Ref. Ares(2021)2897285 - 29/04/2021

Deliverables

Deliverable Number	**D4.4**
Deliverable Title	**Evaluation report on access and structuring of light sources for SMEs**
Lead Beneficiary	**ESRF**
Type	**Report**
Dissemination Level	**Public**
Due date of delivery	**Month 48 – April 2021**

INDEX

1. INTRODUCTION

The present deliverable D4.4 “Evaluation report on access and structuring of light sources for SMEs” of NA3 work package summarises on the one hand the feedback from small and medium sized companies, SMEs, that have benefitted from the pilot programme “Tailor-made for SMEs Trans-national Access” (TamaTA, work package 22). The aim of TamaTA is to lower the barriers between SMEs and light sources by granting short experiments and access to 10 different light sources located in Europe. On the other hand, the document also reports the views of the CALIPSOplus partners on outreach strategies to contact and attract SMEs and industries in general and on which are the most effective approaches for this purpose.

SMEs are abundant in number and have a crucial role in the innovation and technology transfer of products and technologies in Europe and very often are strategic targets for the research facilities. However, the resource limitations of SMEs and the preconceived idea that light sources are not aligned with their needs make it difficult for them to have access to the knowledge and techniques available at light sources. For this, it is of relevant importance to understand the best approaches that facilities should perform to increase the awareness among SMEs, to confirm the usefulness and benefits of TamaTA for the companies, to use their feedback to look for improvements and to verify their interest in future similar programmes.

All this information has been compiled through a detailed analysis of two different surveys, one to the SMEs having accessed light sources via TamaTA and another one to the partner light sources providing the services.

2. SURVEY TO SMEs

2.1. Survey

The SMEs survey was performed in January and February 2021 to all the SMEs completing the TamaTA access to the light sources from January 2018 up to December 2020. This represents a total of 18 SMEs. There is a close contact between each light source and their corresponding SME for a fast feedback, however this is the first survey performed in the context of TamaTA and all the participating light sources. It allows a global overview of the light source services and TamaTA to be made.

2.1.1. Link to the survey

The survey was launched using Indico web page, in cells.es domain, through the following link:

https://indico.cells.es/event/263/overview

2.1.2. List of questions

A list of 6 questions was included in the survey to the SMEs. The aim of the questions was to collect information on how the SMES knew about TamaTA, on the difficulties to use this

access, on the advantages or disadvantages of using a single entry point, on the usefulness of the results obtained and on the quality of the serviced provided. The list of questions is as follows:

1. How did you know about CALIPSOplus and in particular about the TamaTA SME access programme?
2. Was it easy to submit a proposal? Do you think that the procedure for this type of European Union funds is simple and easy for a SME?
3. Did you find it useful to have chance to access to all the main European light sources through a single scheme?
4. Was it the first time that you used a light source infrastructure? After this TamaTA access, have you used a light source again? With or without the TamaTA scheme? Do you foresee to use a light source infrastructure again in the future?
5. Did you get valuable results from the experiment that you performed? Have you used the results for developing an innovation or a patent? Was the innovation or patent related to a new material, product or service?
6. Would you recommend TamaTA access to other SMEs? Would you suggest any changes to the current TamaTA scheme?

2.1.3. Anonymity

In order to enhance participation and promote transparent answers the survey was carried without collecting the name of the person answering the questions and for the same reason the name of the company will be kept confidential in this report.

2.2. Results and analysis of the survey

<u>About the survey and participants:</u>

The survey was analysed by examining the answers received from 15 different companies that have performed and completed experiments using TamaTA scheme. It represents 88% of the SMEs that completed their experiments at the moment when the survey was launched, therefore, the SMEs answering this survey is a meaningful sample of the total population. The SMEs that have participated in the survey come from 8 different European countries, Spain being the country with the highest number of answers. An important remark is that companies located in countries that do not have a light source have also benefited from TamaTA and sent their feedback, as is the case for Denmark and Slovakia (Figure 1).

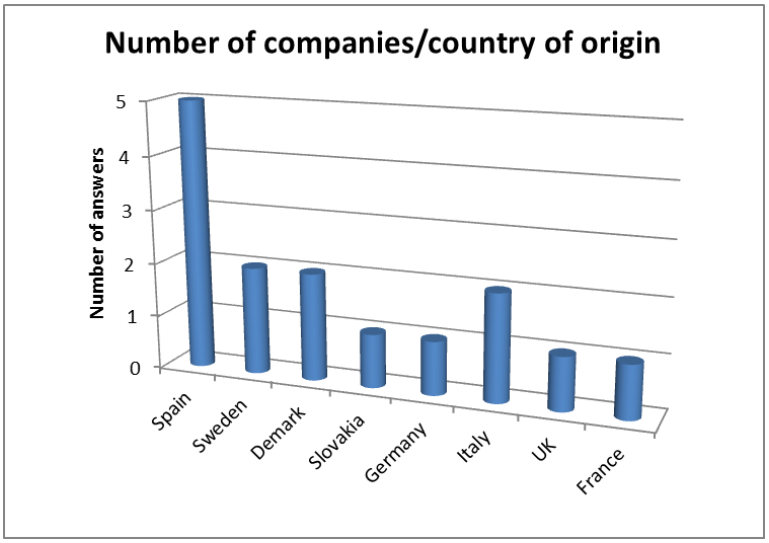

Figure 1. Number of answers received per country of origin of the SME.

The companies belong to a variety of industrial sectors which makes the results of this survey valid for general purpose. Most of the companies are working in engineering and technology sector. Health is the second industrial sector which includes pharmaceutical and cosmetics industries (Figure 2).

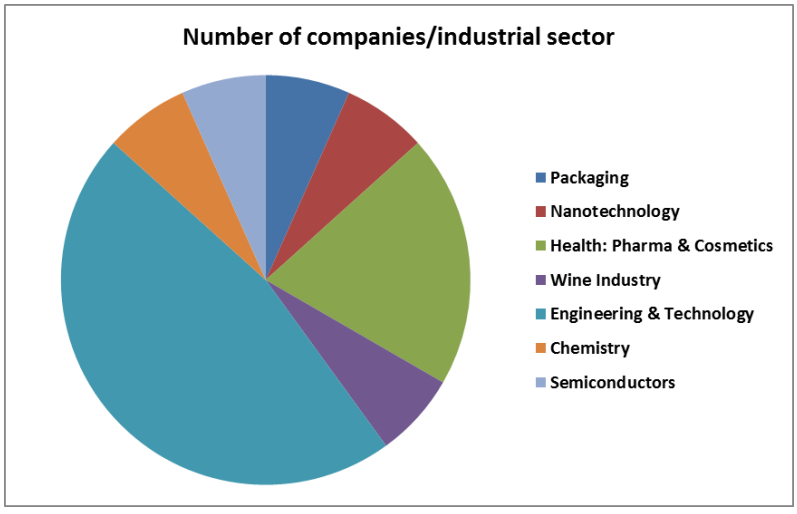

Figure 2. Industrial sectors of the companies participating in the survey.

Awareness of TamaTA:

60% of participants to the survey were aware of the TamaTA scheme through outreach and engagement activities carried out by the facilities, 27% through other colleagues and partners, 7% through the web and the rest is not specified (Figure 3). It indicates the importance of the role of the facilities in being active and promoting their capabilities to the industrial sector. This is one of the reasons why the second part of this deliverable is focussed on industrial outreach activities performed by the facilities.

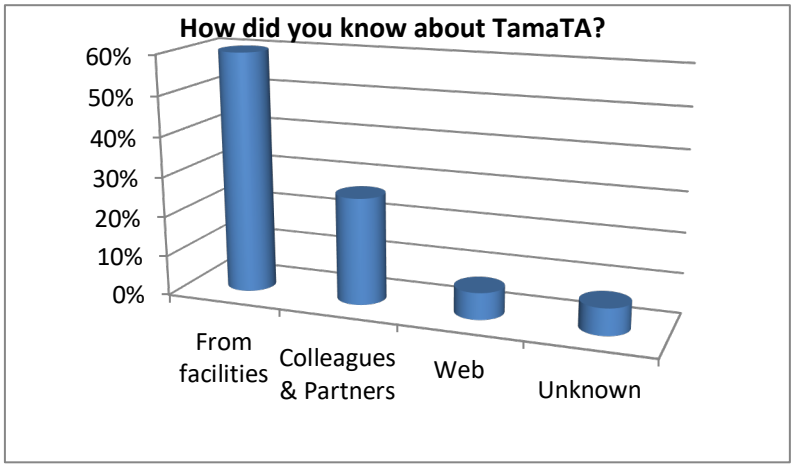

Figure 3. Feedback from the SMEs regarding the awareness of the TamaTA program.

Simplicity of TamaTA procedure

The TamaTA scheme and procedures were elaborated with the intention to minimise the paperwork and workload to the company when submitting a proposal. With this aim, a single entry point for proposals was created, where a minimum relevant information about the experiment is required and with an agile evaluation procedure. All this has been reflected with a very positive answer from the companies as all of them have confirmed through the survey that they find the procedure easy and simple (Figure 4). This is a very important feedback as very often, the tedious amount of paperwork and long period needed for this type of funding discourage SMEs companies to participate in these types of initiatives. All the SMEs considered that the submission system was easy and in particular “efficient and quite simple”.

Having access to different European light sources

The single entry point created in TamaTA provides access to 10 different light sources located in Europe. It means having a centralised contact point that offers all the capabilities of the facilities and the companies may choose the service that better fits their needs indistinctly. This fact has been evaluated very positively as all the participants of the survey corroborate that it is useful to have a single scheme access (Figure 4). The single entry point foster the use of all the facilities as is exemplified in one particular answer saying: ”we eventually used ELETTRA which we wouldn't have otherwise done.”

Another key outcome of the TamaTA programme is the collaboration amongst different light sources to provide service to a single SMEs. Comments in this sense are very encouraging: “the cooperation between the sources was excellent - after initially contacting ESRF we were put in touch with ELETTRA. The ELETTRA staff went above and beyond running our experiment during the peak of the pandemic last spring. Fantastic commitment, great data/analysis. Very impressed.”

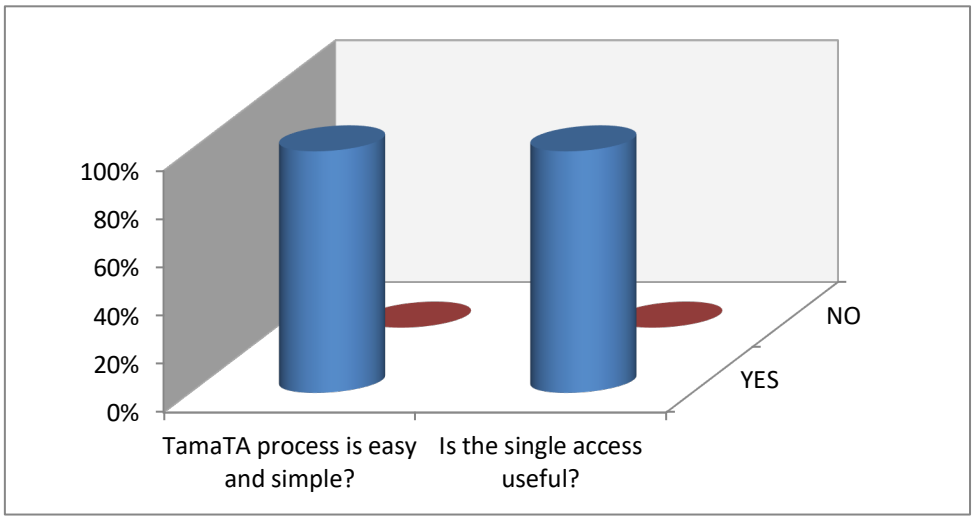

Figure 4. Feedback from the SMEs regarding the simplicity of the process and the single scheme offered.

Attracting new companies and increasing the SME portfolio

One of the main goals of TamaTA is lowering the barriers between SMEs and light sources by granting and performing short experiments to show the advantages of the available techniques in these types of facilities. In this regard, 67% of the companies had access to a light source for the first time through TamaTA and 73% expressed the intention of using it again (Figure 5). This is a very important milestone achieved with TamaTA: first, performing experiments for companies that never performed measurements in light sources before implies increasing the portfolio of companies that are aware of the advantages that these techniques offer and contributes to the innovation capabilities of industries and its impact to the society. Secondly, it is important to remark that most of the companies claimed that they would like to use again these facilities, therefore, they may become a recurrent users and customers thanks to the pilot programme TamaTA.

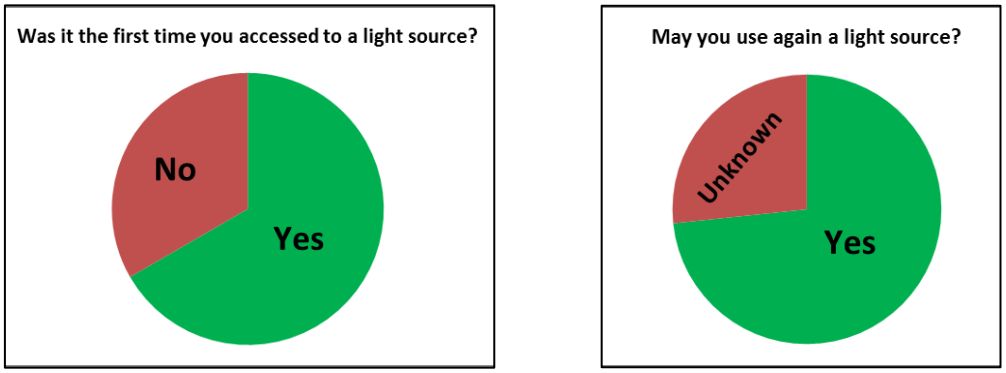

Figure 5. Number of companies using for the first time a light source technique (left) and companies claiming the intention of using them again (left).

One answer illustrated very well how TamaTA is lowering the barriers for SMEs to access light sources: “it was the first time we used this infrastructure. We have not used again. We foresee future uses of a light source, but this will be very conditioned to free or very low cost access for us, since we cannot afford paying standard fees”.

Outcome of the measurements

A definitive evidence and one of the most relevant conclusions of this pilot programme is confirming whether the techniques available at light sources allow valuable results to be obtained for the companies. Interestingly, the survey indicates that 80% of the SMEs found valuable results from the experiments performed under TamaTA (Figure 6). The type of projects conducted are very diverse and detailed information cannot be disclose due to confidentiality or because the evaluation of the results is under process but most of the companies confirmed that results will provide very useful information on new products and new processes and in one case, results will be useful for scientific communication purposes. In only one of the projects the expected innovation was not reached and in another one the data treatment of the experiment was not successfully achieved. It confirms that the request of the industries are very demanding and in some cases difficult to accomplish. Some answers remarks the relevance of the results for the companies:

- “We obtained very useful results for improving the formulation and manufacturing process of a very innovative product that we are currently introducing in the market.”
- “We received valuable results concerning materials used for X-ray optics which we produce”
- “The results have been valuable and we have used them in a regulatory process for an agrochemical product”
- “We are extremely satisfied with the results and they have given us new insights into our materials discovery pipeline.”
- “Good results related to a new class of product”
- “Synchrotron light was fundamental in our development since there was no other technique that would allow to obtain the relevant compositional information that allowed us to better understand our manufacturing process”

Future of TamaTA and similar programmes

CALIPSOplus will conclude in October 2021 and the feedback from the SMEs that have benefited from this programme is crucial to focus properly the continuation of similar programmes that will come in LEAPS-INNOV (WP8 in the H2020 LEAPS-INNOV projects, which is funded and will start on 1 April 2021, will continue TamaTA) for example, or more ambitious initiatives that could be studied and considered. In this regards, the answers from the survey encourage to continue with these types of programmes as all the participants state that would recommend TamaTA to other SMEs (Figure 6). At the same time, some improvements or recommendations have arisen from the survey: more complex and complete projects and measurements could be contemplated and implemented in order to offer more ambitious experiments. These requests would require greater investment from the light sources and therefore a higher funding/subsidy level from Europe. For instance, having the possibility to use complementary techniques to prepare the experiment and to focus the light source measurements may be included in future programmes.

In addition, it has been suggested to complement the services offered by light sources with intermediary companies, RTOs or academic specialists with strong capabilities on light source techniques. Such activities would widen and make the service provision more resilient and applicable to real world SME needs. The possibility that members of the SME team participate during data collection for complex experiments has also been recommended and finally, a robust and strong support for data analysis should be ensured. This data analysis support is particularly important for the SMEs as normally they do not have strong R&D resources, like the large companies, which makes it more critical for a good uptake of the results obtained.

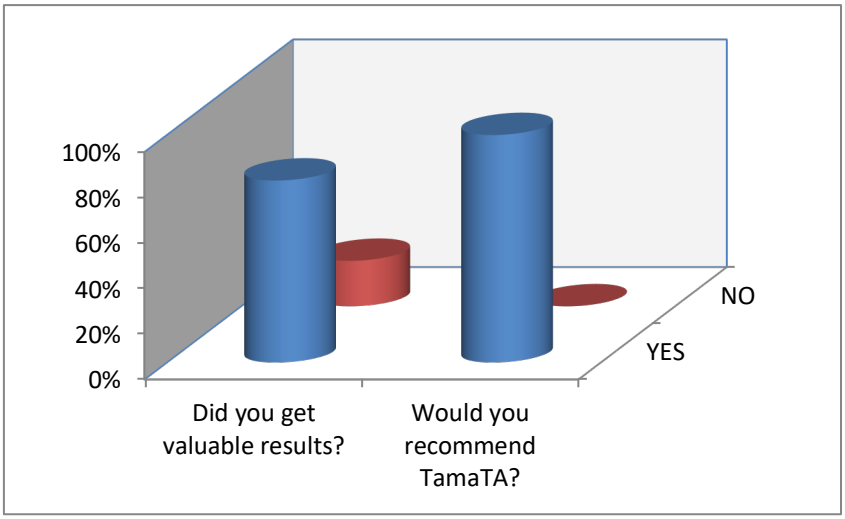

Figure 6. Outcome of the measurements and future of TamaTA programme.

2.3. Conclusions on TamaTA access

TamaTA is a pilot programme addressed to SMEs that promotes the awareness and usage of the techniques available at light sources. It is the first time that such a programme has been put in place and it is of great relevance to evaluate and analyse the experience from the companies that have participated in it. One of the main conclusions extracted from the SMEs that have performed experiments under TamaTA programme is that the techniques offered by light sources provide valuable results for their projects. It reinforces the efforts done by all facilities to build bridges with industry and with SMEs in particular. A second conclusion is that TamaTA procedures are easy and simple and it allowed engagement with new SMEs that never performed measurements at light sources before. In addition, most of them will consider again to use these techniques in the future. Finally, providing access through a single entry point to most of the light source facilities in Europe is a great advantage for industry.

For all this, the experience of the participants indicate that future similar programmes would be recommended with some improvements and recommendations coming from the SMEs, for example, considering more ambitious projects with the possibility of having access to complementary techniques or additional support to provide a more complete service.

3. SURVEY TO LIGHT SOURCES

3.1. Survey

3.1.1. Link to the survey

The survey was launched using Indico web page, in cells.es domain, through the following link:

https://indico.cells.es/event/262/overview

3.1.2. List of questions

A list of 8 questions was sent to all the facilities participating in the CALIPSOplus project. The aim of the survey was to evaluate the networking activities conducted by the facilities to contact and attract SMEs and industries that may benefit from the capabilities that the light sources offer.

The list of the questions is as follows:

1. Did you make any outreach activities specifically targeting SMEs generally? If so, what were they? Were they successful? Did you work on your own or with partners?
2. If the answer to question 1 is NO, did you make any outreach activities targeting industry in general? If so, were they attended by SMEs? If so, what were they? Were they successful? Did you work on your own or with partners?
3. Did you outreach specifically to targeted SMEs (e.g. geographically close to your facility)? If so, what were they? What industry sector is/are the SMEs in? Were they successful?
4. If the answer to question 3 is NO, did you outreach industry in general (e.g. geographically close to your facility)? If so, were they attended by SMEs? If so, what were they? What industry sector is/are the SMEs in? Were they successful?
5. Have you found it particularly challenging to attract SMEs to use the facility as a client or user via peer review procedures? Are SMEs an important or less relevant target sector for your facility (e.g. from a political and/or local ecosystem view point)?
6. From your experience, what is the best way to attract SMEs? Face to face meetings? Conferences? Workshops? Showing real cases studies of competitors?
7. Do you have any recommendations for future engagement with SMEs? At a local scale? At a national or European scale?
8. What could LEAPS do as a network to better engage with SMEs? Is there any advantage in teaming up with (e.g.) LENS (neutrons) or DREAM (electron microscopy)?

3.1.3. Anonymity

In order to enhance participation and promote transparent answers the survey was carried without collecting the name of the person answering the questions and for the same reason the name of the facility will be kept confidential in this report.

3.2. Results and analysis of the survey

Outreach to attract industry

The first four section of the survey to light sources concern the efforts made to attract industry to the light sources. SMEs are a notoriously challenging target to reach – often working only in the local native language and having specific cultural needs and expectations, with very focussed objectives and limited capacity to engage in potentially complex research with institutions that may be perceived as elitist and with high administrative barriers. An objective of the industry work in CALIPSOplus was to engage with local ecosystems, with SMEs part of the overall mix within those ecosystems.

The survey results show that the majority of the light sources endeavoured to engage with SMEs in some way – either via generic outreach and/or specifically within their local ecosystems where SMEs may be known personally to light source staff or easier to reach as "business within walking distance" in the immediate vicinity of the light sources or via local networking and business clusters. The light source comments to the survey show that multipliers (business incubators, clusters, associations etc) were often used to reach out to SMEs, in contrast to trying to get in touch directly with SMEs. When facilities do activities to encourage industry engagement, the survey comments show that these events such as training or awareness raising workshops are usually done by industry thematic (the themes mentioned are broad including pharma, biotech to advanced materials, energy, consumer products, cosmetics, aerospace and electronics) and not by light source technique.

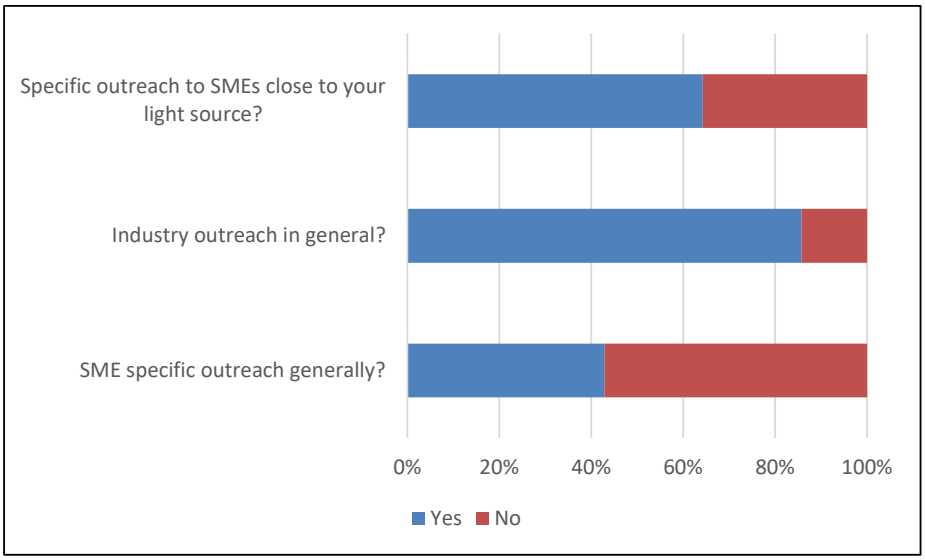

Figure 7. Outreach to industry performed by the light sources.

Challenges to attract SMEs

The light sources were asked about their particular experiences in attracting SMEs to use their facilities on engage with them on research projects. The responses highlight that traditional light source access via peer review is clearly inappropriate being slow and requiring external review and publication of data (open data policy for most if not all light sources assures that data collected under public support are published after a certain delay) and of eventual results. For SMEs dependent on their own IP, patents and developments, this is more or less kills interest in peer review access. Normal commercial access, even if performed under costs recovery levels for the light source concerned, is also often out of scope as the costs are too high for SMEs to bear, especially with the cash flow challenges SMEs often have or limited resources in their developmental phase. The survey shows that TamaTA has enabled SMEs to benefit from commercial, and therefore confidential access, and which otherwise would have not possible. The fact that TamaTA allays the financial burden and makes access simple via an easy to use process is important and critical to attracting such industry segments as the micro- and small and medium enterprises to Europe's research infrastructures.

A few comments from the survey highlight some of the issues and drivers:

"Yes, it was challenging. SMEs are important and a relevant sector we are targeting."

"The SMEs normally have fewer resources than larger companies therefore they appreciate very much a funded access like TamaTA which makes easier for us to attract SMEs."

"Traditional peer review access for SMEs is pointless. SMEs are an important political target."

"SMEs are difficult to convince, especially with peer review procedures."

"The potential of SME as user of RI is rather limited by available resources (personnel, knowledge, budget) of SME."

Best way to attract SMEs

The common denominator in attracting SMEs from the survey results is "face to face" with bilateral meetings; the personal contact and understanding then becomes a driver in the relationship, building trust and translating the SME problem into light source techniques. Face to face, up until COVID, has implied rather close geographical zones around the research infrastructures, though with COVID and teleconferencing becoming more acceptable and used this limitation may ease. Though this was not the only mechanism suggested with workshops, feasibility/demonstrator studies, visits, etc also proposed.

A few comments from the survey further highlight future options:

"Somehow engage regional efforts to support local business to use advanced research infrastructure including synchrotrons."

"Many SMEs and companies do not have a clear idea what they can get from our techniques. Therefore they become very interested when they see real case studies."

"Storytelling is important - even in in face-to-face meetings and at conferences."

Recommendations for future engagement with SMEs

SMEs are recognised as an important target – as drivers of innovation in Europe and increasingly based on technology and therefore potential exploiters of large-scale research facilities, including light sources. The survey also asked the light sources to look ahead as to how better engagement with European SMEs could be made.

Feedback was centred partially on the exploitation of business in walking distance with SMEs local to the light sources and therefore easier to target with face to face meetings, visits, etc and with the SME more likely to be aware of the existence of such a large scale facility in its vicinity.

However, continued and larger subsidy support for the SME access is required, extending to before and after the light source access itself, with resources able to help with experiment design, ancillary techniques, sample preparation and with data analysis, interpretation and reporting making the experimental data of value to the SME. TamaTA has typically enabled more routine measurements at the facilities, but the real power of light sources is the capacity for complex, in situ measurements – watching materials as they are processed, manufactured or aged. Such access takes longer in preparation, testing, the actual experiment and in analysis. Future programmes should have deeper pockets to allow such higher value experiments.

A few specific comments are provided below:

"Performing detailed analyses of the R&D agenda of particular SMEs would help attract them to use synchrotron radiation in their activities."

"To increase use of SME's as a client financial support and fast-track access to use light sources is a plus."

"Full subsidy required for large-scale experiments (meaning 10s of kE per SME)"

The survey also questioned the facilities about the potential value of the research infrastructure networks of light sources but also beyond in working with SMEs. Opinions varied, returning to the ongoing theme of SMEs often being a local or regional activity of the research infrastructures. However, the perspective of simply solving SME problems was mentioned and the capacity of a network or a hub of networks could be a valuable facet, especially when teamed with multipliers such as RTOs, academics, innovation campuses and intermediaries, to support SMEs:

"Partnering with LENS and DREAM would be beneficial - SMEs don't care that much about the technique, but they do care about solving their particular problems."

3.3. Conclusions on the networking activities and light sources strategies

The feedback obtained through the survey is perhaps not surprising – SMEs remain a desirable but elusive target as a user of large-scale facilities. They require a personalised and resource-heavy approach in outreach and in service provision, beyond that usually required for large multinational companies. This practically means that the SMEs in the geographical neighbourhood of the light sources are those most likely to be proactively engaged. Engagement

may be either directly as a result of the light source outreach to SMEs, or going via clusters, local technology organisations or regional industry structures allowing more efficient outreach to a wider range of SMEs albeit often on a thematic basis.

Timeliness, cost and usefulness of the access are seen to be core by the light sources for SMEs to exploit their facilities. TamaTA has undoubtedly helped this at a modest scale given the resources. There is motivation to continue and this is made possible by LEAPS Innovation; but it would be interesting to structure a more broader SME access programme, funding the research infrastructures for more outreach, funding the SMEs to be able to exploit confidential access and making such a programme broader and incorporating other complementary research infrastructure families. RTOs, academics and intermediaries all have potential supporting roles to play in such a broader programme, in particular in the expertise to translate problems or translate results for greatest impact to the SME R&I programmes.

4. CONCLUSIONS AND RECOMMENDATIONS

The TamaTA scheme is welcome and suitable for SMEs because of the useful results obtained and the simplicity of the procedure to be followed. To upscale the TamaTA initiative for a larger number of SMEs, potentially including more techniques from other research infrastructure families and perhaps laboratory based conventional techniques, additional specific scientific support dedicated to provide industrial services to SMEs is required, as the industrial proposals imply problem understanding, data analysis and debriefing that goes beyond the measurement itself. Thus a TamaTA-like scheme will continue in the LEAPS-INNOV project incorporating refinements taken from this survey and from the experiences of the partners to improve the TamaTA model.

To bring SMEs to the facilities, comprehensive outreach activities are needed to make them aware of the capabilities of the light sources. A programme to help light sources in that matter would be advisable.

As mentioned above, SMEs are a challenging target for research infrastructures, as in contrast to large R&D based companies such as GSK, P&G, BASF and others, the SMEs do not have large R&D divisions with the mission to do exploratory research and innovation. SMEs are numerous, largely working in their own native language and culture. As such the outreach and engagement with them takes an order of magnitude additional effort compared to the large R&D driven national and international companies. Nonetheless, the experience of TamaTA provides a modest foundation for a more ambitious inclusive scheme for European SMEs, allowing them to benefit from Europe's portfolio of research infrastructure, second to none in the world, for their research, innovation, process and development challenges.

As a general conclusion, a more vigorous programme to support SMEs for developing their innovative products and materials for a longer period would be recommended strongly and would generate a robust socio-economic impact in the industrial fabric of Europe. A long lasting programme of for example 5 years and an increase of the per access support up to 50,000 Euros (with suitable justification of the scientific and technological needs and impact) would boost SMEs to achieve the significant results for implement their innovative developments. Such a comprehensive programme

could be supported by the recently established European Innovation Council and implemented by experienced research infrastructures on behalf of the community without ruling out other possible options and always taking into account the needs and interests of the main stakeholders.