

October 2022

Impact Assessment Study on Short- Term Mobility

Final Report Draft



Version 2

October 2022

Impact Assessment Study on Short-Term Mobility

Final Report Draft

Thorben Strähle, Maria Stalla, Dr. Jan Biela



Table of Contents

Executive Summary	4
1 Introduction	6
1.1 COST Association and COST Actions	6
1.2 Short-Term Scientific Missions	7
1.3 The present study on Short-Term Scientific Missions (STSM)	8
1.3.1 Case selection	8
1.3.2 Data collection	9
1.3.3 Typology development and case studies	10
2 Empirical Findings	10
2.1 Overall trends of Short-Term Scientific Missions	10
2.1.1 Activities pursued during the STSMs	11
2.1.2 Embeddedness of STSMs in the COST Action	12
2.1.3 Outputs of STSMs	13
2.2 Patterns depending on career stages and participating countries	14
2.2.1 STSMs at different career stages	14
2.2.2 STSMs and ITC	15
2.2.3 STSMs and COST global networking	15
2.3 Typology	16
2.3.1 Research work	16
2.3.2 Knowledge transfer	18
2.3.3 Networking	19
2.3.4 Ideal types in the sample	20
3 Impact analysis	20
3.1 Impacts at beneficiary (institution) level	21
3.2 Impacts at host (institution) level	23
3.3 Impacts at COST Action level	24
4 Implications for COST Actions and COST	26
4.1 Good practices for COST Actions	27
4.2 Development recommendations for STSMs	29
Appendix A	31
A.1 Survey Questions	31
A.2 Visualisation of survey results	31
A.3 Interview guides	32
A.3.1 Guide for interviews with STSM grantees	32



A.3.2	Guide for interviews with STSM hosts	33
A.4	Vignettes	34
A.4.1	Knowledge Transfer STSM with impact at institutional level – New methods and cooperation partner	34
A.4.2	Research work STSM - strategically contributing to COST Action deliverable and supporting career advancement	35
A.4.3	Networking STSM - resulting in new collaborations and a research grant	36
A.4.4	Research STSM kickstarting individual career and engagement in COST Action	37
A.4.5	Research work and networking - established researcher visiting ITC	38

Tables

Table 1	- Overview of selection criteria for the investigated STSMs and cases in sample and analysed	8
Table 2	- Overview of good practices for COST Actions	26
Table 3	- Overview over survey questions	31

Figures

Figure 1	- Average time distribution per activity type in STSMs	12
Figure 2	- Ranking of most important outputs of STSMs (3. Question)	14
Figure 3	- Overview STSM types	16
Figure 4	- Overview of main impacts at different levels	21
Figure 5	- Ranking of most important outputs of STSMs (3. Question)	31

Executive Summary

The COST Association is an intergovernmental initiative funded under the EU's Horizon Europe Framework Programme. **COST's goal is to offer an open space for collaboration among scientists across Europe (and beyond) and thereby give impetus to research advancements and innovation.** To contribute to this, the strategic priorities of COST are to promote and spread excellence, to foster interdisciplinary research for breakthrough science and empowering and retaining young researchers. The main instrument which COST is using are COST Actions, which are networks of researchers on dedicated topics. In the framework of these COST Actions, individual researchers can also apply for short term research visits, the Short-Term Scientific Missions (STSMs). These are offered to a broad range of researcher backgrounds (career stage, origin, discipline). To better understand STSMs, the COST Association has commissioned Technopolis with an **Impact Assessment Study on Short-Term Mobility**. The study assesses Short-Term Scientific Missions (STSM) and was carried out between March 2022 and October 2022. In the context of this study, 44 STSMs grantees and 15 hosts were investigated in depth using literature review and interviews.

STSMs are generally perceived as a **valuable instrument** which is offered in the framework of COST. The short missions are understood as a possibility to focus on deepening with on researcher or research group / institution. They provide time and space to spend time at another researcher's institute and contributes to **building trust between the involved parties**. The time is concretely used on a **diverse range of activities**, including discussion on the research topic, networking of the grantee with the host and other researchers at the institute, conducting concrete research activities together, learning a new method or using the research infrastructure available at the host. Accordingly, the **results** observed in the study encompass newly developed skills and research collaborations, joint publications or applications to European or national research grants. STSMs are primarily used by researchers in the early stages of their career, but the research stays are also appreciated by more established researchers. They are a valuable tool for researchers from ITC (widening) countries but used by researchers from non-ITC countries alike. STSMs also allow for research stays outside Europe, contributing to the COST Action's global networking efforts.

Based on the collected evidence, a typology of STSMs was developed as a central part of this study. These **ideal types** reflect patterns regarding STSM activities but also allow conclusions regarding the characteristics of STSM grantees and hosts as well as STSM results and impacts. As per definition, the ideal types showcase an abstract direction of the STSMs – the cases in the sample often contributed to several ideal types. The first ideal type, **research work**, is focused on performing research at different stages. It includes the initial ideation phase of research, concrete work on data collection or analysis and the dissemination phase including follow-up plans. The second ideal type, **knowledge transfer**, refers to cases where knowledge is transferred from the host institution to the STSM beneficiary or vice versa. It can also include cooperation with industry. The third ideal type identified in the sample, **networking**, is mainly focused on the involved researchers getting acquainted or getting to know researchers at the host institution. While many STSMs have this component integrated, it can be directed and non-directed. Moreover, some cases of joint STSMs were observed in the sample, with several STSM researchers visiting at the same time, providing networking opportunities amongst each other. Also, personal development, in the form of personal mentoring played a role in the STSMs. Mostly observed was the research work type, followed by the knowledge transfer and the networking ideal type.

The study also observed the **impacts of STSMs** at different levels. On the beneficiary (and institution) level, the STSMs led to new research projects or inclusion in project proposals. Furthermore, the stay contributed to an enhanced quality in the research or an expansion of the research topic. The beneficiary (often in tandem with the host) also jointly planned or submitted research proposals for national or European research projects. STSM beneficiaries were also able to disseminate the learnings at the home institution upon their return. On the host (and its institution) also several impacts could be observed. Also for them, the STSM led to new research projects or the inclusion in project proposals and other, less observed, impacts such as data sharing, recruitment of new students or the distribution of a research method. At the level of the COST Action, the STSMs contributed to the improved quality of the COST Action outputs and led to a closer connection between two COST Action participants. At times, the concrete results were shared with the wider participants of the COST Action or the outputs directly contribute to COST Action deliverables.

The study has implications for the use of STSMs by COST Actions on a strategic and operational level. These include the following good practices:

- STSMs are characterised as a **highly flexible format**, which should be maintained regarding the choice of host, thematic focus and activities conducted.
- STSMs are most useful in the **earlier phase of the COST Action** as the deliverables can be used by the Working Groups and the built connections can be leveraged.
- In the observed STSMs (44 cases), the **process of defining the STSM topics** is rather a top-down process, but also a more bottom-up approach could have advantages.
- More STSMs should be available for researchers in **early career stages**, but STSMs of established researchers can also benefit themselves, the host or the COST Action
- **Global STSMs** can make sense from an academic perspective but carry along higher costs and more efforts related to organising the research visit.
- Beneficiaries value the **low administrative burden** in the application and reporting phase, it allows them to focus on the academic work.
- A **structured prior preparation** of the STSMs via online-meetings allow for time during the research visit to focus on academic and network activities.
- COST Actions which **institutionalise the dissemination of results** among the participants can increase the impact of the STSM on the wider COST Action.

1 Introduction

For the **Impact Assessment Study on Short-Term Mobility** the COST Association commissioned Technopolis. The study assesses Short-Term Scientific Missions (STSM) and was carried out between March 2022 and October 2022. In this chapter, we will first provide an understanding of the COST Association, the COST Actions, STSMs and the objectives of the study.

1.1 COST Association and COST Actions

COST was established in 1971 as an **intergovernmental initiative to enable bottom-up networking around nationally funded research activities in a broad variety of thematic fields**. The instrument is a founding pillar of the European Research Area (ERA). The programme promotes transnational networks among researchers from COST member countries¹, from partner countries known as Near Neighbour Countries (NNC)² and International Partner Countries (IPC)³. These activities aim to promote excellence and interdisciplinarity of research as well as embed (young or less-well connected) researchers in an international research environment. In 2013, COST was re-organised as an **international non-profit organisation (the COST Association)** under Belgian law. It is administered by its Brussels-based headquarters (the COST Administration) and is funded from the **EU's Horizon Europe Framework Programme**, as part of the Widening Participation and Spreading Excellence (WPSE) pillar.

The role of COST under Horizon Europe is to function as a **pre-portal to other European funding instruments and to facilitate brain circulation among EU and non-EU countries**. The long-term goal of the programme is to narrow the gap between science, politics and society in Europe. In its 2017 Strategic Plan, the COST Association has identified **three strategic priorities** in this regard, which are (1) promoting and spreading excellence, (2) fostering interdisciplinary research for breakthrough science and (3) empowering and retaining young researchers.

The main instrument of COST are the **COST Actions**, which are networks of researchers. On average, a COST Action has 50 participants in the Management Committee. In general, COST Actions are funded for a period of four years⁴. During the funding period, COST funding can be allocated to organising conferences and workshops and to covering related costs (travelling, accommodation, etc.). Moreover, COST promotes the careers of Young Researchers and Innovators (YRI), e.g., by funding training schools and the Short-Term Scientific Missions (STSM) investigated in this study. The programme is **thematically open and follows a bottom-up approach**. Apart from scientific excellence, of those member countries designated as Inclusiveness Target Countries (ITC), female researchers, and Young Researchers. COST is thus

¹ COST member countries: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Republic of Moldova, Montenegro, The Netherlands, The Republic of North Macedonia, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, Israel (Cooperating Member), South Africa (Partner Member)

² Near Neighbour Countries (NNC): Algeria, Armenia, Azerbaijan, Belarus, Egypt, Jordan, Kosovo*, Lebanon, Libya, Morocco, Palestine**, Russia (suspended), Syria, Tunisia

³ International Partner Countries: All countries not included in the categories above with whom one or more COST Actions find mutual benefit in cooperation

⁴ Extensions were granted under *Force majeure* due to the COVID-19 pandemic to CA171**, CA181** and CA182** Actions

*All references to Kosovo, whether the territory, institutions or population, in this text shall be understood in full compliance with United Nations' Security Council Resolution 1244 and without prejudice to the status of Kosovo.

**This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue

designed to bridge the innovation and participation gaps between well-established member countries on the one hand, and ITC, IPC, and NNC, on the other, as well as promoting gender equality and career development.

In the last years, COST has developed a new strategy towards the COST Actions which is termed the “**COST stewardship approach**”. It is based on the notion of COST becoming an “engaged investor” **facilitating the success of the COST Actions by empowering the COST Actions and their leadership to succeed**. As a funding instrument, COST has thus chosen to move beyond being a mere controller of funds and expecting a report at the end of the funding period, towards being an active facilitator, and continuously engaging with its beneficiaries (the COST Actions).

1.2 Short-Term Scientific Missions

As the primary objective of COST is the facilitation of networking, COST Actions have a range of tools and additional activities at their disposal. One of these tools are **Short-Term Scientific Missions (STSMs)** which are exchange visits for individual researchers in the same COST Action in an organisation located in a different country than the country of affiliation. Under Horizon 2020 (H2020), these visits could have a duration from five days to six months.⁵ The goal of STSMs is to provide a tool for individual mobility which allows for in-depth and intensive collaborations between individuals and their institutions.

As a networking tool, **STSMs contribute to the overall mission of COST and the COST Actions**. One of the aims of COST Actions is “spreading excellence” by supporting “brain circulation” through STSMs and short-term visits (e.g., access to laboratories). Moreover, the goal is to provide opportunities for younger researchers from ITCs, who, through STSMs, can build up personal networks with institutions and form deeper collaborations. STSMs are thus an effective tool for giving researchers direct access to excellent external research facilities, which is important to close the research and innovation gap across Europe.

Despite a focus on Young Researchers, **STSMs are open to applicants from all career stages**, ranging from doctoral students to established researchers such as professors. The selection process for STSMs is handled internally in the COST Actions. Typically, COST Actions issue a call, specifying the topic and scope of the STSM, and COST Action members (also ad hoc ones) are invited to apply. The topic of the STSM is always connected to the focus of the COST Action. The COST Actions are given relative autonomy on the topics of the STSMs, the duration and scope and the selection process. The COST Action Management Committee is then responsible for selecting the STSM beneficiary and grant amount to be awarded, taking into account the background, gender and career stage of the applicants.

Within COST Actions, several networking tools are offered next to the STSMs. These include **meetings, workshops and conferences** organised by Management Committees and **Training Schools**, which are intensive coaching opportunities for up to 15 days for COST Action participants on topics chosen by the COST Actions. Particularly Young Researchers can benefit from this format, although more established researchers may also apply. Moreover, there are **Dissemination Activities** supporting the COST Actions in spreading the results of their scientific research, **Conference Grants** providing the opportunity to visit conferences external to COST and **Virtual Networking Tools**, facilitating digital collaboration. In comparison to these other networking tools, STSMs are a widely used instrument: between 2,000 and 2,700 researchers per

⁵ Under the COST Annotated Rules, which are in vigour for Horizon Europe, STSMs can be carried out for “a determined period of time”.

year visit a host institution. For instance, in 2019 2,055 STSMs took place as part of 294 running Actions. The most frequent host countries are the UK, Italy and Germany.

Beyond the scope of the COST Action, more added-value activities are available for researchers. These include the following instruments:

- **COST Academy:** Training initiative offering trainings, workshops and webinars on topics relevant for the performance of COST Actions,
- **COST Global Networking:** Opportunities to include partners outside of Europe,
- **COST Connect:** Cross-COST Action networking in an open format with other stakeholders,
- **COST Innovators Grant:** Funding to enhance the pace and success of breakthrough innovations, accelerating innovations from basic science towards market readiness. A COST Innovators Grant is awarded to ending COST Actions that can show innovation potential. The COST Innovators Grant awarding follows an application and evaluation process managed by the COST Association,
- **COST science-informed policy advice:** Initiative to provide policy input to relevant European, national and regional topics.

1.3 The present study on Short-Term Scientific Missions (STSM)

The present study aims at a **better understanding of the nature and impact of STSMs**. Accordingly, the first objective of this study is to shed light on the set-up, character, activities and results of the STSMs. The second objective is to provide insights on how the STSMs contribute to the impact of COST on multiple dimensions: for the beneficiary and host institution, for the COST Action and for the scientific field. To fulfil these objectives, the study has an **explorative character** and an empirical research design, encompassing data collection methods such as desk research, a short survey and interviews with a selection of STSM beneficiaries and host institutions. In total, 44 cases of STSMs were included in the study and researched with the methods mentioned above. The study was conducted from March until October 2022. In the following, the steps of the research process will be presented.

1.3.1 Case selection

As a first step, **Technopolis and COST defined criteria for the selection of STSM cases** to be included in the study. The selection criteria chosen were the STSM duration, the age of the beneficiary, the country classification of the beneficiary and host (according to the ITC and non-ITC dichotomy), the beneficiary's gender and the discipline of the COST Action. The purpose of the selection criteria was to ensure the selection of a diverse set of STSMs and STSM beneficiaries covering a broad range and diversity of cases. This was important because COST Actions, the participants and STSM researchers are diverse and the study seeks to be representative across all STSMs. Table 1 provides an overview of the selected cases and the according selection criteria. For the selection itself, COST provided a subset of 235 cases to Technopolis – this subset was quasi-randomly drawn from the full set of STSMs which took place between mid-2017 and mid-2021. In turn, the 44 cases were selected from this set with respect to the agreed criteria and target numbers.

Table 1 - Overview of selection criteria for the investigated STSMs and cases in sample and analysed

Criterion	Categories	Operationalisation	Cases in sample (236)	Cases analysed (44)
	Short	< 10 days	90 cases (38%)	20 cases (45%)

Duration of stay	Medium	> 10 days, but < 6 weeks	35 cases (14%)	17 cases (39%)
	Long	> 6 weeks	111 cases (47%)	7 cases (16%)
Age	Low	< 33 years	70 cases (30%)	14 cases (32%)
	Medium	33-41 years	86 cases (36%)	15 cases (34%)
	High	> 41 years	80 cases (34%)	14 cases (32%)
Type of country of grantee/host (excl. global cases)	Both ITC	COST Membership categories (ITCs/ non-ITCs)	105 cases (45%)	13 cases (33%)
	Both non-ITC		17 cases (7%)	8 cases (21%)
	Grantee ITC, host non-ITC		68 cases (29%)	3 cases (8%)
	Grantee non-ITC, host ITC		28 cases (12%)	15 cases (38%)
Gender	Female		112 (47 %)	22 cases (50%)
	Male		124 (53 %)	22 cases (50%)
Discipline	Natural Sciences	First discipline of assigned COST Action field	97 cases (41%)	20 cases (52%)
	Social Sciences and Humanities		41 cases (17%)	8 cases (18%)
	Medical and Health Sciences		37 cases (15%)	7 case (16%)
	Engineering and Technology		40 cases (17%)	7 cases (16%)
	Agricultural Sciences		21 cases (9%)	2 cases (5%)

Technopolis

Our analysed sample (see Table 1) contains a broad **age range** (24 – 71 years) and the selected cases are almost evenly distributed across the different age stages (low, medium, high). The same is true for the **gender** distribution, which is evenly split between male and female STSM beneficiaries. According to our classification of **career stages**⁶, most of the grantees (41 %) are recognised researchers (R2, postdocs or equivalent) or first-stage researchers (R1, PhD students) (35 %). 16 % are established researchers (R3, assistant professor or professor) and only 8 % are leading researchers (R4, director or PI).

1.3.2 Data collection

Once the cases were selected, the empirical research on the STSM, the beneficiary and the COST Action was initiated. As a first step, the **COST Action documents** such as the Memorandum of Understanding, progress and achievement reports were analysed. Scanning these documents provided a better understanding for the thematic direction and the goals of the COST Action under which the STSM was tendered. Subsequently, the **STSM reports**, drafted by the beneficiaries after their visit, were read carefully to better understand the topic, objective, activities and results of the STSM. This desk study also served as preparation for the interviews with the beneficiaries. Alongside the interview invitation, the interviewees received a **short online survey** on the contribution of the STSM, the concrete activities conducted and the outcomes of the STSM (see 0). The survey served two main purposes: to prepare the interviews by collecting some basic data on the STSMs and to collect quasi-quantitative data allowing for comparison between the different STSMs. The survey was filled out by 37 of 44 beneficiaries (84%). The main source of information about the STSMs were the **44 interviews conducted with beneficiaries**. These interviews were conducted virtually and in a semi-

⁶ For the classification of the career stages we are using the research profiles descriptors of EURAXESS (see: <https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors>).

structured way. Each interview lasted between 45-60 minutes and extensive notes were taken by the interviewers. The goal of the interviews was to gain qualitative insights on the STSM experience from the beneficiaries. The questions covered the beneficiary's career development and role in the COST Action, the COST Action goals and the link to the STSM, the STSM activities and direct results and its contributions to the beneficiary's development, the host institution, the COST Action and the scientific field. The interview guides can be found in the annex.

1.3.3 Typology development and case studies

On the basis of the data collected, the insights gathered and the understanding of STSMs formed, a **typology of STSMs** was developed. This typology is helpful to form a nuanced picture of STSMs in terms of their purposes, functions, ways of conducting STSMs and results. While the typology itself will be explained in more detail in the following chapters, it should be emphasised here that it is a simplified perspective on STSMs, using ideal types. In order to develop the different types, the gathered evidence was analysed and grouped. Subsequently, the typology was also discussed and further developed together with COST representatives. The typology is also the outcome of the desk research analysis, the survey and interviews of and with the STSM beneficiaries.

As a next step, out of the 44 initially investigated cases **15 STSM cases were selected for the second round of research**, this time focusing on the host institution. The purpose of this second round was to complement the knowledge about the STSM and the observed impact path, to gain insights on the host institutions' motivation to validate the developed typology. To select this subset, the selection criteria were the (1) observed impact (on grantee, host or COST Action), (2) diversity of impact paths, and (3) diversity of profiles. The interview with the hosts (and potentially other collaborators) was conducted in a semi-structured way and most interviews lasted between 30-45 minutes. Finally, **five of these cases analysed in detail were selected for case studies**. The purpose of these case studies is to illustrate examples of different STSM types and their "successful" impact paths in more detail. Each case study was therefore selected for highlighting a different aspect of successful STSM practice. Accordingly, the relevant criteria for selecting the five cases were (1) high impacts on at least one of the three impact levels (grantee, host, COST Action), (2) coverage of all STSM types (research work, knowledge transfer, networking) and (3) the diversity of profiles. These cases are summarised in a vignette (see Appendix) and the relevant findings have been highlighted in the text.

2 Empirical Findings

In this chapter, the empirical findings which were gathered in the interviews, the survey and the desk research will be presented. The chapter will provide insights into the overall picture of STSMs, the activities which researchers pursued during the STSMs and the results of the STSMs.

2.1 Overall trends of Short-Term Scientific Missions

STSMs are, according to the interviewees, **generally perceived as a valuable instrument** which the COST framework offers. It complements the *modus operandi* of the COST Actions which often brings together large groups of researchers with the purpose of forming networks in the field of the COST Action. Mostly, events organised in the framework of the COST Actions allow researchers to get acquainted with many other researchers in a short period of time. STSMs help to form and maintain connections and to conduct concrete work together. Thus, this is where STSMs complement and benefit the COST Actions. As will be elaborated in the following

sections, STSMs are generally **understood as the possibility to focus on deepening collaboration with one researcher or research group / institution**. Some of the interviewees have described STSMs as the most valuable instrument which COST offers, exactly because of the possibility to **concentrate on concrete tasks only, form new collaborations and spend time at the other researcher's place of work** without other interfering obligations. One of the most important functions which the beneficiaries described is **building trust**, which these in-person research visits facilitate.

2.1.1 *Activities pursued during the STSMs*

As an important first step in understanding STSMs, this study tried to grasp **how the beneficiaries allocate their time during the visit**. Thus, a survey question was posed assessing how many activities the beneficiaries engaged in and how they chose to divide their time between different activities. The activities provided as answer options encompass discussions with researchers at the host institution, networking with researchers at the host institution, work focusing on data collection and on data analysis, use of infrastructure only available at the host institution and learning a new method or usage of a tool (see 0). The results show that during their visits, **most grantees engage in a diverse range of activities during their STSMs**. These range from unstructured activities such as discussions on the topic and networking to concrete tasks such as research execution (e.g., data collection, analysis, learning a method). While most respondents engage in several or all (43%) activities, 19% (7 respondents) concentrate their time on two or three specific activities. The latter is however a very heterogeneous group and no systematic similarities are observable – they allocate the majority of the time to different activities (among them are data analysis, learning a new method, discussions) and share represent all career stages and other characteristics.

Taking a closer look at the activities which STSM beneficiaries usually engage in reveals that all dedicate time to **discussions on the research topics**. While on average 29 % of the time during the STSM is allocated to these discussions, some grantees spend most of their time (up to 85 %) discussing the research. Admittedly, discussions come in various formats: bilateral conversations with the host or other collaborators, participation in meetings of the hosting research group, or presenting own research work to an audience at the host institution.

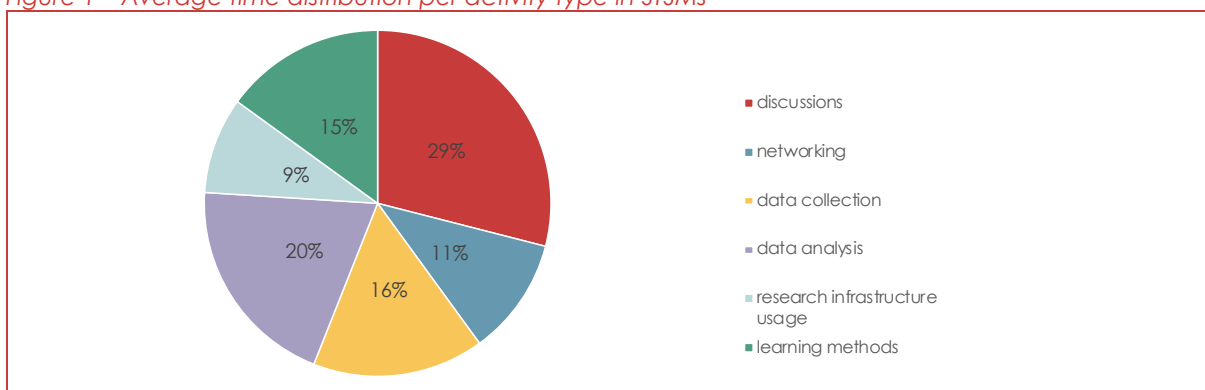
Another important STSM activity often performed according to the survey was **networking with researchers at the host institution that were not directly related to the STSM topic**. Almost all survey participants indicated pursuing this activity during their stays, albeit only for 11 % of their time. Some purposely planned exchange with other scientists, while others reported having coincidental conversations over coffee, which led to new connections.

As pointed out before, the STSMs are perceived as an opportunity to **conduct research together or at the host institution's facility**. The survey on the activity distribution reveals that beneficiaries spend more time conducting data analysis than data collection. In fact, on average 20 % of the time is spent on data analysis and only 16 % on data collection. Unsurprisingly, the two activities are often conducted in tandem. In practice, interviewees for example conduct experiments in the host laboratory or analyse data collected by different COST Action participants.

Closely connected to the previous activity is the focus on learning a new method. The results of the survey show that 80 % of respondents **invest time to learn a new method during** their STSM. In the observed cases, this applies to young researchers and their more established counterparts alike. The time dedicated to learning a new method constitutes 10 % of the stay on average.

Less often, beneficiaries concentrate their time on using **infrastructure only available at the host institution**. Among the few cases, they only spend between 10 % and 20 % of their time using that infrastructure. A plausible explanation for this activity not being the primary focus for most of the STSMs could be that only few disciplines need complex infrastructure which is only available at some institutions. Mainly, these are infrastructure elements related to conducting natural experiments (such as a particle accelerator). Moreover, the actual work with the infrastructure might not take much time, but instead the analysis of the data is time consuming. To gain access however, beneficiaries need to be there in person, as was reported during one interview, to be instructed or supported.

Figure 1 – Average time distribution per activity type in STSMs



Technopolis, based on results of survey

2.1.2 Embeddedness of STSMs in the COST Action

All STSMs are related to one COST Action and are, as per the Annotated Rules for COST Actions⁷ (2021), required to thematically fit into the focus of the COST Action. To better understand the nature and purposes of the STSMs, the study investigated the proximity of the STSM with the COST Action. The findings from the interviews and desk research (comparing STSM reports and COST Action documents), show that indeed not surprisingly, **STSMs are thematically closely related to the thematic focus of the COST Actions**. Furthermore, the connection of individuals to the COST Action and specific Working Groups on the one hand, and the relevance of the STSM outputs for the COST Action on the other, were investigated to find out more about the proximity to the COST Action.

The findings show that **some STSM beneficiaries only have an indirect connection** to the COST Action. The interviews revealed in seven cases only limited knowledge about COST or the COST Actions; these grantees were barely involved in the COST Action. These are mainly Young Researchers learning about the opportunity from their supervisors who are more involved in the COST Actions. The majority of the investigated **beneficiaries had good knowledge about the COST Actions** and were somewhat actively involved prior and after the STSM. Accordingly, their STSMs were contributing to the progress of particular Working Groups or the COST Action as a whole. This was seen in the interviews on the one hand, but also in the STSM reports summarising the experience. In the reports, 43 % of grantees have mentioned the COST Action or a specific Working Group. 16 out of 44 **beneficiaries were strongly involved, either in leadership positions, like COST Action Chairs or Working Group leaders, or as MC Members in the COST Action**. Some of them acted as COST Action Chairs, MC Members or Working Group leaders.

⁷ <https://www.cost.eu/uploads/2022/02/COST-094-21-Annotated-Rules-for-COST-Actions-Level-C-2022-02-15.pdf>

2.1.3 *Outputs of STSMs*

Having considered the activities of the STSMs, this section will shed light on the outputs of the research visits. It will discuss the **immediate results of the STSMs**, while the impacts (to which these results lead) are explained in chapter 3.

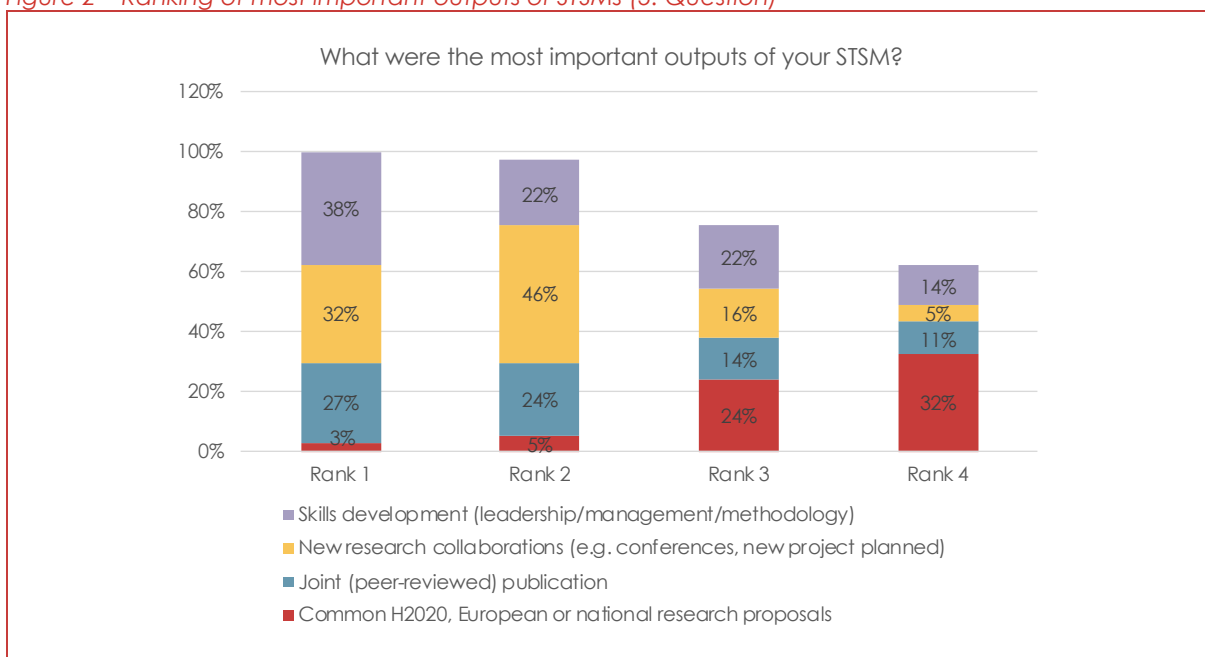
The two most important outputs, as shown by the interviews, are **developed skills** and **new research collaborations** (see Figure 5 5). While the former refers to methodological skills as well as management and leadership skills, the latter leads, for example, to new planned research projects. The survey conducted among STSM beneficiaries confirms this picture with most respondents (70 %) ranking these two outputs first. It also shows that, without exceptions, all of the interviewees and survey respondents mentioned new research collaborations as a key output.

Moreover, **joint publications** between the visiting researcher and the host were the third most common output mentioned as most important result. Since publications often take time, and most observed STSMs have taken place quite recently, publications as a medium to long-term output of research activities are possibly underestimated in their importance by the survey participants. Less frequently, grantees have mentioned **common European or national research proposals** as important outputs of the STSM.

When considering who these outputs benefit, the picture emerges that the **outputs predominantly contributed to the STSM beneficiaries' own work**. These results from the interviews were confirmed by the analysis of the survey. Here, 81 % regarded the STSM as mostly contributing to their own work. Simultaneously, the data also show that only few STSM beneficiaries see no connection to the work and agenda of the COST Action or Working Group⁸. This can be explained by a strong alignment between the (research) interests of the COST Action and the individual work of the beneficiaries as explained in the previous section. In other words, the research visits seem to be a win-win-situation for individual and COST Action in the majority of the cases.

⁸ Only 16 % (COST Action) and 19 % (Working Group) of the survey respondents indicated that the STSM did not contribute to the COST Action or Working Group. In these cases, the STSM beneficiaries were usually not connected to or actively involved in the COST Action

Figure 2 – Ranking of most important outputs of STSMs (3. Question)



Technopolis, based on results of mini survey

2.2 Patterns depending on career stages and participating countries

2.2.1 STSMs at different career stages

STSMs are primarily used by **scientists at early career stages**. This is a deliberate choice in the COST framework, enabling younger researchers to gain important experiences at the start of their careers⁹. The tilt towards Young Researchers can also be seen in the sample of STSMs for this study, in that it is often early career researchers who are the main beneficiaries of STSMs. However, STSMs as an instrument are also appreciated by more senior researchers holding professorships.

The findings of the study show that STSMs are in fact mainly suitable for **researchers in the early stages** of their research career. The interviews revealed that younger researchers often have fewer binding commitments in their professional and personal life and can therefore be more flexible and commit easier to a research visit away from their institution. Another aspect is that for young researchers, STSMs can represent the opportunity (for some the first) to spend time abroad without permanently moving. STSMs are perceived as an accessible way to fund research stays for young researchers, as it can be challenging for them to acquire larger grants as they might not meet high requirements (like a specific number of publications) or because they are usually less connected. At this early career stage, it is easier to spend longer time periods abroad and hence, the STSMs tend to be longer.

Although less represented in the sample, **more established researchers** also see value in STSMs because they provide an opportunity to fully immerse in a project or specific research question. More established researchers partly saw the STSMs as an opportunity to revitalise long-standing connections and partly to get acquainted with new colleagues – at times from different disciplines. Often, the STSMs conducted by more senior researchers tended to be shorter in

⁹ See: COST Vademecum, 2021, 8.2 Evaluation and selection of applicants

duration and less focused on conducting concrete research but more on discussions and networking.

2.2.2 STSMs and ITC

Besides the focus on earlier career stages, **STSMs also set a focus on Inclusiveness Target Countries (ITC)**¹⁰. In this sense, COST Actions encourage the STSM application of researchers from ITCs. In our sample, half (22) of the beneficiaries are from ITCs. In 14 cases the host institution is located in an ITC. The results from the interview programme show that for some beneficiaries from ITCs STSMs represent a rare opportunity to finance research stays as such funding is often lacking in their country. **The majority of beneficiaries from ITCs were motivated and picked the host institution based on shared research interests or complementary skill sets.** This is especially underlined in numerous interviews conducted with ITC based researchers visiting host institutions in other ITCs. In these interviews, the significance of STSMs was highlighted (just as in almost all other interviews) as well as the value of collaborating between two parties from ITCs, which includes increased visibility in the research community and forming of networks between researchers based in ITCs.

Example: In one case, the STSM developed an impact for the grantee's institution in an ITC. The grantee learned a new internationally recognised method and transferred it to their home institution, which supported the institution's integration into the international research community. *For more information on this case see 0*

2.2.3 STSMs and COST global networking

While COST, as integral part of the European Research Area (ERA), concentrates on the 40 European COST Members and one Cooperating Member, non-COST Members - **International Partner Countries (IPCs)**¹¹ - can participate in COST Actions as well. This focus on **global networking** is also a dedicated instrument for the COST Action as shown in the introductory chapter. Among the 44 investigated STSMs **five were research stays in such an IPC: in Japan, South Korea, Australia and two in the United States.** As this constitutes only a small number of cases, the evidence **cannot be considered representative of all STSMs in IPCs.** However, some observations across all cases offer some insights into specific opportunities and challenges these STSMs might have.

In these global STSMs, the motivation is to gain **specific scientific knowledge the host institution or researcher/ research group had in the field.** For instance, two of the observed STSMs were conducted in the USA at well-known institutions, where grantees were able to connect with renowned researchers in their field. Indeed, the **reputation of the host institution** seemed to play a role in the observed global STSM cases. However, the cases show rather different profiles and thus, **no clear pattern is discernible regarding impacts on the research collaborations:** we observed both strengthened relationships promoted by the STSM and rather loose connections. With regard to the context of these STSMs on the other hand, all grantees reported **especially high administrative burdens (e.g., for meeting entry requirements) as well as high costs for accommodation and travel.** In some cases, the STSM was combined with another grant to make the research stay affordable. This however does not include double funding for the same

¹⁰ See: COST, 2018, Short Term Scientific Mission (STSM) User guide.

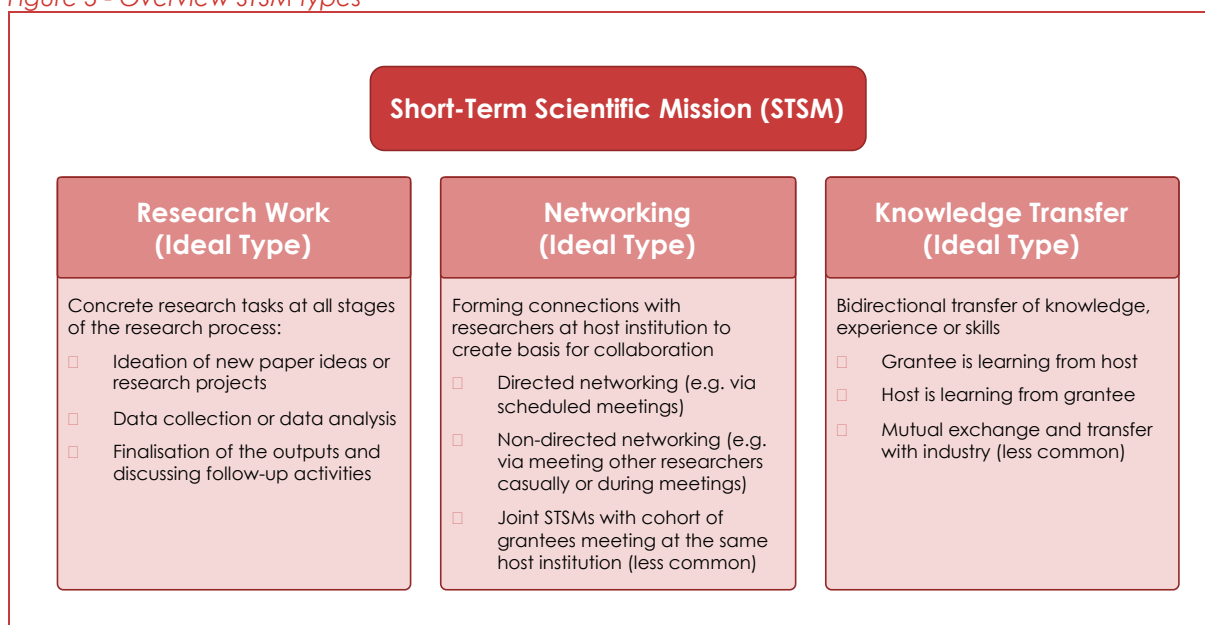
¹¹ Additionally, Near Neighbour Countries (NNCs) can participate and even be financially supported but are not investigated in this study.

activity. Finally, **learnings on cultural differences** between host and home country have been emphasized in the interviews (especially with participants in the US).

2.3 Typology

Based on the collected data of the 44 studied cases, a **typology of STSMs** was developed as a central part of this study (see **Error! Reference source not found.** for an overview). This inductively derived typology was then confirmed by deductive perceptions like former COST impact assessments¹² and concepts of research practice. These **ideal types** reflect **patterns regarding STSM activities** but also allow conclusions regarding the characteristics of STSM grantees and hosts as well as STSM results and – as described in chapter 3 - impacts. The ideal types represent options of developing an STSM. Cases in our sample incorporate more than one aspect of each type. The three STSM types identified are: **research work**, **knowledge transfer** and **networking**. The purpose of this typology is to provide a practical understanding of different forms of STSMs.

Figure 3 - Overview STSM types



Technopolis

2.3.1 Research work

The first STSM type is termed **“research work”** and is focused on performing research at different stages. While the COST Action meetings and COST centralised activities, such as the COST Academy, COST Connect or Global Networking are focused mainly on interactions and networking, the STSMs can be used to perform research work. This can for example be a PhD student working on finalising their thesis or more established researchers putting their heads together to craft ideas for a research paper. The **opportunity to conduct research in the STSMs is appreciated by researchers** for multiple reasons. Firstly, spending non-virtual time with

¹² Technopolis (2020). COST Impact Assessment Study 2020. Analysis of Follow-Up Activities to COST Actions.

another researcher provides a (sheltered) space to focus on the other person in ways that virtual formats cannot replicate. Secondly, data collection can be conducted on site in specific places. Thirdly, researchers can focus entirely on the work conducted in the context of the STSM without having to juggle teaching duties or other projects. To provide more details some common themes were identified in the study, further differentiating this type.

- Several STSMs in the research ideal type focus on the **ideation** phase of the research process. Accordingly, STSMs were used to brainstorm ideas on general research questions, joint publications or proposals for research funding. This is mainly interesting for **researchers with a long-standing or newly established interest in collaborating**. Some of the observed cases showed two researchers having met at a COST Action meeting wanting to further explore opportunities to collaborate. Yet in another case, two researchers with a long-standing collaboration wanted to use the STSM to take time exploring a new topic together. Moreover, some of the cases in the sample showed two researchers from different disciplines wishing to explore in more depth the potential for collaboration. Accordingly, the activities are mainly discussions between the involved researchers. Interestingly, the host institution often provided the opportunity for the beneficiary to get to know other host-institution researchers from the same institute or research group.
- Further along in the research process, some of the STSMs were **focused on conducting research tasks**. This includes the collection of data and data analysis. The manifestation of this research phase varies across different disciplines and since COST allows for a broad range of thematic COST Actions, it is hard to generalise at this point. For instance, in the social sciences, the conducted research could consist of experiments, conducting onsite visits or interviews. In the natural sciences, it could consist of investigating data bases or conducting (natural) experiments. For the latter disciplines, the facilities of the host institution were sometimes used to perform a specific research task (such as conducting an experiment). Since complex research infrastructure is not available in some countries, researchers need to spend time on site to conduct research. A good example of this is the use of particle accelerators in physics, which are not widely distributed. Despite advancing digitalisation, it is not possible to perform work at this type of research infrastructure remotely. Performing concrete research work is relevant mainly for younger researchers such as PhD students who are in the later stage of their thesis or close to finalising the project. Often, they carry out the work by themselves but have regular meetings, sometimes even mentoring sessions, with their host professor. In some cases, they also worked together closely with other researchers on an operational level.
- The later stages of the research cycle are covered by the **output phase**. The STSMs which were observed are mainly dedicated to finalising academic projects (such as PhD theses) or discussing the further steps after finalising joint projects. Researchers use the time to extensively discuss the follow-up opportunities of papers, which can also connect back to the first stages of the research process in finding new research questions, joint publications or opportunities for research funding.

In summary, the studied cases show the **research type to be relevant for nearly all disciplines** that were investigated. Although the research designs, practices and tools differ across the thematic spectrum, the STSM was seen as an opportunity across the spectrum to conduct work together. In the same way, the **research type is relevant for researchers in all career stages**, since all the different stages were observed in this ideal type ranging from PhD students to more established researchers. While PhD students were more focused on conducting concrete work, more established researchers were more involved in the ideation and output phase.

2.3.2 Knowledge transfer

Among the studied cases, a second type can be identified, which is termed **knowledge transfer** and refers to cases of STSMs where knowledge was transferred from the host institution to the STSM beneficiary, or the beneficiary brought knowledge into the host institution. An important property of this STSM type is the bidirectionality: knowledge can flow to and from the beneficiary. A core objective of COST that is part of any strategic goals of COST is to encourage brain circulation. This type of STSM contributes to this goal by allowing for beneficiaries to spend a limited amount of time in a different context with the explicit plan to acquire knowledge and transfer this knowledge back to the home institution.

- One way of knowledge transfer can focus on **transferring methods**, which includes flows of knowledge from the STSM host to the beneficiary. Applying the STSM in this way is a rather common format. In more detail, it encompasses the beneficiary spending time at the host institution to learn and acquire the skills and knowledge on a new method, which is relevant to their own work, for instance in the context of a PhD thesis. It is also used to train a researcher to transfer knowledge on a certain methodology back to the home institution. In some cases, the STSM researcher came to be perceived as an expert on the method in the home institution and acted as a point of contact to the host institution. This can have positive impacts on the researcher's career development, the home research group can benefit from a new method available at the institution, and the cooperation between the two institutions can be fostered and further developed. In many cases observed in the interview programme, the host institution was renowned or very established in the field. It could even be the owner or proprietor of the methodology, seeking to educate (younger) researchers in that specific methodology (see next paragraph). The pursued activities were a mixture of receiving training, individual work and interactive sessions with the hosting professor or other researchers at the host institution (for instance in the form of presentation and feedback).
- Also observed among the STSMs is a focus on **teaching**. Here, the transfer of knowledge occurs from the STSM beneficiary to the host institution. This focus is less commonly observed and based on only a few cases. Concretely, the beneficiary uses (some of) the time of the STSM to teach a module or course at the host institution. Also, it includes direct work with students at the host institutions, providing them with feedback or input on particular assignments. In one case, the STSM is used to plan a summer school on a topic related to the STSM. This type, although uncommon, is mainly used by more established researchers, visiting already known colleagues at other institutions. At this point, it needs to be pointed out that there are overlaps and potentially synergies with the COST Action Training Schools.
- Another interesting variant is the knowledge transfer with **industry**, however only observed in one case. Here, a bidirectional flow of knowledge occurs. More specifically, the STSM involves a researcher (often PhD student), working academically on a particular method in which the researcher is highly trained. The STSM itself is then focused on applying and transferring this method to a company using the method. In this way, the STSM was beneficial to both sides. The researcher applies the method and learn about its relevance in the industrial context. The company was able to further develop its products and services by grounding them in a more sophisticated data basis (which the methodology allowed). Also, the researchers acquire insights into industry dynamics and have the chance to learn management and leadership skills, expanding their personal development and skills set. The STSM also allows the company and the researcher to become acquainted and can be the prelude to a more permanent engagement (job offers) or more intensive collaboration between the research institute and the company.

The most obvious pattern observed in this knowledge transfer type was that the majority of **STSMs were focused on transferring methods**, only a minority took the form of the teaching or industry types. Furthermore, the methods focus is **mainly used by researchers in earlier stages (R1 or R2 level), such as PhD students or postdocs**. In our view, this makes sense because they are mainly in the learning and training process of methods. Similarly, for the industry focus it makes sense that the beneficiaries are predominantly younger. **No significant differences could be observed with regards to the geographical background** of the beneficiaries. This implies that the knowledge transfer STSMs have been conducted both by widening country beneficiaries as well as non-widening. An interesting finding is that beneficiaries participating in these kinds of STSMs had no specific role in the COST Action (like MC member) and only had a limited involvement in the COST Action.

2.3.3 *Networking*

The third type identified through the research is the **networking type**, in which the STSM is mainly focused on the involved researchers getting to know each other and their respective institutions or research groups. The networking dimension, central to the COST Actions as a whole, plays an important role in all the observed STSMs. As described above, networking during STSMs differs fundamentally from networking during the COST Action meetings. While meetings are large gatherings where the networking goal is to get to know many different people, the STSMs are used for a more intensive and focused networking. This dimension of the STSM is useful to revitalise established collaborations but also to get to know new partners. It seems also to be an effective way of bridging two disciplines – especially by taking the time to understand the work and questions of another researcher from another discipline.

- A variation of this type is **open networking**, which to some degree was part of all STSMs studied. This serves the purpose of the beneficiary getting to know researchers or research groups at the host institution. It can also be used to map competences and explore and understand research in another field. In this specific case, the researchers involved in the STSM aim to bridge two academic fields (interdisciplinary). For **directed networking**, the activities consist of scheduled meetings, which are organised with members of the research group or across the hierarchy with the head of the research group or institute. These meetings are partly scheduled prior to the start of the STSM and in part organised during the STSM itself. Next to this, **non-directed networking** in the form of chats at the coffee machine or organised dinners is also highly useful for the researchers. For instance, in one case, a STSM grantee met coincidentally a researcher working at the host institution with whom they developed a conversation on a new research idea. In the aftermath of the STSM, this chat evolved into a concrete research project.
- Moreover, some **joint STSMs** were observed in the data, for which several STSM beneficiaries were invited to the host institution together. The benefit here is that these STSM beneficiaries could get to know each other, exchange and connect with each other. In one observed case, the host institution welcomed an entire group of STSM grantees, treating them as a cohort. There are possible overlaps and synergies with the COST Action Training Schools here, which can be organised by the COST Actions for exactly this goal: bringing together a group for educational purposes. The difference here is that in the joint STSM more concrete work is performed. The STSM beneficiaries came with their own projects, datasets and problems, mainly working individually, and the host was occasionally present to support and answer questions. While the interaction and mutual inspiration contributes to the impact of this type of STSM, it also brings along a significant effort for the host institution. This type of STSM implies a high degree of coordination and planning by the host institution in advance.

Another feature typical of the networking type is the **personal development** of STSM beneficiaries. More concretely, it involves skills training, career development and, at times, even mentoring relationships with the host researcher. This STSM format needs to be well structured and planned in advance. In the observed cases, the beneficiary and the host needed time for research or informal sessions to get to know and understand each other. Often, it is the beginning of a more long-term relationship in which follow-ups are necessary and contribute to lasting effects.

The patterns in the networking STSM type were that **all STSMs focused to a certain degree on networking**. Most beneficiaries were highly involved in the COST Actions, sometimes also in multiple ones. It was generally **relevant to researchers at all career stages but mainly used by more established researchers**. This STSM type also includes more structured planning of future collaboration in the form of concrete projects, further visits or even mentoring relationships.

Example: In one case of directed networking, the grantee held a presentation at their host institution that was advertised by the host. This helped them to get into contact with other researchers in the same field. *For more information on this case see 0*

2.3.4 Ideal types in the sample

In our sample, some of the described types are observed more often than others. For the purpose of this study, the observed cases are assigned to one or two types. **In reality, the STSMs are multidimensional and can integrate several types**. In other words, knowledge transfer STSMs can also contain elements of networking and even though training a beneficiary in a specific method may not be intended, there is always knowledge transfer happening when researchers work together - be it learning about small-scale differences in research practices, research planning or time management.

As described, the ideal types are helpful to portray the multiple dimensions of the STSMs. The **most often identified type was the research work type** (17 cases) **followed by the knowledge transfer type** (11 cases). The networking type that mainly concentrated on connecting to researchers and building a network was not as dominant (6 types). Among the cases that were assigned to two types, **research work STSMs have often been combined with a networking focus** (5 cases) **or knowledge transfer** (5 cases).

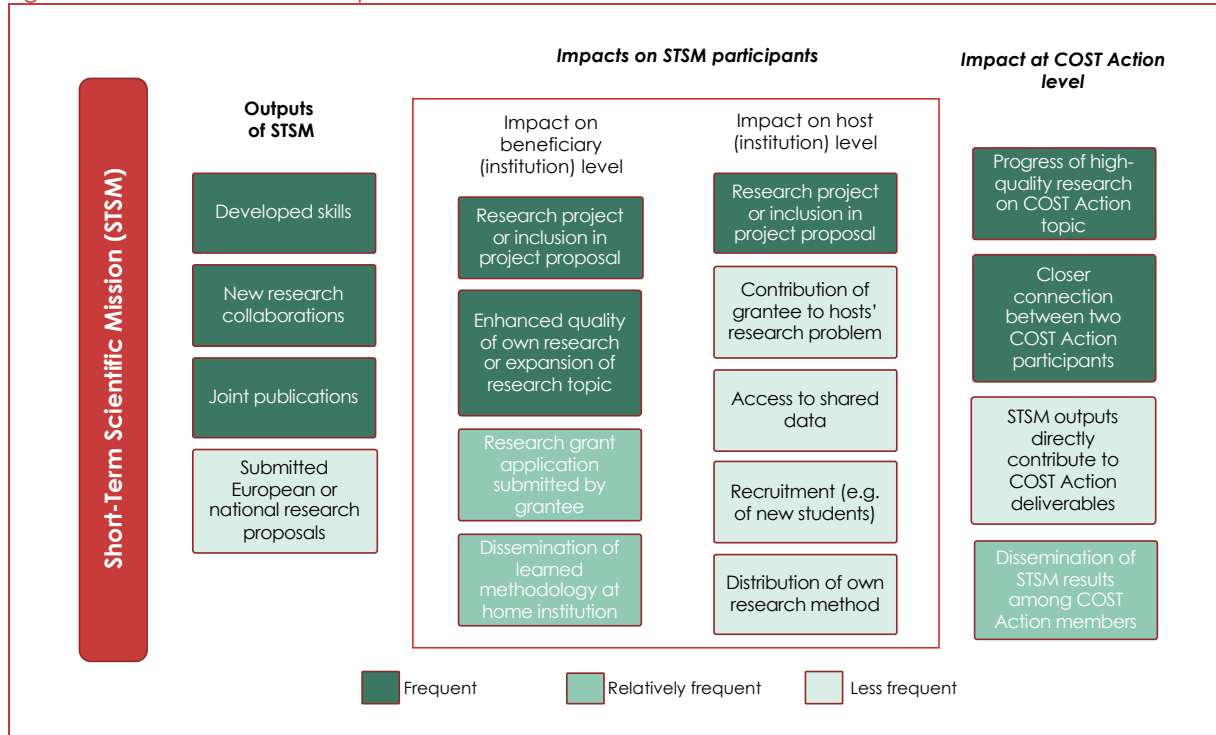
3 Impact analysis

In the comparative analysis of the 44 STSMs in our sample we identified **various impacts at three levels: the level of the beneficiary and their home institution, of the host (institution), and of the COST Action**. At each level we differentiate between those impacts that occurred often in our sample and impacts observed less frequently as well as factors that contribute to the impact. The identified impacts also corresponded to the COST impact model as point of orientation. Finally, we **connect these impacts to the allocated STSM types** considering observations from the data and plausibility (see 2.3). This way, we qualify which impacts might be expected from what kind of STSM type. The implications of the STSM typology give indications for COST Actions and the COST Association, how STSMs could be used for the goals of COST and COST Actions.

For the interpretation of the following results, it must be considered that the investigated STSM cases took place over a period of five years (2017–2021). Consequently, we could detect differences of **advancement of impacts depending on the length of time** that has passed since each research stay. As one would expect, recent STSMs usually have not developed significant long-term effects, yet. For example, most STSMs that could already publish the results of their

STSM completed their stay more than two years ago due to long publication processes (see also 2.1.3). Impacts of such outputs could therefore mainly be observed for STSMs that took place between 2017 and 2019 or can only be predicted for the future based on expectations formulated by interviewees.

Figure 4 - Overview of main impacts at different levels



Technopolis

3.1 Impacts at beneficiary (institution) level

As mentioned in 2.1, the most important immediate outputs of STSMs are developed skills and new research collaborations followed by joint publications and lastly new research proposals. From these outputs, a variety of impacts on beneficiaries derived.

The **impact we observed most often** for beneficiaries in the longer term is the initiation of own or joint **follow-up research projects on the same topic as the STSM, or the mutual inclusion of each other in project proposals**. In a concrete case from the study sample, host and grantee collaborated for the first time, knowing each other only from the COST Action. The grantee initially wanted to learn a specific method from the host and discuss research projects. Like in many cases, they got to know each other personally while working together. They were able to publish a journal paper based on the STSM afterwards. But in the longer run, based on the trust in each other and the identified common research interests that manifested in the paper, the grantee got involved by the host in two more proposals on the same topic.

Secondly, for many beneficiaries an important personal impact of the STSM was the **enhanced quality of their own research or an expansion of research topics**. This benefit was mentioned by many grantees but in diverse ways. For example, in one case, the grantee was unconfident about their own position as a researcher because of a lack of research practice but could learn from discussions with colleagues at the host institution about practical research management and methodological skills. This helped them to improve their PhD

methodologically and complete it on time. In another example, the grantee used an instrument at the host institution that was not available at the home institution. This way they collected data that contributed to their dissertation and, according to the grantee herself, improved it.

Thirdly, another often-mentioned impact is (successful) **research grant applications by the grantee**. Even though many other factors like personal situation, career stage and general research output play important roles regarding the decision to apply for a research grant, for some beneficiaries the STSM added significant value to their decision or even the success. In one case for example, a grantee developed a **mentor-mentee relationship with the host**, from which the grantee learned advanced research management skills and more confidence in their own research ability. In this case, the grantee reported that they would have not applied for an international grant without this support by their host and the gained confidence. In another case, the papers that resulted from the data analysed during the STSM were **published in a journal with high impact factor**. According to the grantee, these two papers in turn were relevant to the positive evaluation of an important national research grant and therefore contributed to the grantee's successful application.

The **fourth impact** we observed multiply in our sample is the **dissemination of a learned methodology at the home institution**. In these cases, the beneficiary usually obtains new methodological skills during the STSM and is the only person with detailed knowledge about this methodology at the home institution. Based on that, grantees train or plan to train colleagues to disseminate the knowledge in the institution.

All impacts are **potentially beneficial for the grantee's career**. In some cases, interviewees even mentioned diffuse expectations regarding career advancements, but only in a small number of cases they assumed a connection between the STSM and a concrete change in academic position. Less often observed impacts are especially connected to the beneficiary institution. One is an institutionalised **teaching and staff exchange**. This institutional benefit is in most cases rather a by-product of collaborations that kickstarted with the STSM, which manifest in institutional contracts or grant applications (like Erasmus+ projects). The second interesting, but rare, example of an impact for institutions that is worth to be highlighted is the **acquisition of an instrument** at the home institution. In one case for example, the grantee selected the host institution for the purpose of **testing and learning how to use an instrument that is not available at the home institution**. Based on the successful approval of the instrument during the STSM, the instrument was purchased by the home institution.

Implications for STSM types

The impact we observed frequently on the beneficiary level were **new research project proposals. These could be found across all three STSM types**. Firstly, in the research type, new insights generated in the research work can be the basis for new projects or proposals. Secondly, the new knowledge acquired in the knowledge-transfer type can lead to new projects or proposals. Thirdly, the network-oriented STSM type can bring researchers together for a new project or proposal. Regarding the **enhanced quality of research**, it was especially STSM grantees who performed concrete research work (research STSMs) or learned a new method that reported of this impact. As for **research grant applications** concrete research results are necessary, it is plausible that this comparably less often observed impact was mainly observed for research STSMs. Finally, the fourth impact of **institutional knowledge dissemination of a new method is mainly observable for knowledge transfer STSMs**, as they are dominated by activities aimed at improving specific methodological skills. However, also research STSMs that actually focus on concrete research work have developed this impact path, as there is an overlap between the two ideal types: Even though it might not be the prior intention to

concretely train beneficiary in a specific method in research STSMs, there is always learning happening when working together - be it regarding small-scale differences in research practices or research planning – that can be transferred to the own institution.

The less often observed impact of **concluding teaching and staff exchange collaborations between institutions was mainly observed for networking STSMs** because networking activity like meeting other individuals, for instance the management level of the host university, is crucial for institutional connections. Finally, we observed one case of knowledge transfer, during which the grantee was trained in using a specific instrument that they wanted to acquire for their institution.

3.2 Impacts at host (institution) level

Overall, we could observe less pronounced, and more diffuse, impacts at the host (institution) level compared to the beneficiary level, which also depends on the status of each host. Mirroring the grantee level, the **most frequently observed impact for hosts are joint follow-up projects and the inclusion into research project proposals by the grantee**. Many hosts reported of an expanded network that developed based on the new collaboration with the grantee. However, for well-connected host institutions, STSMs are one research visit grant scheme among others, while hosts with little international connections associated a much more significant impact with the STSM regarding their own network. In our sample of contacted hosts, the majority of them belongs to the first group. A particular case are **non-European hosts**: for them, the connection they can build to European institutions via hosting a European researcher has in multiple cases impacts for their own network as the connection to the European research community is of high relevance for most disciplines. For instance, one host received more requests on general collaborations in the aftermath of the STSM, another host was even invited to another COST Action.

Less common impacts for hosts relate to method dissemination, data sharing, recruiting, and practical support. In a limited number of cases, we could observe that the host research group profits from a **contribution of a grantee to own research problems**. For instance, in one case, a grantee (young researcher) brought a specific expertise into the research group. The host research group learned from the grantee and could conclude their research work more efficiently. Another impact on host level, observed in very specific cases, pertains to **data sharing**: through the strengthened collaboration. The grantee's research group, which originally used different sources, **shared data with the host**. The host could then expand own research and develop new research projects. Another seldomly observed impact builds on the possibility for the host to assess if the grantee (or other researchers from the grantee's research group) would be suitable for **recruitment based on the experience of jointly working during the STSM**. In the study sample, in one case the grantee was invited to join the host institution but decided against a transfer, in another case, the host hired a researcher from the grantee's institution. Finally, an impact on the host level is the **dissemination of an own research method**. Under specific conditions, for example with a research topic that is still in an exploration phase and the trained method is not popular in the research field (yet), the host can profit from the training of STSM grantees as the dissemination of the method can contribute to the host's position in the research community.

Implications for STSM types

Looking at which of the impacts developed from which kind of STSM type, we **cannot detect a connection between the most important impact at host level, joint follow-up projects and involvement of the host in the grantee's research proposals, to a specific STSM type**. STSMs that concentrated on joint or individual research as well as more loose networking activities gave

impetus to an inclusion. For knowledge transfer STSMs (that often were performed by early career researchers), this impact path usually developed not between the grantee, who at PhD level often is not yet deeply involved in project proposals, and host but with the grantee's supervisor or research group. Still, hosts especially highlighted STSMs that concentrated on concrete research work. Similar to grantees, multiple hosts have reported that they profited from the possibility to **take the time to perform ambitious research work**, for instance an experiment on high scientific level, despite other obligations at their institution. In some cases, host and grantee even have worked together before and still reported that they would have not continued without "taking the time" during the STSM. Still, the benefit of concentrating on a research work task was less often observable for hosts or other collaborating researchers at the institution, as they were not always involved in concrete tasks or could not renounce other obligations.

As we found the remaining identified impacts only up to two times in our sample, an implication on impact paths can only be established based on **plausible assumptions of ideal types and examples**. The impact of method dissemination is most probable for knowledge transfer STSMs that concentrate on the training of such a method. For the data sharing impact, every STSM type could logically come into consideration as it mainly depends on the established collaboration between host and grantee that can be the output of all three STSM types. The recruiting and the grantee support impact were mainly observed for research STSMs. This can also plausibly be expected as both impacts require concrete research work in form of discussion, data collection or analysis activities.

3.3 Impacts at COST Action level

As STSMs are very diverse, they can have various impacts contributing to **COST Action scientific goals – from concrete to more diffuse contributions – and to the COST Action management**. Thereby, **COST Actions themselves are diverse** in setting different priorities in accordance with their research topic which in turn can imply that a similar output of an STSM can have different impacts on different COST Actions. While some COST Actions formulate rather broad goals and deliverables, for example because the research topic is new and the community less connected, other COST Actions aim at more concrete research deliverables and scientific goals. In the impact analysis of STSMs, such differences were considered.

Most STSMs in our sample contribute rather diffusely to their COST Action's scientific goals. In most of these cases this contribution manifests in form of the research topic or a research technique of the STSM that corresponds with the topic or technique of a specific Working Group or the overall COST Action. For instance, in one case the investigated STSM topic was located at the specific intersection of two disciplines the COST Action was dealing with. Consequently, **STSMs that produce outputs that deal with the COST Action topic contribute generally to the progress of research on that topic**. Such contributing outputs can for example be papers and presentations or new methods and the application. In the scope of this study, we could not systematically evaluate the quality of these research results, but several beneficiaries and hosts (especially at more established career stages) stressed that the results were important to the research field because they conducted fundamental research or contributed to central hypotheses of Working Groups. However, for many of the cases in which both STSM parties already knew each other, the research project would, according to interviewees, probably have been carried out even without the STSM. Still, many researchers were convinced that the **research stay improved the quality of the outputs, and therefore the contribution to the progress of the topic under research or made it more efficient**.

Secondly, one of the most frequently expressed effect of STSMs is the **established closer connection between grantee and host**. This contributes, again diffusely, to the **general goal**

that all COST Actions unites – network building. Considering that there are different types of COST Actions, this impact of STSMs is especially important to COST Actions that deal with a topic on which there is little exchange among researchers and where few standards are yet established. An added value evolves also when grantees connect with multiple researchers in the field. The majority of STSMs resulted in new connections beyond the STSM host, mostly with other researchers at the institution but in several cases also with researchers in the region (sometimes being authorities in the field).

While the diffuse impacts of STSMs on COST Actions could often be identified in the sample, **more concrete contributions to COST Actions are less common.** A direct contribution to a COST Action can be identified, **when STSM outputs become part of COST Action deliverables** that are connected to a scientific goal. A limited number of examined STSMs contributed this way to their COST Action via a strategic top-down connection of STSM task and COST Action deliverable. These cases in which, for example, the COST Action formulated concrete research output deliverables that included a data analysis, the STSM that performed the data analysis contributed significantly to the deliverable and therefore the concrete scientific goals of the COST Action.

Yet in several cases also less strategically planned STSM tasks finally contributed to a concrete deliverable of a COST Action, for example when research results were included in a COST Action paper. In several cases, STSM outputs were also presented at COST Action meetings and therefore contributed to **knowledge dissemination among COST Action members.** These more concrete forms of impacts often developed from STSMs that were performed by grantees that were very active in the COST Action.

Example: The COST Action CA18214 implemented an ambitious top-down approach of using STSMs strategically: In the STSM call potential STSM tasks were predefined by connecting them to concrete deliverables. This way the STSM results fed directly into a working paper of Working Group 1. *For more information on this case see 0.*

Impacts on the management of COST Actions

Finally, STSMs can contribute to the **management of COST Actions:** in some cases in our sample, STSM grantees were very engaged in the COST Action and held specific positions as MC members or even Core Group Members and met other Core Group representatives that were located at the host institution during their STSM. These cases had the positive side-effect that these individuals could discuss management issues of the COST Action effectively in person and could get to know each other more in addition to regular COST Action meetings. However, as we have no counterfactual we cannot evaluate if such meetings have changed significantly the implementation of COST Action. Another impact that evolved from STSMs for COST Actions in several instances is an **increase of active network members because previously inactive grantees became more involved in the COST Action in the aftermath of their STSM** (see for an example 0). In several cases grantees, especially at early career stage, even had no knowledge about COST and about COST Actions before.

Implications for STSM types

For the diffuse contributions of STSMs to the progress of research on the STSM topic and to network building in the field, all STSM types are of relevance. Research STSMs that often resulted in research outputs like publications can contribute to the **progress of research** in various ways like new developed research ideas or new collected data. Through knowledge transfer STSMs,

grantees obtain new skills regarding specific methods that are relevant for enhancing the quality of research or even enabling it. This impact of knowledge transfer STSMs can also develop a specifically important impact for COST Actions whose scientific goals concentrate on standard setting. Furthermore, STSMs that concentrate on networking often resulted in new research proposals and scientific outputs that are diffuse contributions to the COST Action scientific goals. Similarly, all STSM types contribute to the connection between host and grantee. For STSMs that focus on networking activities beyond the host a stronger networking impact can plausibly be assumed.

The **contribution to concrete COST Action deliverables**, which was one of the less frequent impacts on COST Actions, **were observable for both research STSMs and knowledge transfer STSMs**. For instance, a COST Action deliverable included data collection for which the grantee first had to learn a specific data collection method (knowledge transfer). When a new method was not required for the performance of a research task, the STSM was used for the execution (research STSM).

For contributions in form of not strategically including STSM results in COST Action deliverables or presenting them at COST Action meetings as well as for the usage of STSMs for connecting with COST Action (Core Group) members, again, **no pattern was observable for STSM types, rather the degree of involvement of the grantee into the COST Action was a relevant factor**.

4 Implications for COST Actions and COST

In this chapter, the findings of the study will be presented for specific target audiences, particularly to COST Actions, summarising good practices to bear in mind when offering STSMs (see **Error! Reference source not found.** for an overview). Moreover, the development potential for STSMs will be provided for the COST Association.

Table 2 - Overview of good practices for COST Actions

Subject	Good practice
Strategic level	
General recommendation	<ul style="list-style-type: none"> • Maintain the current high degree of flexibility in conceptualising and implementing STSMs, accommodating for researchers' needs
Timing offering STSMs	<ul style="list-style-type: none"> • Beneficial at COST Action level: offer STSMs especially in the beginning of a COST Action to involve new participants or to feed STSM results into deliverables • Networking oriented STSMs are reasonable at an early stage of COST Actions to build up new connections • Research and knowledge transfer STSMs are reasonable in the second or third year focusing on the work at hand
Defining STSM topics	<ul style="list-style-type: none"> • Process can be organised in two distinct ways: top-down (defined by the Core Group) or bottom-up (defined by other COST Action participants) <ul style="list-style-type: none"> – A broad top-down call ensures congruence with COST Action objectives – A more concretely defined top-down call can be used by COST Actions with very concrete deliverables via connecting STSM tasks to them – In a bottom-up approach the definition of topics could be an outcome of a COST Action meeting
Career stages	<ul style="list-style-type: none"> • Young Researchers, who especially benefit on individual level, should be incentivised and get more time for an STSM

	<ul style="list-style-type: none"> • STSMs of established researchers can be of shorter duration
Global STSMs	<ul style="list-style-type: none"> • Global STSMs can allow to get access to specific advanced research knowledge and networks but are generally more costly • Emphasising the dissemination of results can assure that the COST Action network benefits from global STSMs
Operational level	
Administration	<ul style="list-style-type: none"> • Low administrative burden should be maintained
Preparation	<ul style="list-style-type: none"> • Preparation to schedule the visit via (video) calls between host and grantee (and where applicable other COST Action participants) supports an effective implementation of an STSM
Dissemination	<ul style="list-style-type: none"> • Feedback loops back into the COST Action, e.g. via presentations of results at meetings enhances the impact of STSMs

Technopolis

4.1 Good practices for COST Actions

For COST Actions and those responsible for STSMs in the COST Action, this study aims to show that **STSMs are considered a valuable instrument which COST can offer**. Particularly, STSMs serve a purpose complementary to the COST Action meetings, where individual researchers can spend time to work together on joint projects. STSMs are highly interesting to young researchers, but also create value for the COST Actions in funding research visits of senior researchers.

On the **strategic level**, COST Actions should consider the following good practices regarding STSMs:

- STSM beneficiaries express their appreciation of the **high degree of flexibility** which characterises STSMs across the COST Actions. Researchers can pursue a wide range of different activities during the research stay and are free to select their host institution. The reporting requirements involve a brief STSM report. This handling fits in well with the overall COST stewardship approach, which lays the emphasis on the facilitation of researchers conducting research. The high degree of flexibility positively impacts the activities and results because researchers focus on exactly what is necessary for the advancement of their research. Thus, **COST Actions should strive to maintain this high degree of flexibility accommodating for researchers' needs**.
- COST Actions should pay attention to the **timing of STSMs**. In the four-year lifecycle of COST Actions, STSMs occur all throughout. However, according to our findings, it is generally more beneficial to the COST Action to concentrate the STSMs at a rather early point in the COST Action (e.g. in the first half). The deep connections between researchers which get to know each other during the STSMs in a trustful relationship can contribute to the progress of the COST Action and the earlier these connections are built, the longer they benefit the COST Action. Offering STSMs at a later stage of the COST Action will mainly benefit the individuals involved but might have less impacts at the COST Action level. For instance, STSM results cannot feed into COST Action deliverables on time, when published at a late stage. It is reasonable to get beneficiaries that are not active yet more engaged in the overall COST Action via the STSM at the beginning of the Action. Worth considering is that **different STSM ideal types might be of relevance depending on the timing of the COST Action**. For instance, the networking type might be deemed relevant in the earlier stages of the COST Action. In the second and third year, STSMs could rather serve the purposes of research and

knowledge transfer, focusing on the work at hand contributing to the concrete COST Action scientific objectives.

- An important aspect to consider is the **process leading to the determination of the STSM topic**. In the observed cases of this study, the calls are conceptualised by researchers in management positions in the Action, such as the COST Action Core Group and Management Committee members. **This top-down approach, used either for a broad call or for a more concrete determination of STSM topics, ensures a high relevance for and congruence with the objectives of the COST Action in advance**. In the latter more strategic practice, for example, COST Actions can connect STSM tasks to specific COST Action deliverables. **Another way of determining the topic of the STSM could be a bottom-up process**¹³. This could include STSMs to be created as outcomes of COST Action meetings or of meetings of particular Working Groups, in which a need for more in-depth research on a certain topic was identified by participants. The implication of this would be to provide opportunity to a broader set of researchers to define the direction of the STSMs. Opening this process could be another interesting way to involve more researchers in the design process and perhaps increase the strategic use of STSMs.
- STSMs are valued by researchers at all **career stages, young researchers and more established** ones alike. According to our findings, the impacts differ across career stages. Especially young researchers benefit from the STSMs at an individual level, as the STSM often manifests their first opportunity to build an international network or to work in and with a new research group. Yet, also the more established researchers can benefit from the research stays. The current practice that STSMs are open to researchers from all career stages while incentivising specifically young researchers should continue, but COST Actions should consider to concretely support them. They could, for instance, dedicate a lion's share of STSMs to younger researchers as more established researchers can potentially tap into other sources of income or research projects to fund their time abroad. The stays of the more established researchers could also be limited to shorter time periods (1-2 weeks) while younger researchers with less experience generally need more time and can benefit from longer durations.
- COST Actions can allow for researchers to spend their STSM beyond Europe in so-called **global STSMs**. In general, these global STSMs can be beneficial for the grantee, the host institution and the (continued) inclusion of the host institution in the COST Action. COST Actions however need to deliberate on the implications of such global STSMs for the Action. Particularly in fields such as computer science, grantees can with a global STSM tap into renowned and highly advanced research knowledge and networks. This has the potential to add scientific value to the COST Action. However, global STSMs are costly and more difficult to organize than STSMs inside of Europe. Especially when considering the trade-off between funding one or two global STSMs, or a higher number within Europe, a "going global" needs to be justified, e.g. with an expected extraordinary scientific value for the COST Action or the scientific field. A good practice for the COST Actions is to emphasise the dissemination of results especially from the global STSMs to let other members of the COST Action also benefit.

At **operational level**, the following good practices should be kept in mind:

- Beneficiaries value the **low administrative burden** in the application and the reporting phase of the STSM. The application process is straightforward and requires only few

¹³ This idea was developed by the study team and was informally discussed also with some interviewees. However, no case was observed where this bottom-up process was deliberately used.

documents, reducing the time needed for application significantly. The same holds true for the reporting requirements. In keeping the administrative burden light, COST Actions allow researchers to focus on their research and encourage applications for STSMs.

- In some cases, a **structured preparation of the STSM via online meetings** was conducted prior to the actual research visit. During preparation usually the schedule, research focus or practicalities of the stay are discussed and planned in detail. In these cases, the researchers were often able to use the in-person time at the host institution more efficiently. Also, the researchers should make sure that the grantee is able to meet other researchers as well; the research stay should, for example, preferably not fall into the holiday period.
- Those STSMs **anchoring the dissemination of STSM results** systematically among members can significantly enhance the impact of STSMs for the COST Action. Considering the strategic use of STSMs, COST Actions could launch STSMs in light of an upcoming COST Action meeting or conference. The good practice for STSMs is to allow (or require) feedback loops back into the working process of the COST Action.

Good practices for STSMs can also be derived considering the types developed in this study. In the STSMs focused on conducting **research**, the researchers focus on concrete research outputs. It helps to spend time preparing the research in tandem with the hosting institution in advance, ideally preparing a mutually agreed schedule for the research. For the **knowledge transfer** type, good practices for STSMs include a structured dissemination of the results in the home institution, for instance in form of a methodological training for colleagues. For the **networking type**, as was already mentioned, a good practice is to schedule a series of meetings, especially with more senior researchers at the host institution in advance. It was also considered beneficial to leave gaps in the scheduling to allow for more spontaneity regarding meetings. Especially for more established researchers doing an STSM, a good practice in STSMs is to plan an introductory presentation (with the help of the host) involving faculty from the host institution as an audience. In this way, researchers at the host institution that have similar research interests can get to know the grantee in an efficient and professional manner.

4.2 Development recommendations for STSMs

Based on the interviews, the study team derived some recommendations for COST to further develop STSMs as an instrument. As pointed out at multiple points in this study, STSMs are considered a **valuable and well-functioning instrument of COST** and thus, there is no significant need for changing or improving STSMs. In fact, many interviewees have advocated for more budget to be allocated to STSMs precisely because they are such an important instrument. However, it needs to be considered that this insight is derived from qualitative interviews, conducted only with researchers involved in one way or another with STSMs. This study did not consider other data sources, measuring the impacts of the STSMs.

The COST Actions have **high degrees of flexibility** in designing their STSM programme. This contributes significantly to the positive reception of STSMs by the beneficiaries. The provided flexibility for COST Actions is directly passed on to the beneficiaries. This includes the flexibility in designing the calls, determining the topics (also regarding the top-down and bottom-up mechanism), the duration of the stays, the inclusion of career stages, the geographical openness and also the low administrative requirements on the side of the STSM beneficiaries. It is important not to overengineer STSMs and to keep them a light, low-threshold instrument which researchers can use to their own benefit.

In the sample, **multiple cases were encountered that had realised several STSMs** (often in various COST Actions) over the years. In general, the second (or sometimes third) STSM was considered by the beneficiaries to be a better experience than the first one. This was mainly

because they could learn from the experience of the first STSM and for instance use a different approach while planning the STSM. Yet, in selection, an emphasis should be put on those researchers (in particularly young researchers) who have not been on STSM before. This is to provide opportunities also for those not likely to apply to research mobility funding and not to cater perpetually to the same group.

There seem to be some **overlaps between STSMs and other COST instruments**. In these cases, the STSMs were used to teach and train (usually by the visiting researcher at the host institution). This shows that there is a need for training formats and that researchers have the choice to implement it in both instruments, STSMs and Training Schools. Another plausible explanation for this overlap was the unawareness of the grantees of these other formats (in this instance Training Schools). In this case, more and clearer communication on the purpose and complementarity of the different formats would be recommended.

Appendix A

A.1 Survey Questions

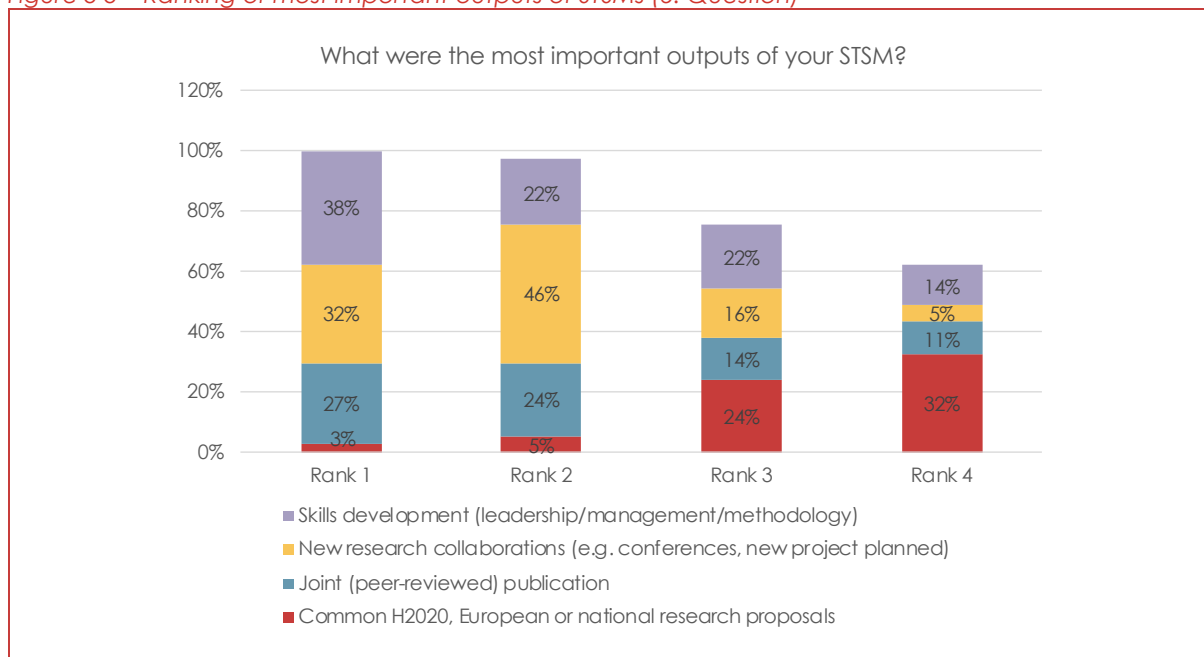
Table 3 - Overview over survey questions

Questions	Answer options
What did your STSM contribute to most?	Ranking of <ul style="list-style-type: none"> individual scientific work, COST Action Working Group (WG) the COST Action as a whole
How much of your STSM have you spent on the following activities?	Allocation of percentage points between the activities <ul style="list-style-type: none"> Discussions with researcher at host institution on research topics Networking with researchers at host institution not directly related to topic Individual work focusing on data collection Individual work focusing on data analysis use of research infrastructure only available at host institution Learning new method or usage of tool/ instrument Other (Free text)
What were the most important outputs of your STSM?	Ranking of <ul style="list-style-type: none"> Common H2020, European or national research proposals Joint publication New research collaborations Skills development

Technopolis

A.2 Visualisation of survey results

Figure 5 5 – Ranking of most important outputs of STSMs (3. Question)



Technopolis, based on results of mini survey

A.3 Interview guides

A.3.1 Guide for interviews with STSM grantees

Grantee background and (career) development

- What is your individual disciplinary background and position?

COST Action

- What are the objectives of the COST Action?
- How would you describe your role in the COST Action? (*If no role, completely new to STSM, then what about prof/ boss/ other colleagues?*)

Short-Term Scientific Mission

- How did you learn about the COST Action and the possibility to do STSMs? Why did you decide to apply for and participate in an STSM?
- *For global STSMs:* Why have you decided to go to this specific country?
- What activities did you pursue during the STSM? (*e.g. working on joint publication, contributing to research proposal, helping with conference, personal development*)
- In how far are the objectives of the STSM aligned to those of the COST Action (as far as you are aware)?
- Has the STSM been used for an interdisciplinary project?

Results & Impacts

- What are the concrete results and outcomes of the STSM? (*e.g., publication, research proposal, conference, career advancement*) – (*linked to targeted online survey*)
- How have these results contributed to the COST Action results and goals (Working Group's work)? How do you think the STSM contributed to the scientific field?
- *For publication:* What other, secondary impacts did the publication have? How did the STSM specifically contribute to the process?
- How will you be able to benefit from the STSM beyond the COST Action?
- How did the STSM contribute to your personal development?
- How has your collaboration with the host institution developed (if not explained before)?
- What would have been different without the STSM?

General experience and future outlook

- How would you describe your experience with the STSM? Where can you identify any challenges that have occurred during the STSM? What, in your opinion, worked well?
- *Optional:* How has the COVID-19 pandemic affected the STSM from your perspective?
- *Optional:* How has your COST Action used STSMs (strategically)? What challenges and opportunities can you generally identify regarding the concept of STSMs?
- How could the concept of the STSM develop in the future to further enhance the STSM experience?

A.3.2 Guide for interviews with STSM hosts

Host background and general questions

- What is your personal disciplinary background and position?
- Do you have knowledge of other STSMs that have been hosted at your institution/ department/ research group?
- If yes: What is your general motivation to host researchers in STSMs at your institution? What has been the general experience with STSMs of your institution/ department/ research group?

COST Action and STSM (questions relate to the selected STSM)

- What was the role of your institution in the COST Action? How would you describe your personal role in the COST Action? (*If no role, completely new to Action, then what about prof/ boss/ other colleagues?*)
- If aware of COST Action goals and work (esp. when host strongly involved in Action): How did the STSM fit into the work of the COST Action?
- Optional: How has your COST Action used STSMs (strategically)? What challenges and opportunities can you generally identify regarding the concept of STSMs?

Short-Term Scientific Mission

- Why did you offer to host this STSM (evtl. how did you learn about the possibility to invite researchers)? What was the motivation to the specific researcher as STSM?
- What activities did you pursue during the STSM? (*e.g. working on joint publication, contributing to research proposal, helping with conference, personal development*)

Results & Impacts

- What were the outcomes of the STSM? (*before the interview, the outcomes as taken from the beneficiary interview will be noted to compare*)
- How have these results contributed to the COST Action results and goals (Working Group's work)?
- How has the STSM contributed to the scientific field?
- In what ways have you/ your institution benefitted from the STSM?
- For publications as results, if not explained before: What other, secondary impacts did the publication have? How did the STSM specifically contribute to the process?
- If not explained before: How has your collaboration with the grantee developed (because of the STSM)?

General experience and future outlook

- How would you describe your experience with the STSM? What did you learn from the STSM?
- Would you again host an STSM?
- Where can you identify any challenges that have occurred during the STSM? What, in your opinion, worked well?
- How could the instrument "STSM" be further enhanced?
- Optional: How has the COVID-19 pandemic affected the STSM from your perspective?

A.4 Vignettes

A.4.1 Knowledge Transfer STSM with impact at institutional level – New methods and cooperation partner

Duration of Action	Time of STSM	Country of home institution	Host Country	Grantee career stage
07/11/2017 to 06/05/2022	04/2018 (2 weeks)	ITC (Serbia)	non-ITC (United Kingdom)	Recognized researcher (R2)

Context - COST Action: The COST Action's¹⁴ goal was to tackle the lack of data on patients with rare neurodevelopmental disorders (NDD) by creating a network to enhance their identification and to standardise research methods and exchange information and knowledge. Among the activities carried out, 10 workshops for network building were held, a website for data exchange was developed and members worked on common guidelines on research practice.¹⁵

The STSM - Starting point and activities: The STSM grantee, then an assistant research professor (now associate research professor (R3)), was a Management Committee Member for their country. The STSM host was COST Action Chair and is Co-Director of their institute (leading researcher (R4)). The grantee selected the host institution strategically: the home institution lacked knowledge about a specific methodology on stem cell analysis, they aimed at learning it at a leading institution, the host institution, in the field. Most of the STSM time (60 %), the grantee received training on this new technique (**knowledge transfer**), but the researchers also discussed projects and explored collaboration potentials for their institutions (**networking**). To a smaller extent concrete research results have been discussed (**research work**).

Description of impact path: Based on the knowledge acquired during the STSM, the grantee **transferred the new method to the home institution**. Furthermore, the personal trust built during the STSM made following **closer collaboration** between the research groups possible.

Benefit for the grantee (institution): The establishment of the new internationally recognized method provided opportunities for the home institution (and the grantee) to get integrated into the international research community, which resulted inter alia in a national grant and in leading a Horizon Europe project. The host institution became partner in the new projects. The expansion of the international collaboration was especially important for the home institution, as it is located in a small country, where collaboration is important due to a lack of resources. Furthermore, the grantee profited from a joint research paper as outcome of the STSM.

Benefit for the host (institution): For the host institution, the benefits have developed at two levels: First, the institution, being also the institution leading the Action, was able to put itself into a leadership position in the field. Second, the institution as well benefits from the collaboration by being integrated into new projects that have evolved from it and by getting access to more data, that is rare in the field.

Benefit for the COST Action: As this COST Action concentrated on building up a network and common standards, the STSM has contributed to these specific goals by establishing a strong collaboration and integrating an institution in an ITC into the research community. It therefore contributes especially to the COST goal of societal impact on bridging gaps in the ERA.

¹⁴ [CA16210 - Maximising Impact of research in Neuro Developmental DisorderS \(MINDDDS\)](#)

¹⁵ See: COST Action Progress Report at 24 months (CA16210)

A.4.2. *Research work STSM - strategically contributing to COST Action deliverable and supporting career advancement*

Duration of Action	Time of STSM	Country of home institution	Host Country	Grantee career stage
2019-2023	10/2021 (2 weeks)	ITC (Poland)	non-ITC (Norway)	Recognized researcher (R2)

Context - COST Action: This COST Action¹⁶ explores the phenomenon of new workplaces in a comparative European perspective. It is a research-oriented COST Action that aims at delivering concrete research outputs e.g., measuring effects of working spaces or developing policy guidelines. The Working Groups (WG) are defined according to their respective research output. For instance, WG1 focuses on defining and mapping of working spaces and typologies. The COST Action **connects STSMs strategically to these concrete deliverables via predefining potential STSM tasks** and rotating STSM hosting among COST Action members. The STSMs have been monitored and their work has been documented on the COST Action website¹⁷.

The STSM - Starting point and activities: In this STSM, the grantee was a postdoctoral researcher (R2) with limited involvement in the COST Action. Their host, a professor (R3), is Science Communication Coordinator of the COST Action and thus involved in the Core Group. Both did not know each other before. The grantee applied for the STSM because of their research interest in working spaces in Nordic countries and in expanding their international research experience. The predefined task of the STSM was to conduct a qualitative analysis of existing case studies (contributing to deliverable 1.4. "Summary reports of WG1 findings"¹⁸). The STSM was spent mainly on **research work**: 40 % of the time, the grantee, conducted data analysis (the qualitative analysis), 15 % on data collection (field trips visiting working spaces), and 30 % they discussed with researchers on the STSM topic. The rest of the time was spent on **networking** with other researchers. The STSM was not used for learning a new method (**knowledge transfer**).

Description of impact path: The scientific results of the STSM contributed to a COST Action deliverable and the corresponding exchange integrated the grantee into the COST Action.

Benefit for the grantee (institution): As the STSM task was connected to another STSM and a COST Action deliverable, the grantee was in contact with other COST Action members and got more integrated into the COST Action. As a follow-up, they organised a COST Action workshop, which potentially supports further integration in the international research community. On top of the higher level of engagement, the mentor-mentee relationship with the host supported the grantee's career development and project management skills, which motivated them to apply for an international fellowship and advance their research career.

Benefit for the host (institution): As part of the COST Action's Core Group, the experience of hosting an STSM was useful to understand this networking tool. The agreement on a predefined task plan for the STSM was especially valuable to organise the cooperation effectively.

Benefit for the COST Action: The analysis results contributed to a working paper of WG1 and thus to the defined scientific goals of the COST Action.

¹⁶ [CA18214 - The Geography of New Working Spaces and the Impact on the Periphery \(comelNperiphery\)](#)

¹⁷ <https://www.nmbu.no/en/projects/new-working-spaces/activities/node/38913>

¹⁸ See: Memorandum of Understanding for the implementation of the COST Action "The Geography of New Working Spaces and the Impact on the Periphery" (comelNperiphery) CA18214

A.4.3. Networking STSM - resulting in new collaborations and a research grant

Duration of Action	Time of STSM	Country of home institution	Host Country	Grantee career stage
2017 to 2021	01/2018 (5 days)	Non-ITC (France)	IPC (USA)	Established researcher (R3)

Context - COST Action: The goal of the COST Action EuroXanth¹⁹ was to gather microbiological experts and knowledge about specific bacteria causing (crop) plant diseases to contribute to the fight against food security. In its Working Groups EuroXanth concentrated on specific aspects of **research on bacteria**, for example population structure (WG1) or genetic resistance (WG3). The COST Action implemented 45 STSMs, three training schools, and a couple of conferences and COST Action meetings.²⁰

The STSM - Starting point and activities: The grantee, who got a new position as an established researcher (R3) shortly before the STSM, was actively engaged in the COST Action as one of the MC members of their country. Their host, a leading researcher (R4), was involved as MC Observer (International Partner Country). Host, grantee and a third group at the host institution aimed at strengthening their on-going collaboration in a research project. Also, the grantee wanted to acquire knowledge on a bioinformatical technique the hosting research group is known for. In their STSM, the grantee spent most of the time (70 %) on discussing and networking with researchers at the host institution and beyond (**networking**). This included bilateral meetings and a presentation the grantee held about their research, which was supported by the host, who advertised the talk at their institution. The rest of the time was spent on learning the bioinformatical technique (**knowledge transfer**); the STSM was not used for research work like data collection or analysis.

Description of impact path: The connections made with their host and with other researchers via the presentation and meetings **helped the grantee to initiate collaborations and projects and start their own research position**. Additionally, the joint work with the host resulted in research outputs which contributed to a **successful research grant application** by the grantee.

Benefit for the grantee (institution): The technique learned during the STSM and the discussions with the host were central to work on the results effectively after the STSM, which eventually lead to two joint papers in high impact journals. These were a precondition for getting an important national research grant. Additionally, further, partly well-known, researchers learned about the grantee's work via the seminar they gave at the institution, which made it possible to discuss with them and expand the network despite the short visiting period.

Benefit for the host (institution): Also for the host, the joint work contributed to a consolidation of joint collaboration, which includes e.g., frequently exchanging data. Also, the connection strengthened the host's connection to COST: they got then involved in another COST Action.

Benefit for the COST Action: The STSM project (including the approach that based on the technique) contributed to the topic of WG 2 and part of two papers that came out from it.

“We really consolidated our collaboration, it was much easier to do more afterwards.” (Grantee Alice Boulanger)

¹⁹ [CA16107 - EuroXanth: Integrating science on Xanthomonadaceae for integrated plant disease management in Europe](#)

²⁰ See: COST Action Final Achievement Report (CA16107)

A.4.4 Research STSM kickstarting individual career and engagement in COST Action

Duration of Action	Time of STSM	Country of home institution	Host Country	Grantee career stage
2016 to 2021	09/2019 (4 weeks)	Non-ITC (UK)	Non-ITC (Netherlands)	Recognised researcher (R2)

Context - COST Action: The COST Action²¹ deals with the topic of pooling knowledge on natural bonding principles of material surfaces (Bioadhesion). Its goals are oriented towards fundamental research: to identify bioadhesive systems, to evaluate bonding properties and performance (WG1) and to design artificial blueprints (WG2). Among the deliverables of the COST Action are a developed model, a database, a Special Issue in a relevant journal and a book.²²

The STSM(s) - Starting point and activities: The grantee of this STSM started their Postdoc (R2) in a new discipline (bioengineering) ahead of the research stay and was not very active in the COST Action before. They worked as experimental researcher in a newly established laboratory. The host, a professor (R3), was Management Committee member. As the grantee was looking for establishing herself in a new field of research, they were looking for **equipment that was not available at their laboratory** and selected their host accordingly. The grantee conducted two STSMs at the host institution: the second STSM was used to extend and optimise the work of the first one. During both they spent most of the time on concrete experimental **research work** (data analysis and discussions) in the laboratory and the rest on **knowledge transfer and networking** (25 %), while no time was allocated to learning a specific technique.

Description of impact path: The basic research conducted during the STSM resulted in data that helped the grantee to **kickstart own experimental work** within their research group. It contributed to the COST Action's scientific goals and was the entrée point for the grantee into the COST Action.

Benefit for the grantee (institution): The material that was produced during the STSM with the hosts' equipment was according to the grantee very fundamental and essential for the start of experimental research in the new postdoc position, especially against the background of lacking equipment in a newly built laboratory. Three publications are currently produced based on it.

Benefit for the host (institution): The STSM was the initial start of a consolidated collaboration with the grantee and is reflected in the ongoing work on joint publications. Even beyond that, the STSM was an impetus for the host that deepened the collaboration with the grantee's research group and manifested inter alia in mutual visits.

Benefit for the COST Action: The results of the STSM, that dealt with a scientific hypothesis relevant to the COST Action, were presented by the grantee at a COST Action workshop and at a conference, thereby contributing directly to the goal of knowledge sharing. The STSM also encouraged the grantee to become more involved in the COST Action.

"Now I am collaborating with many people of the [COST] Action, [this] would have probably not been possible without this starting point" (Grantee Domna-Maria Kaimaki)

²¹ [CA15216 - European Network of Bioadhesion Expertise: Fundamental Knowledge to Inspire Advanced Bonding Technologies \(ENBA\)](#)

²² See: COST Action Final Achievement Report (CA15216)

A4.5 Research work and networking - established researcher visiting ITC

Duration of Action	Time of STSM	Home Country	Host Country	Grantee career stage
2014-2018	09/2017 (2 weeks)	Non-ITC (Spain)	ITC (Serbia)	Established Researcher (R4)

Context - COST Action: The COST Action²³ explores the role of metal spin states in a diversity of chemical problems, where spin is an important factor. For this purpose, theorists and experimentalists are brought together in a network and, jointly, work towards establishing a common database. This will be openly accessible, benefiting the scientific community and leading to scientific and technological advances. The four Working Groups included: Spin state database, Enzymatic spin states, Spin crossover and Biomimetic spin states.

The STSM - Starting point and activities: In this STSM, the grantee was an established senior researcher, who also served as the COST Action Chair. Similarly, the hosting researcher was also an established researcher, leading the first Working Group on establishing the common open database. The researchers knew each other before the STSM and also coordinated the proposal for the COST Action. The reason for selecting the host was a longstanding relationship which both shared and the academic added value which the STSM created. For the host, the STSM represented an opportunity to welcome a renowned researcher in Belgrade for two weeks. The activities included a public opening lecture²⁴ and the mentoring of PhD students (**knowledge transfer**), participation in two meetings of the department and one group meeting with the PhD students (**networking**) and the planning of a series of 15 papers (**research work**).

Description of impact path: The work conducted during the STSM was instrumental for developing a research agenda. In this, 15 papers were planned concretely, and of those, 10 have already been written. Furthermore, the STSM facilitated further research stays of two Serbian PhD-researchers in Spain for a research visit (not funded by COST).

Benefit for the grantee (institution): For the grantee, the STSM was academically valuable, because the scientific agenda for the upcoming years was developed together with the host. Moreover, the grantee institution was visited by two Serbian PhD students as a result of the STSM. Together with the host, a proposal was submitted for a research project funded for Horizon Europe Twinning– unfortunately, this proposal was not selected.

Benefit for the host (institution): For the host, the STSM was highly impactful on the individual but also on the institutional level. Individually, the researcher benefitted from the papers published which were planned during the STSM. They admitted that one of the papers published was “the best paper written by them so far”. On an institutional level, it was important for her to have a leading figure from the field present in the department, serving as inspiration for the PhD students, creating visibility for the topic inside the university but also connecting other colleagues with the renowned grantee. Concretely, more applications from PhD students were received. Generally, it was stated that ITCs benefit from visits of renowned researchers because in this way, the picture of the universities in the wider research community changes.

Benefit for the COST Action: The developed research agenda contributed to the progress of the entire field but also contributed to the COST Action deliverables. Plans were made for 15 papers, at the time of writing 10 have been published.

²³ [CM135 – Explicit Control Over Spin-states in Technology and Biochemistry \(ECOSTBio\)](#)

²⁴ This was open to the public and approximately 60 people (professors, lecturers, students) attended.

technopolis
group 

www.technopolis-group.com