Europe, making COST an indispensable partner in the European R&I community.



Figure 11: By providing a coherent set of networking instruments and offering added-value services to COST Actions, COST is an indispensable partner in connecting the different funding instruments in the ERA.

COST Connect

Rationale: To increase its visibility and impact and to act as a pre-portal to ERA, COST is creating synergies between research and innovation stakeholders working on a common topic high on the EU policy agenda. Through COST Connect, it will provide funding and networking opportunities to COST Action participants and link them with the relevant ERA stakeholders so that they can discuss possibilities for future research cooperation.

Implementation: The COST Connect workshops provide an interactive networking forum for COST Actions and ERA stakeholders (e.g. JPIs, JTIs, EIT, KICs) in a specific research or innovation domain. These workshops are organised on different topics in which the COST Actions are active, and provide networking and funding opportunities, and link researchers and innovators with policymakers, thereby connecting different stakeholders and funding instruments in the ERA. These events enable connections among different COST Actions (meta-networks) and create links with other initiatives related to each given topic.

Target: Throughout its lifetime, each COST Action should benefit from at least 1 COST Connect event.

COST Academy

Rationale: The COST Academy was set up to address the needs of COST participants, in particular ITC participants and young researchers and innovators, with respect to the management of a COST Action.

Implementation: The COST Academy – which will be organised following every open call – enhances the leadership, financial/administrative and communication skills of ITC and young researchers and innovators. It offers a series of specific workshops and mentoring as well as various modules of online training courses, and will build on the work of the Targeted Network BESTPRAC⁵. In 2017, the COST Academy pilot started and will be scaled up – its added value compared to other initiatives, such as the NCP Academy, will be taken into account.

Target: By the end of FP9, at least 2000 researchers and innovators will have participated in COST Academy activities.

COST science-Informed policy advice

Rationale: The need for science-informed policy advice at both national and international levels is increasingly being achieved. The substantial increase in the science base, and the pace of innovation create both an opportunity and a challenge for societies and governments. COST Actions provide a pool of excellence that can be utilised for science-informed policy advice on relevant EU policy topics.

Implementation: COST is in an ideal position to mobilise expertise from its COST Actions, feeding into science-informed policy advice in the Scientific Advice Mechanism (SAM) for policymakers. COST will cooperate closely with the Science Advice for Policy by European Academies (SAPEA) consortium, which is part of the SAM, as well as the Joint Research Centre (JRC). To this end, COST will fund a series of dissemination/publication activities and actively engage with policymakers and decision-makers.

Target: 20 % of COST Actions feeding into policy advice each year.

COST global networking

Rationale: The scientific expertise required to reach full potential within a COST Action might not always be present in Europe. By the same token, participation in COST Actions might be beneficial to NNCs. Therefore, COST has a proactive *Open to the World* policy enabling researchers and innovators from all over the world to join COST activities. Furthermore, greater involvement by the NNCs will empower ITC participation in COST through several regional collaborative activities in the Mediterranean, including both ITCs and NNCs.

Implementation: The top-up budget for NNC participants in COST Actions will be reinforced. Dedicated Info Days will be organised in NNCs, in particular in less-research-intensive countries associated to Horizon 2020 but not COST members. With a view to further widening the scope of COST beyond Europe, a selected number of IPCs with a track record of collaborating in COST Actions will be approached to discuss the possibility of them engaging further with COST through a new partner status.

Target: By the end of FP9, the participation of researchers and innovators from NNCs will have been doubled. To this end, at least one Info Day per year will be organised in the selected NNCs and IPCs, and a minimum of five COST partner members will be part of the COST framework by the end of FP9.

5. "The Voice of Research Administrators – Building a Network of Administrative Excellence".

COST Innovators Grant

Rationale: To enhance the pace and success of breakthrough innovations and to build bridges between the scientific research performed in COST Actions and marketable applications, a COST Innovators Grant will be developed to explore innovation potential.

Implementation: For COST Actions which demonstrate commercial/innovation potential, an additional budget will be allocated to enhance the potential take-up. For budgetary reasons, this activity will be launched under FP9. The funding will cover the activities required to turn the research network outputs into either a commercial or technical proposition. To fully benefit from this Innovators Grant and successfully implement it, COST Actions will be able to apply for a one-year extension of their activities. COST will maintain an interface with relevant initiatives, such as the EIT, as well as the newly created European Innovation Council (EIC) initiative which is subject to further development.

Target: At least 20 % of the completed Actions to be eligible for funding from the COST Innovators Grant, under FP9.

Cross-cutting Activities

Rationale: As a means of building the European Research Area and promoting the values of science in Europe, several policy priorities have been established across Europe and shared by countries. COST is also doing its part through its inclusiveness policy (geographical spread, young researchers and gender balance). However, the need remains to better connect policymakers and R&I actors to share best practices. COST's networking experience will be particularly useful to address this need, and can be complementary to the Policy Support Facility tools funded by the EC.

Implementation: COST's Cross-cutting Activities (CCA) will be implemented with the aim of utilising its networking instruments to target specific policy priorities in order to strengthen its role in a given policy domain related to COST policies, ERA priorities or other EUR&I policies. They will focus on horizontal topics, such as impact, science communication, gender equality in R&I, and research integrity. The topics will be decided top-down, and the primary beneficiaries of the outcomes will be the COST Action participants and the R&I policy community in Europe as a whole. The CCA will be built on the successes of previous Targeted Networks but will also take into account the caveats, for instance in terms of duration and funded activities, as CCA cannot be considered as 'traditional' COST Actions.

Target: One CCA to be funded each year, running for a maximum of two years.

COST's instrumental role in contributing to the EU Spreading Excellence and Widening Participation (SEWP) activities

Due to its proven track record of networking researchers across Europe and its success in reaching out to researchers and innovators in the less research- and innovation-intensive countries, COST has a role to play in supporting the SEWP programme in Horizon 2020 and its successor under FP9.

For example, the 'ERA Chairs' projects bring outstanding academics, with proven research excellence and management skills, to universities and research institutions in the 'Widening' countries with potential for research excellence. The aim is to attract and maintain high-quality human resources under the direction of an outstanding researcher (the 'ERA Chair holder'). COST can also play an important role in identifying and proposing to the EC future ERA Chair holders and participants from its own networks and databases.

Another example is the current *Twinning* instrument in the SEWP, which is a networking instrument between one institution from a 'Widening' country (the coordinator) and at least two leading institutions from two different countries as partners. The activities funded are somewhat similar to those funded in COST Actions. COST can act as a broker in identifying and proposing to the EC future Twinning partners from its own networks and databases.

Finally, the current *Teaming* instrument in the SEWP is a collaborative instrument between one institution in a 'Widening' country (the coordinator) and a partner institution with an international reputation in research and innovation excellence. It supports the establishment of new, or updates existing, centres of excellence in 'Widening' countries. COST can act as a broker in Phase 1 of *Teaming* calls, which launches the partnerships, by identifying and proposing to the EC Teaming partners from its own networks and databases.

COST's dedicated policies to ITCs will also enhance the capacity of researchers and innovators in ITCs, by submitting more Teaming and Twinning proposals.

Financial framework and requirements

In line with the 'LAB-FAB-APP' report and the European Parliament's recommendations for the next FP for R&I [14], COST will need at least EUR 600 million in FP9 to cover its activities to successfully implement its three strategic priorities. With an increased budget, COST will be able to offer enhanced networking opportunities to even more researchers and innovators across Europe and make a tangible contribution to closing the research and innovation divide and participation gaps in Europe.

Currently, 75 % of the proposals rated as excellent do not receive funding due to a lack of budget, leaving the current overall success rate at around 5 %. Increasing the budget to at least EUR 600 million (EUR 85.7 million per year) will enable a 15 % success rate overall and give COST room to further strengthen its core business, by expanding the number and reach of COST Actions, and offer more added value to its participants, as mentioned above.

The COST budget for FP9 has been prepared taking into consideration an enhanced success rate of 15 %, based on the notion that the average number of proposals is in the order of 500 per call. Personnel costs have been adapted according to the number of Actions running. The budget also takes into consideration the continuation of the COST Academy and stakeholder engagement.

The outcome of this scenario is as follows:

- Total required budget of at least EUR 600 million for the entire duration of FP9 (EUR 85.7 million per year);
- Up to 75 new COST Actions per call (every 6 to 8 months), reaching a maximum of 625 running Actions per year;
- Average Action budget of EUR 150 000 for 27 Participating Countries, including NNC top-up budget;
- Average budget of EUR 50 000 per COST Innovators Grant allocated to 20 % of the Actions ending per year under FP9.

As mentioned in Section 2, for the future programming period (i.e. under FP9) COST is expected to be fully integrated into the successor programme of SEWP alongside other instruments such as Teaming and Twinning. Consequently, 80 % of its budget will be devoted to widening actions and 50 % of its budget will be invested in widening countries (ITC).

The COST budget for FP9 has been prepared by taking into account that similar conditions will apply as those under Horizon 2020. For the entire H2020 period, COST has concluded a Framework Partnership Agreement with the EC, complemented by annual Specific Grant Agreements (SGA). The SGA provides that 15 % of the budget is retained and will be released subject to approval of the periodic report submitted after the end of the SGA period. COST has taken a European Investment Bank (EIB) loan to bridge this cash-flow gap.

Under the current rules, the SGA can be extended by an additional year or even several years. This allows more flexibility and cost efficiency in budget implementation. However, each year 15 % of the budget will be retained, while the total accumulated sum of cash retained will only be released after the end of the entire SGA period. This annual budget accumulation, and consequently cash retention, requires COST to take a larger loan with the EIB. A multi-annual grant agreement would facilitate the financial management of the COST Association.

To summarise, COST needs to double its current budget to implement its ambitious strategic priorities for the benefit of researchers and innovator across the whole of Europe and beyond. COST should be considered a programme, rather than a project, and thus be offered a multi-annual funding perspective.

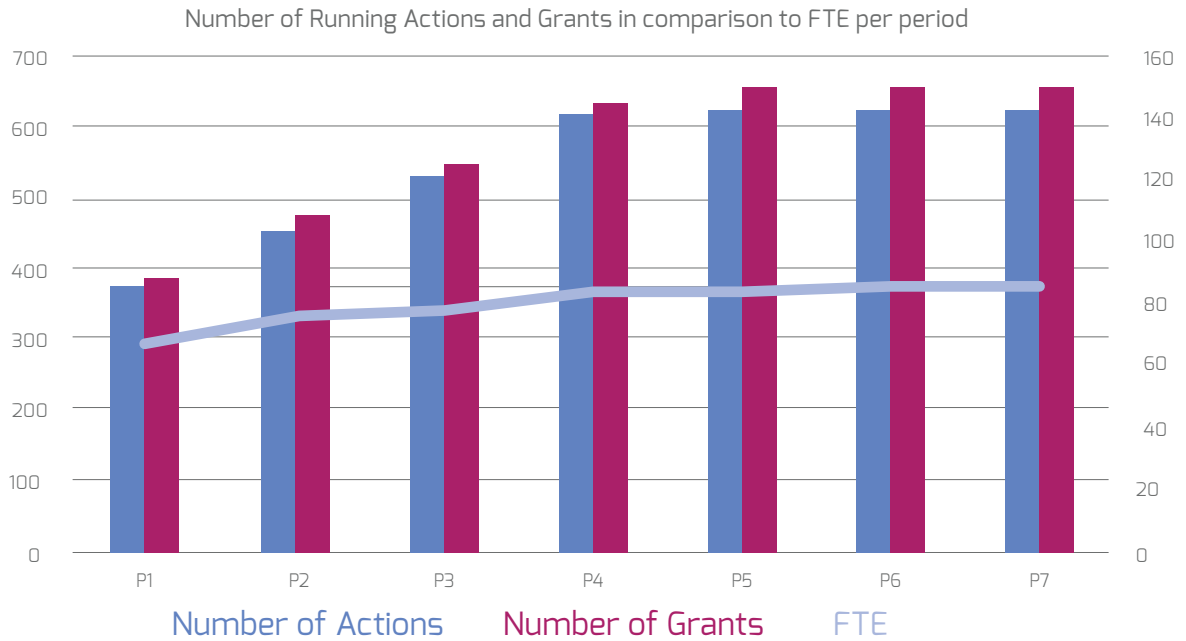


Figure 12: Number of Running Actions and Grants in comparison to FTE per period.

A 100 % increase in the budget would imply an increase of 31 % in staff (which is necessary since the number of Administrative Officers and Science Officers is dependent on the number of running Actions and the number of Grants

to be implemented). This estimation takes into account efficiency gains that could be implemented in the course of FP9.

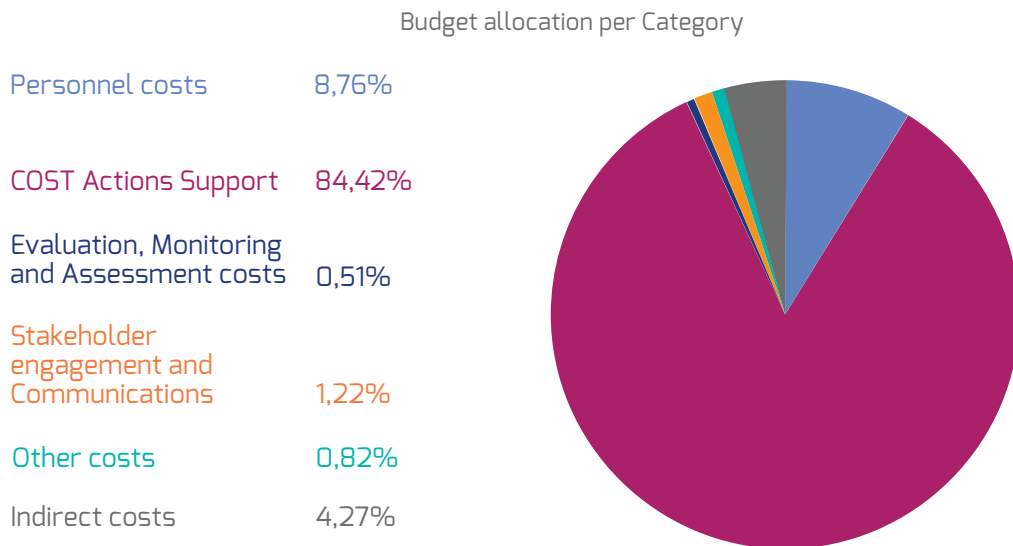


Figure 13: Budget allocation per spending category.

Along with an enhanced budget, COST also needs a funding scheme that is better suited to its organisation. The current system with annual extensions of Annual Grant Agreements leads to repeated periodic cash-flow shortages which

COST must finance via an EIB loan and contributions from its members. This model is not sustainable, and a solution needs to be found for the next FP for R&I.

Conclusions and outlook

COST is committed to reinforcing its role as a leading networking instrument in the ERA. In line with the COST Vision and Strategic Goals, it has defined the following three priorities for its positioning in the remaining part of Horizon 2020 and in FP9, the next Framework Programme for Research and Innovation: 1) Promoting and spreading excellence; 2) Fostering interdisciplinary research for breakthrough science; and 3) Empowering and retaining young researchers and innovators. The COST Strategic Plan defines specific targets and KPIs for each Strategic Priority. Several instruments are available to monitor and measure the outputs, tangible results and scientific impact of COST Actions.

To implement the Strategic Priorities, COST will strengthen its core business by expanding the number and reach of its Actions. New services, including COST Connect and the COST Academy, are being provided to strengthen the position of COST and its Actions in the ERA. It also has an ambition, through its community involved in COST Actions, to contribute expertise to science-informed policy advice and the *Open to the World* policy.

A COST Innovators Grant scheme for exploring innovation potential will be developed further to bridge scientific research performed in COST Actions and marketable applications. Cross-cutting Activities will be deployed to utilise COST's networking instruments for targeting specific policy priorities. COST also recognises a number

of opportunities for further contributing to the Spreading Excellence and Widening Participation package in Horizon 2020 and its successor in FP9. Interfaces with partners in the ERA (including, for example EIT, ERC, EIC, SAM/SAPEA and JRC) will be established and maintained to create synergies and avoid duplication of effort.

There is a significant need for an increase in budget to successfully implement COST's three Strategic Priorities. A financial framework and budget of at least EUR 600 million (EUR 85.7 million per year) will enable the initiation of up to 75 new COST Actions per call, reaching 625 Actions per year with a success rate of 15 % for submitted proposals – at present, 75 % of the proposals rated as excellent cannot be funded due to lack of budget. With this increase in budget, and in line with the Lamy Report LAB-FAB-APP, COST will be able to offer enhanced networking opportunities to even more researchers and innovators, making a tangible contribution to bridging the innovation divide and participation gaps in Europe and beyond.

The COST Strategic Plan will be implemented through Annual Activity Plans, including work packages with specific goals and KPIs, activities, deliverables, required human and financial resources, as well as the stakeholders and beneficiaries concerned. With more budget available under FP9, COST will scale up its activities to reach its full potential as a leading networking instrument in the ERA.

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Annexes

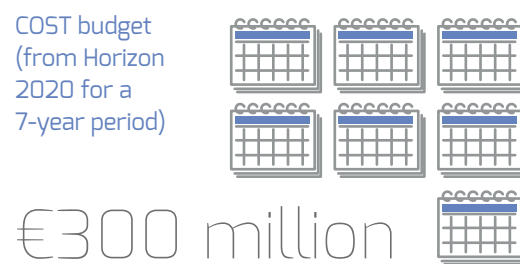
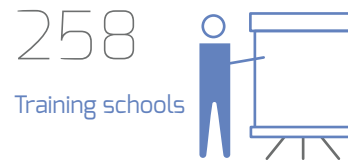
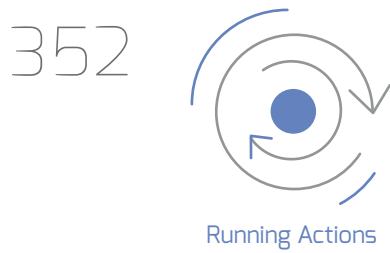


Figure A1: COST key figures for 2016. Calculation based on 352 running COST Actions. The total Horizon 2020 budget dedicated to COST is EUR 300 million, and each COST Action has an average annual budget of EUR 129 000.

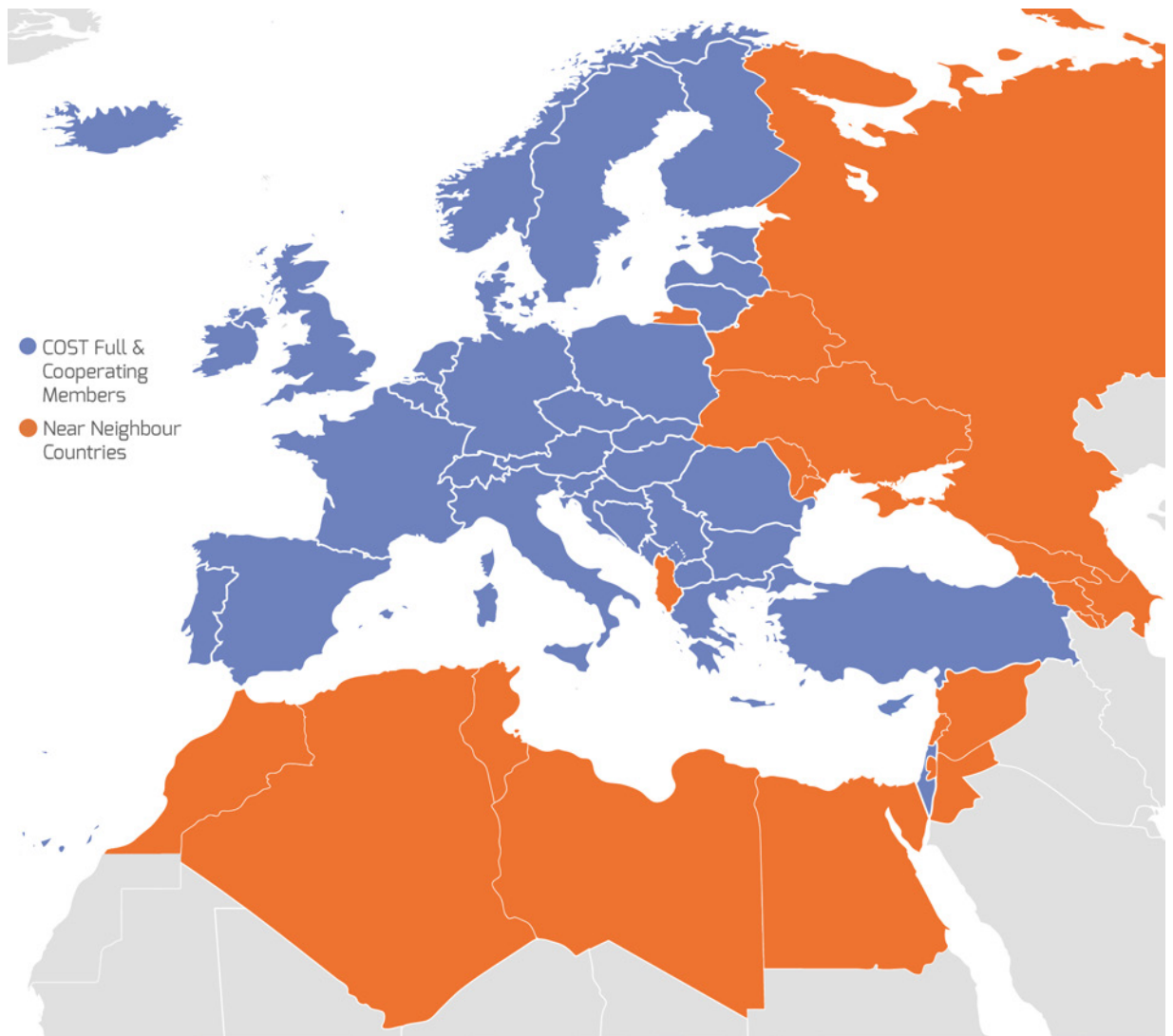


Figure A2: Participation of NNCs in COST Actions (Albania 33, Algeria 5, Armenia 17, Azerbaijan 1, Belarus 8, Egypt 10, Georgia 6, Jordan 6, Lebanon 2, Morocco 5, Palestinian Authority 6, Moldova 12, Russia 62, Tunisia 16, Ukraine 54). In 2016, 243 institutions from NNCs participated in running COST Actions.

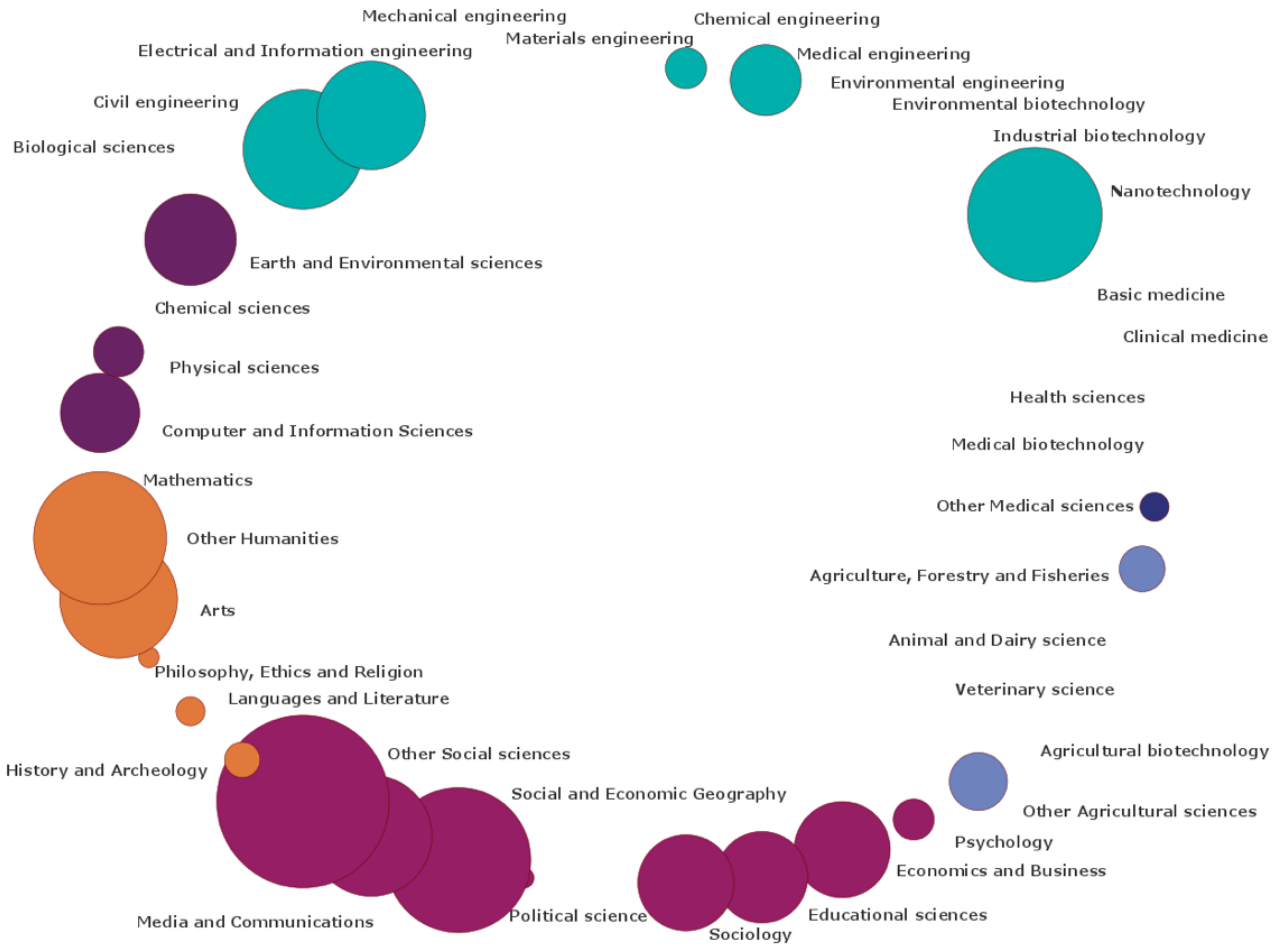


Figure A3: Interdisciplinarity within a particular COST Action: TU1306. Fostering knowledge about the relationship between Information and Communication Technologies and Public Spaces supported by strategies to improve their use and attractiveness

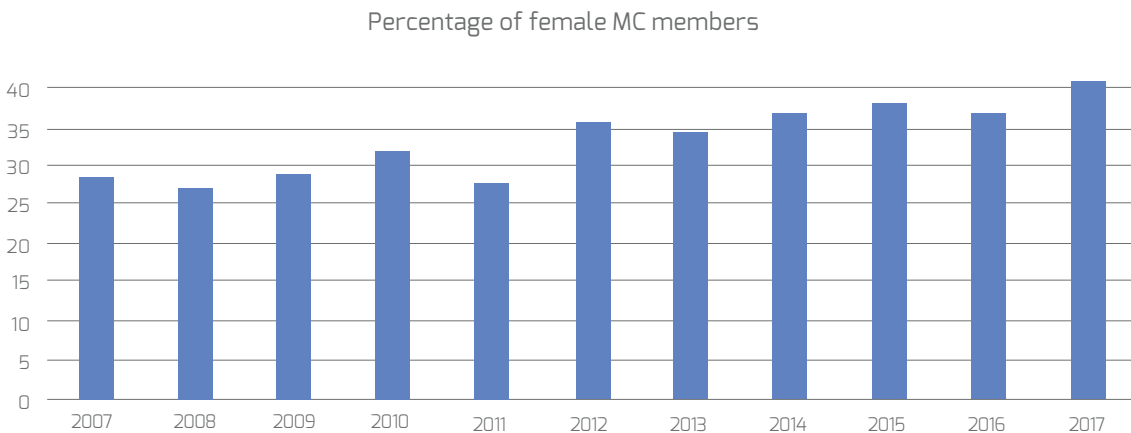


Figure A4: Percentage of female management committee members.

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COST is supported by the
EU Framework Programme Horizon 2020