TOWARDS A GROWING S+T+ARTS COMMUNITY:

Exploratory analysis to the power of attraction of
Science + Technology + Arts collaborations initiatives

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I. INTRODUCTION

This report is produced within S+T+ARTS PRIZE, a project funded by the European Union's Horizon 2020 research and innovation programme, as part of the S+T+ARTS initiative (GA no. 956603). S+T+ARTS[1] is an initiative of the European Commission to foster alliances between science, technology, and the arts. Since 2016, S+T+ARTS has supported hundreds of collaborations between Scientists, Technologists and Artists through residencies, prizes and mentoring programmes. It is without a doubt the largest European programme dedicated to these cross-disciplinary collaborations.

The actions of S+T+ARTS are supported by a community that has continuously grown and strengthened since the creation of the initiative. S+T+ARTS PRIZE intends to contribute to this growing tendency, by implementing different actions. This project not only organises the annual S+T+ARTS Grand Prize[2], as well as organises events, dissemination and communication campaigns, cross-fertilization program, impact analysis and community-oriented activities. To support the design and implementation of these and future actions, an exploratory study was organised under coordination of INOVA+, with the ambition of collecting feedback from S+T+ARTS community members and external individuals. In this report, we present the results of this exploratory study.

The study aimed at assessing S+T+ARTS in specific, as well as to have some basis of comparison, by approaching other cross-disciplinary initiatives. In this context, **the study sought to assess, in a first moment, initiatives promoting collaborations between science, technology and arts, and, in a second moment, the S+T+ARTS initiative in particular.** In specific, with this study, we aimed at knowing and understanding the factors that lead individuals and organisations taking part (or not) of such initiatives – the wanted benefits, the weaknesses, what activates and engage the individuals and organisations or prevents them in taking part of such initiatives.

Since 2016, S+T+ARTS has supported the development or promotion of more than +500 science+tech+arts innovations through

+150 S+T+ARTS Residencies
Gathering scientists, tech, artists, business and other areas

+250 S+T+ARTS PRIZE winners, honorary mentions and nominees
Gaining visibility and raising traction to further develop their projects

© Photo: Artificial Intelligence and Its False Lies at CENTQUATRE-Paris, during the S+T+ARTS Residencies Days 2020. Photographer: Quentin Chevrier.

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[1] S+T+ARTS: https://starts.eu/
[2] S+T+ARTS Grand Prize: https://starts.eu/what-we-do/starts-prize/

With this study, we aimed at knowing and understanding the factors that lead individuals and organisations taking part (or not) of initiatives promoting collaborations between science, technology and arts.

© Photo: S+T+ARTS PRIZE Trophy.

1.1. Methodology

The methodology used is close to a qualitative-oriented methodology, where we intended to openly hear from the individuals approached by us. The technique used was an online questionnaire conducted in the format of interviews, and included open and semi-open questions.

The sample built is a non-probability sample, following the *Purposive or Judgmental Sampling* method, which, as the names suggests, is built based on the researchers' purpose and judgment and the members engaged in the collection of information are chosen based on that purpose. In our case, we sought actively to reach and engage individuals with different expertise, from different countries, contexts and involved or not in S+T+ARTS. A database covering our intentions does not exist. For this reason, we opt for the above-mentioned sample method. A total of 1140 individuals and organisations from S+T+ARTS Community and other communities, different countries and sectors (Academia, Industry, Business, Digital Innovation Hubs) were contacted to take part of our study. We were successful in engaging and collecting feedback from 72 individuals, between July and December 2022.

Being a non-probabilistic sample, the analysis presented in this report cannot be read as representative of the whole universe of science, technology and arts collaborations initiatives and communities. Nevertheless, considering the characteristics of our sample of respondents, we believe we were successful in gathering answers from a diversified number of individuals, coming from different countries, with different ages and backgrounds. We believe, in this report, we provide useful information that provide tips for enhanced strategies for science, technology and arts initiatives, as well as a basis for other and future analyses on these topics.

1.2. About the respondents

We were successful in engaging and collecting feedback from 72 individuals, between July and December 2022. As shown in Figure 1, our sample has a good geographical distribution, covering 27 countries, two of them outside Europe (Canada and Australia).

Figure 1. Characterisation of analysis's respondents: nationality, 2022
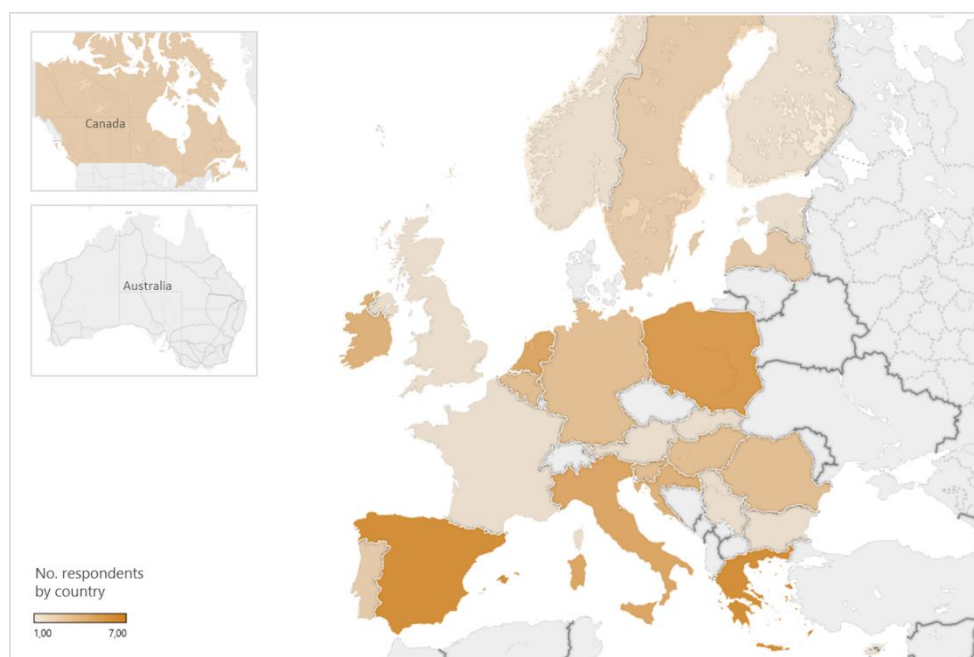
The survey targeted individuals/ organisations familiar and non-familiar with sci-tech-arts collaborations. In the map in Figure 2, we can confirm that we were successful in reaching and collecting feedback from these two types of interviewees in the different countries, guaranteeing the collection of feedback from different contexts.

Figure 2. Characterisation of analysis's respondents: familiarity with sci-tech-arts collaborations by country, 2022
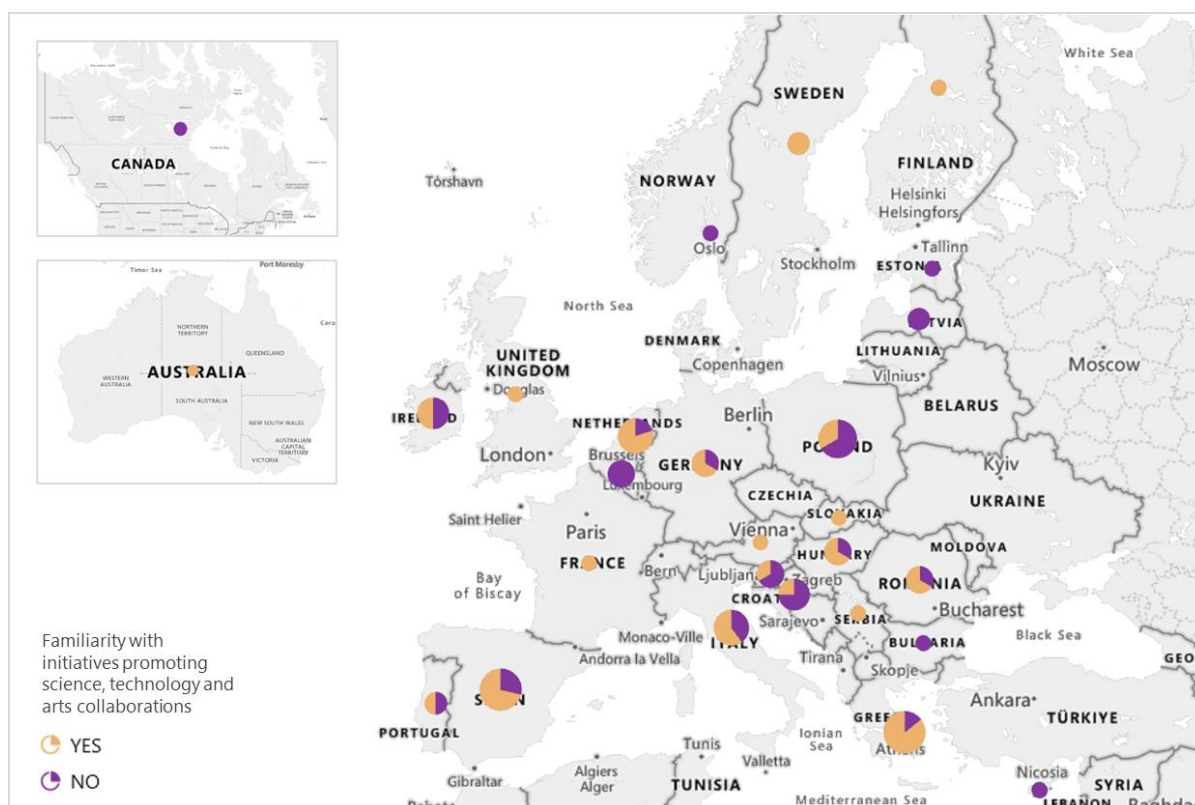
The graphic, in Figure 3, aggregates the data by region, revealing that, in the Central and Eastern Europe and Northern Europe, the number of respondents that are familiar and non-familiar with sci-tech-arts collaborations are similar. In the Southern Europe and Western Europe, the numbers have a bigger difference.

Figure 3. Characterisation of analysis's respondents: familiarity with sci-tech-arts collaborations by region, 2022

Number of respondents by region
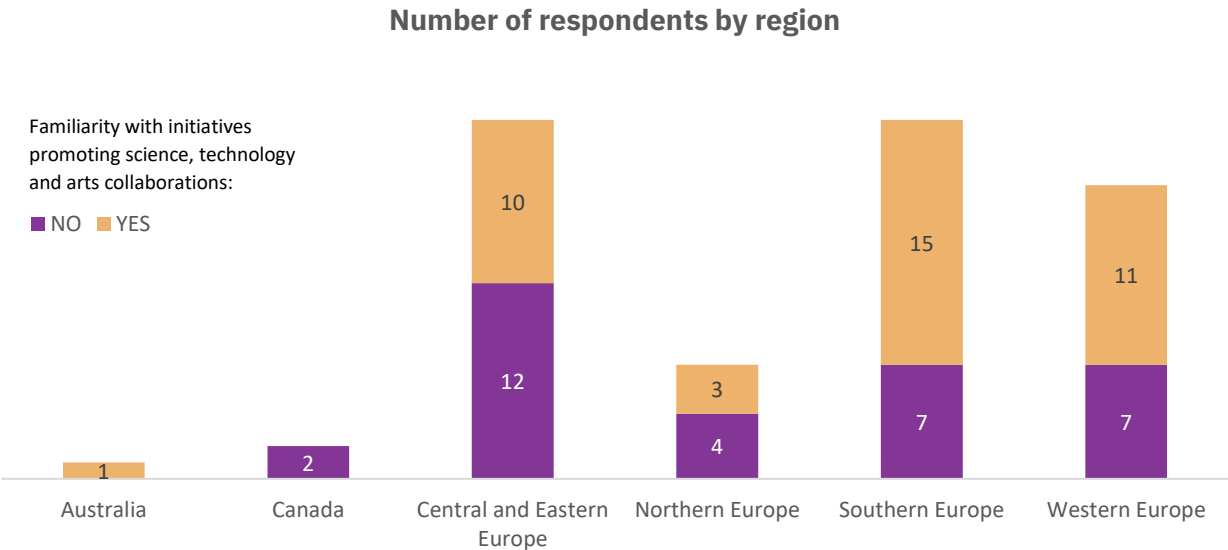
In Figures 4a/b, we can see that our sample has a predominancy of Men (72%) when compared with Women (28%) and is mostly constituted by individuals with ages ranging between 40-49 years old (28%) and 50-59 years old (26%).

Figures 4a/b. Characterisation of analysis's respondents: gender and age, 2022

(a) Number of respondents by gender
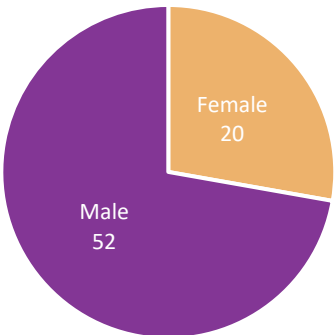
(b) Number of respondents by age
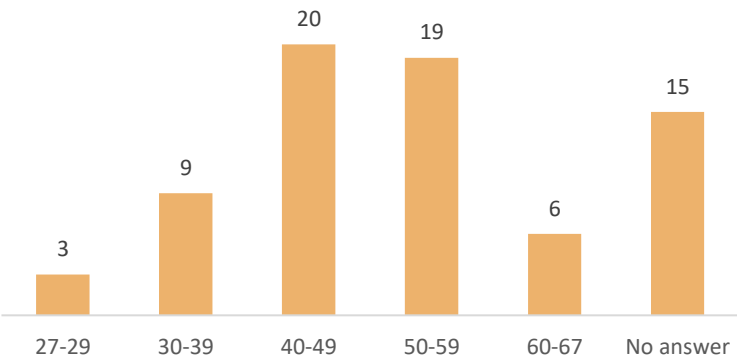
Figures 5a/b show us that almost all our respondents have a higher education degree (99% of the respondents). About 33% of the respondents have a degree on "Engineering, architecture, manufacturing and construction"; 25% on "Social sciences, journalism, business, administration and law"; and 24% on "Humanities and arts".

Figures 5a/b. Characterisation of analysis's respondents: education degree and field of education 2022

(a) Number of respondents by education degree
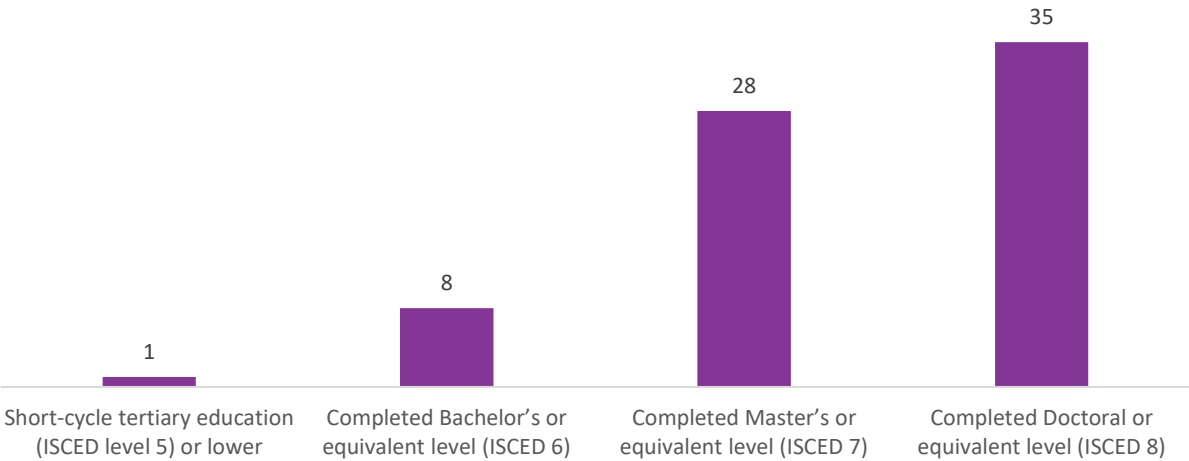
(b) Number of respondents by field of education
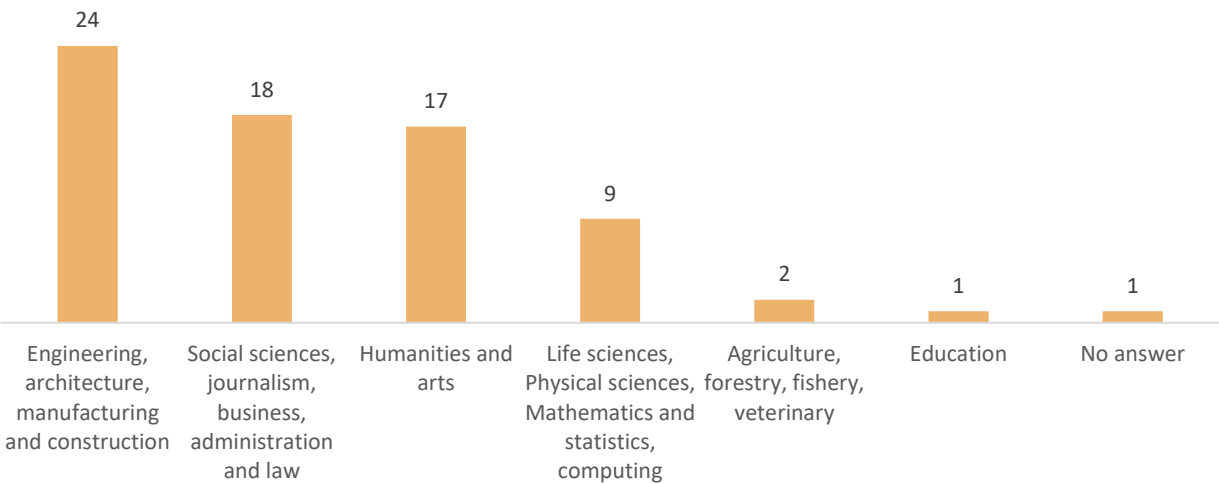
Lastly, in Figures 6a/b, we can see information about the respondents' working area. The majority of the respondents work in "Research/ Academia" (54%), followed by "Business/ Industry" (33%) and "Creative and Cultural Industries" (10%). When asked to identify more specific working areas, the respondents revealed to be working in sectors linked to "Engineering, architecture, manufacturing and construction" (26%); "Education" (17%); "Social sciences, journalism, business, administration and law" (14%); "Life sciences, Physical sciences, Mathematics and statistics, computing" (13%).

Figures 6a/b. Characterisation of analysis's respondents: working areas, 2022

(a) Number of respondents by working area
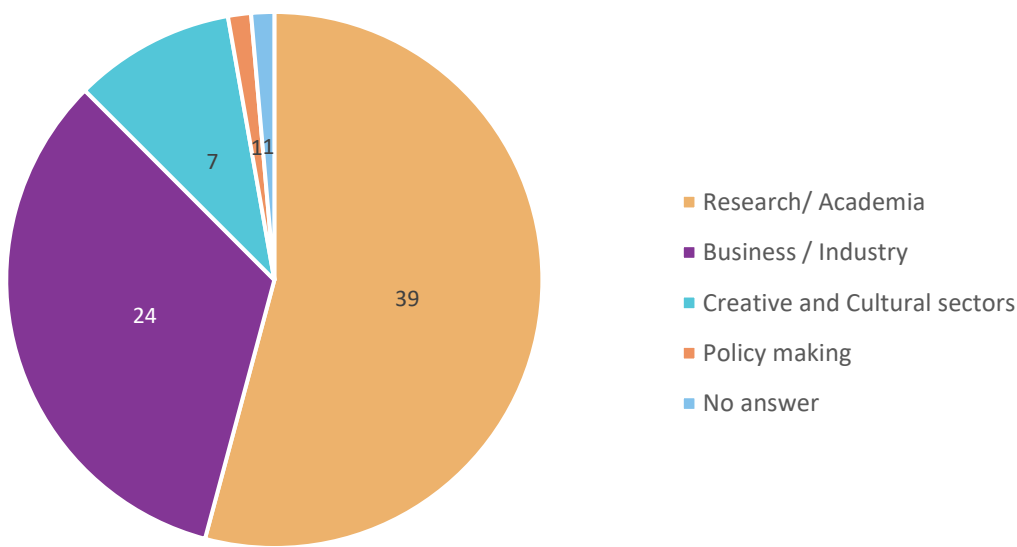
(b) Number of respondents by working sector
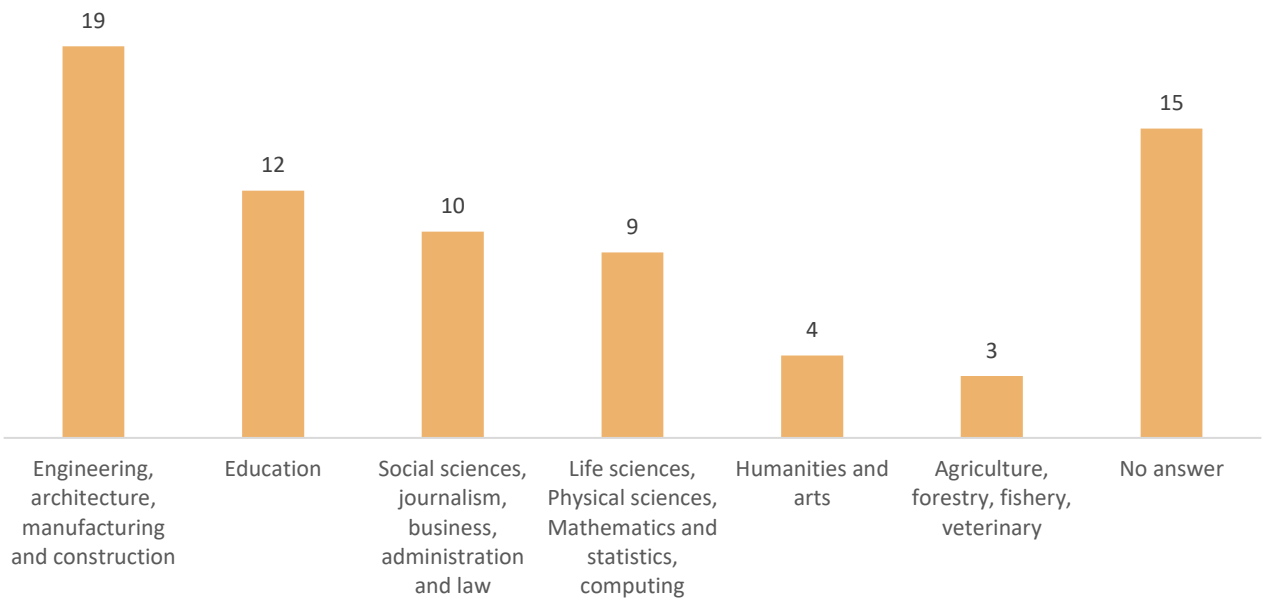
2. SCI-TECH-ARTS INITIATIVES

In this chapter, we explore more deeply the familiarity (or not) with sci-tech-arts collaborations, providing information on the benefits and weaknesses that respondents identified in relation to these types of collaborations.

2.1. Respondents familiar with Sci-Tech-Arts initiatives

About 56% of the respondents mentioned to be familiar with initiatives or projects promoting science, technology and arts collaborations, while 44% mentioned to not be familiar with these types of initiatives. In **Annex 1**, we can consult a list of initiatives mentioned by respondents.

Table 1. Number and proportion (%) of respondents familiar with sci-tech-arts collaborations, 2022

Do you know or are familiar with initiatives or projects promoting science, technology and arts collaborations?	No.	%
YES	40	55,6%
NO	32	44,4%
Total	**72**	**100%**

Figure 7. Number and proportion (%) of respondents by age and familiarity with sci-tech-arts collaborations, 2022

Respondents by age and familiarity with sci-tech-arts collaborations

Familiarity with initiatives promoting science, technology and arts collaborations:
- YES
- NO

Age	27-29	30-39	40-49	50-59	60-67
YES	1 - 33,3%	3 / 33,3%	13 / 65,0%	9 / 47,4%	3 / 50,0%
NO	2 - 66,7%	6 / 66,7%	7 / 35,0%	10 / 52,6%	3 / 50,0%
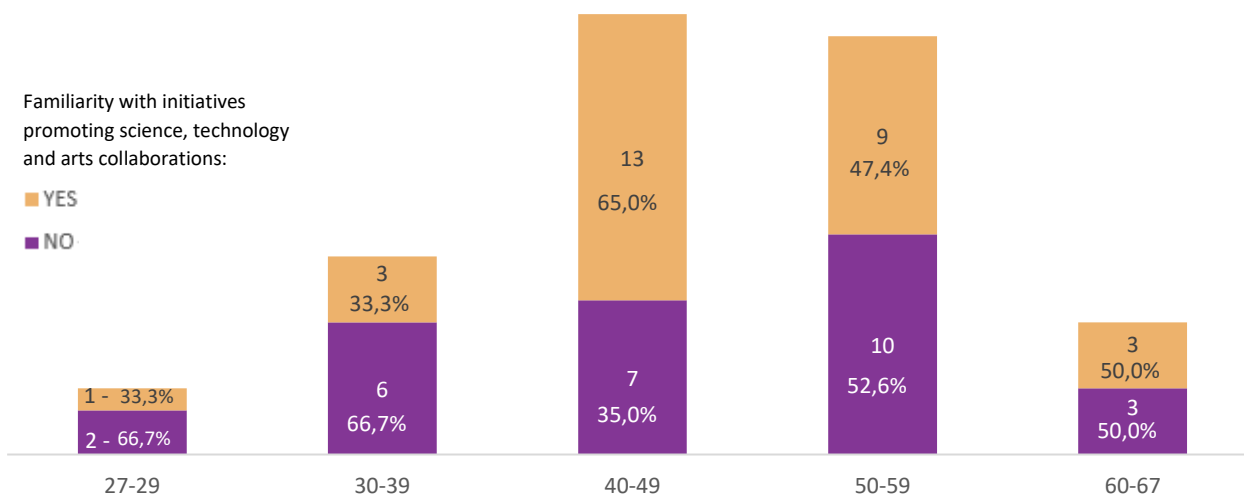
Starting our analysis considering some correlations between familiarity and other variables from our study, we identified an interesting tendency regarding the **age** of the respondents (Figure 7). According to the data collected, our sample of respondents exhibits a tendency for a positive correlation between age and familiarity with sci-tech-arts collaborations: the older the respondent, the greater the familiarity with sci-tech-arts collaborations. On the contrary, in the younger ages, the familiarity with this type of collaborations was lower.

When intersecting the familiarity with sci-tech-arts collaborations with **gender**, the data suggests similarity between the genders, although Men exhibit a slightly higher knowledge on this type of collaborations.

If we consider the **field of education**, in our sample the familiarity is higher within individuals with degrees in "Life sciences, Physical sciences, Mathematics and statistics, computing" (68%); "Social sciences, journalism, business, administration and law" (61%); "Humanities and arts" (58%); and "Engineering, architecture, manufacturing and construction" (50%). When analysing the **working area** (Figure 9), our sample suggests that individuals working in "Creative and Cultural Sectors" and "Research/ Academia" tend to have a higher familiarity with sci-tech-arts collaborations.

Figure 8. Proportion of respondents by gender and familiarity with sci-tech-arts collaborations, 2022
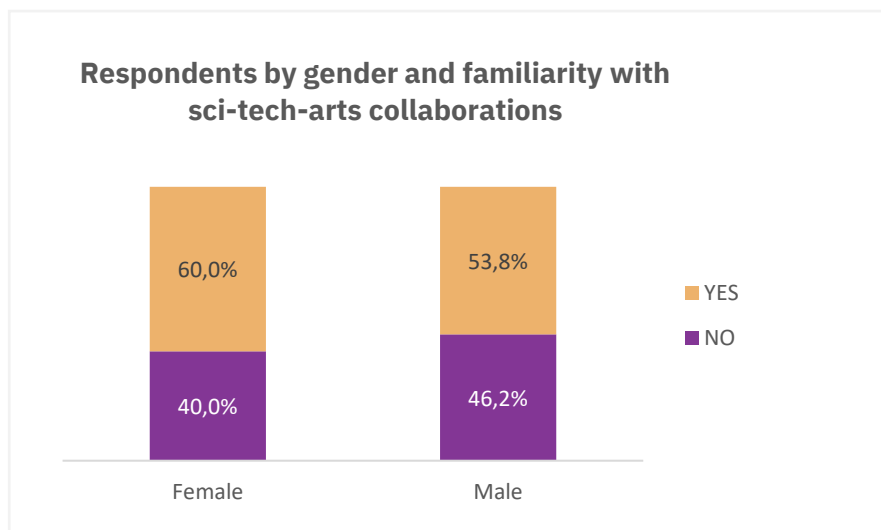
Figure 9. Number and proportion (%) of respondents by working area and familiarity with sci-tech-arts collaborations, 2022
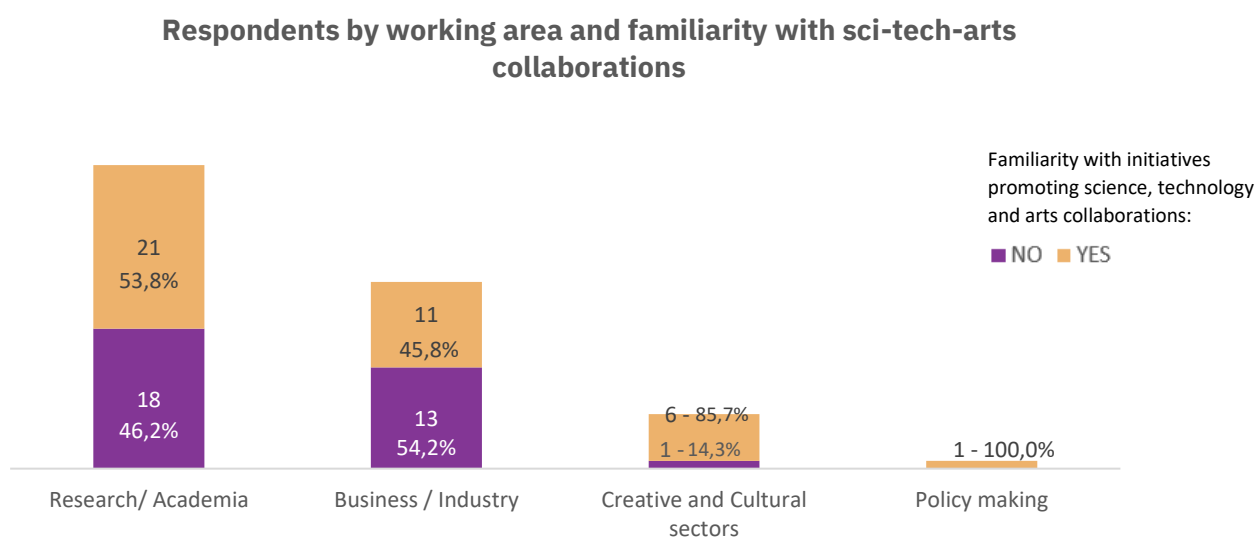
2.2. Benefits

The respondents familiar with sci-tech-arts initiatives (40 respondents, representing about 56% of the total of respondents) were asked to identify the benefits of initiatives and projects promoting science, technology and arts collaborations. The following are the main benefits identified:

Figure 10. Benefits of initiatives and projects promoting science, technology and arts collaborations identified by respondents (no. and %), 2022

Benefits of initiatives or projects promoting sci-tech-arts collaborations

No.: 31 | 77,5%
Stimulated me to embrace multidisciplinary/ interdisciplinary work

No.: 28 | 70,0%
Helped me to get to know and connect with interesting individuals or entities

No.: 27 | 67,5%
Helped me to think out-of-box

No.: 25 | 62,5%
Introduced me different and innovative solutions

No.: 13 | 32,5%
Helped me to develop a work/ result

No.: 7 | 17,5%
Supported me and my work with funding

No.: 2 | 5,0%
Helped me to find how to fund my work

No.: 26 | 65,0%
Other Benefits

About 65% of the respondents familiar with sci-tech-arts initiatives identified other benefits. The following list presents the **other benefits of initiatives or projects promoting sci-tech-arts collaborations identified by respondents:**

✓ Contribute to more and enhanced connections and synergies (arts and economy; between tech-eco system and creative eco-system; getting in touch with industry; between industries; access to technology);

✓ Enhance creativity and development of better solutions (co-creation);

✓ Help to experience another world and break the routine;

✓ Contribute to bring audiences closer both to art and science/technology;

✓ Raise awareness on the advantages of sci-tech-arts collaborations and co-creation, among the public and decision makers;

✓ Support enhanced understanding of technical side of "things";

✓ Contribute to the preservation of traditional arts and crafts, digitization of arts and cultural heritage;

✓ Contribute to the development of new policies;

✓ Contribute to the identification of new ideas for research projects;

✓ Provide opportunities to experience different research methodologies, concepts, theories, practices;

✓ Enable better 'lateral thinking' and problem solving;

✓ Contribute to the development of approaches to evaluate artistic endeavours using quantitative methods (computation statistics, machine learning).

2.3. Weaknesses

The respondents familiar with sci-tech-arts initiatives were also asked to identify weaknesses of initiatives or projects promoting sci-tech-arts collaborations, if any. Half of the respondents familiar with this type of initiatives (50%) did not identify weaknesses, while the other 50% identified the following **weaknesses:**

○ The financing support/budget provided is not sufficient;

○ There is a lack of continuity of projects/ initiatives;

Figure 11. Number and proportion (%) of respondents familiar with sci-tech-arts collaborations that identified weaknesses on this type of initiatives, 2022

Do you identify weaknesses on sci-tech-arts initiatives?

NO
No. 20
50%

YES
No. 20
50%
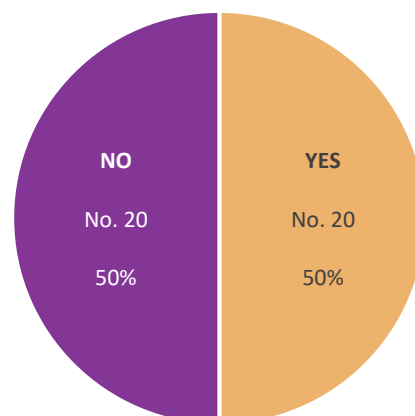
- Different legal entities (such as municipalities, foundations) have more difficulty in working together, especially at the beginning of projects;

- Economic exploitation of sci-tech-arts results remain underexplored, without plans for economic and labour returns.

- The topics approached can be very technical and it can be very difficult to reach general audience.

- There is a need for new mediation methods to reach the general public, as it is difficult to find technicians and professionals interested and with necessary competencies;

- Results promotion and impact can be limited, due to low level of reach outside the region where they were created;

- The results of sci-tech-arts projects sometimes seem to not have sufficient applicability in reality;

- There are challenges to unlock synergies, as different industries have issues in approach (micro vs macro perspective) and motivation (business vs culture);

- It is necessary a higher involvement of policy makers;

- Interdisciplinary research, typically, has a longer duration (especially in early stages);

- There are challenges to publish interdisciplinary research in top journals, as these journals generally focus in just one of the disciplines;

- "We are a science institute, and our priority is scientific publishing. This is normally not among the top priorities among the arts people";

- It is difficult to reach, engage and get funding from industry stakeholders, as these stakeholders tend to focus on short-term benefits;

- There is the need to improve the uptake of technology developed from the market;

- The support to design in the industrial solutions or digitalization of arts shall be higher;

- Administrative and reporting obligations are complex and demanding. More time should be dedicated to present the projects and results to the general public, through conferences and other events.

3. INTEREST IN SCI-TECH-ART EXPERIMENTS

To assess the potential to grow of sci-tech-arts initiatives and projects and the interest in interdisciplinary collaborations, respondents were asked if they would be willing in taking part of a Sci-Tech-Art experiment/ residency[3].

Figure 12. Number and proportion (%) of respondents interested in taking part of a Sci-Tech-Art experiment, 2022

Are you interested in taking part of a Sci-Tech-Art experiment?

YES
68 respondents (94,4%)
Familiarity with sci-tech-arts collaborations:
Familiar: 39 (54,2%)
Not familiar: 29 (40,3%)

NO
4 respondents (5,6%)
Familiarity with sci-tech-arts collaborations:
Familiar: 1 (1,4%)
Not familiar: 3 (4,2%)
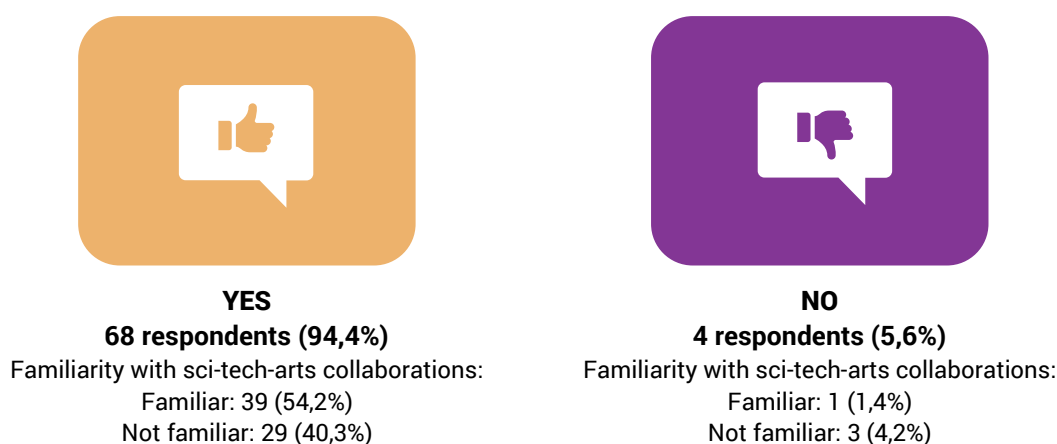
3.1. Respondents not interested

Only 6% of the respondents (4) mentioned to not be interested in taking part of a sci-tech-art experiment (Figure 12). Among these respondents, **the justifications** for not being interested were mostly:

○ lack of time;

○ and misalignment with the existing regular work and focus.

3.2. Respondents interested

The majority of the respondents (94%) revealed to be interested in taking part of a sci-tech-art experiment, including the respondents that are not familiar with sci-tech-arts collaborations (Figure 12). The **justifications** for this interest are as presented next:

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[3] A Sci-Tech-Art Experiment or residency was defined in the survey script as «a interdisciplinary project that brings together different individuals with background on science or technology/engineer or arts or other fields, in an working process where the different experiences are conceived as equally relevant for the project goals.»

Figure 13. Reasons behind respondents' interest in taking part of a Sci-Tech-Art experiment, 2022

WHY ARE RESPONDENTS INTERESTED IN TAKING PART OF A SCI-TECH-ART EXPERIMENT?

Respondents familiar with sci-tech-arts initiatives

✓ Interest in sci-tech-arts co-creation, cross-disciplinary approaches;

✓ "Real world problems are not discipline specific". These initiatives help us having greater impact in society.

✓ Alignment with the current work and ambition;

✓ "As a researcher I am committed to working on interdisciplinary ventures. They are the future of science and art";

✓ Cooperation with different partners enable new ideas to improve local/ regional context;

✓ These initiatives enable innovation, new solutions, creativity, out-of-the-box thinking, opportunity for problem solving, user-friendly solutions;

✓ These "experiments and collaborations are very productive";

✓ Mixing disciplines (sci-tech-arts) allows us to take the best of each one;

✓ Interest in enlarging the scope of work;

✓ "Art can create memories";

✓ Innovation will be a priority of the EIT Culture and Creativity;

✓ Interest in creating and strengthening synergies;

✓ Art has the power of translating science and technology, enabling improved communication to general public;

✓ It is still not common this type of cross-collaboration, and these initiatives enable them.

Respondents not familiar with sci-tech-arts initiatives

✓ Interest in exchanging perspectives with others with similar interests, but different experiences and point of views;

✓ "It is important to work in transdisciplinary environments";

✓ Sci-tech-arts collaborations have the potential to produce interesting results, create new experiences and knowledge with applicability in various fields;

✓ Curiosity, interest in experimenting new methods of working and innovation production;

✓ "Experimenting is one of the ways to understand the world around us. It must be interesting to cooperate with scientists";

✓ "Huge opportunities for new business creation";

✓ Alignment with the current work and ambition;

✓ Interest in repeating and deepening past experiences implementing similar approaches;

✓ "There are only a few differences between science, technology and arts. Such experiments would expand my horizons."

✓ Only technology, science or arts is not sufficient. They need each other. Collaboration is an added value;

✓ Interest in digitalisation of current work;

✓ "Working alone can be hard or impossible in some situations".

4. S+T+ARTS

As mentioned in the introduction, the key goal of our study was to collect data to assess the S+T+ARTS initiative performance. To have a basis for comparison and put S+T+ARTS in perspective, respondents were asked to share their feedback on sci-tech-arts initiatives and projects, in general (previous chapters present the results of this exercise). In a second moment, respondents were asked to address S+T+ARTS initiative in specific. In this chapter, we present the results obtained regarding the S+T+ARTS initiative performance from the point of view of our respondents.

4.1. Respondents familiar with S+T+ARTS

About 14% of the total respondents (10) mentioned to know S+T+ARTS. When comparing with the number of respondents familiar with sci-tech-arts initiatives (40, representing 56%), this number reveals that only a quarter (1/4) of the respondents familiar with sci-tech-arts initiatives affirmed to know S+T+ARTS. The numbers become lower when considering the immediate memory. One of the questions asked respondents to list the initiatives or projects promoting science, technology and arts collaborations that they knew (see list in Annex 1). Only 7 respondents mentioned S+T+ARTS initiative or S+T+ARTS funded projects in the list.

Table 2. Number and proportion (%) of respondents familiar with S+T+ARTS, 2022

Do you know S+T+ARTS?	No.	%
YES	10	13,9%
NO	62	86,1%
Total	**72**	**100%**

Analysing the sociodemographic characteristics of the respondents familiar with S+T+ARTS, we can conclude that, in general, the characteristics of these respondents are in line with the characteristics of the whole group of respondents familiar with sci-tech-arts initiatives. In our sample, there is a tendency for higher familiarity with S+T+ARTS from individuals based in Southern and Western Europe, with male gender, 40 or more years old and from higher education degrees (MA and PhD). If we consider the field of education, although ranked differently, the fields of education are the same among the respondents familiar with S+T+ARTS and the whole group familiar with sci-tech-arts initiatives: "Engineering, architecture, manufacturing and construction"; "Social sciences, journalism, business, administration and law"; "Humanities and arts"; and "Life sciences, Physical sciences, Mathematics and statistics, computing". Similar situation occurs with the working areas of the respondents, with the majority working in "Research/ Academia" area.

Figures 14. Number of respondents familiar with S+T+ARTS, by region, gender, age, education degree, field of education and working area, 2022

(a) Number of respondents familiar with S+T+ARTS, by region

- Central and Eastern Europe: 2
- Western Europe: 3
- Southern Europe: 5

(b) Number of respondents familiar with S+T+ARTS, by gender

- Male: 6
- Female: 4

(c) Number of respondents familiar with S+T+ARTS, by age

Age	Number
30-39	1
40-49	5
50-59	
60-67	1
No answer	3

(d) Number of respondents familiar with S+T+ARTS, by education degree

Education degree	Number
Completed Bachelor's or equivalent level (ISCED 6)	1
Completed Master's or equivalent level (ISCED 7)	4
Completed Doctoral or equivalent level (ISCED 8)	5

(e) Number of respondents familiar with S+T+ARTS, by field of education

Field of education	Number
Engineering, architecture, manufacturing and construction	5
Social sciences, journalism, business, administration and law	2
Humanities and arts	2
Life sciences, Physical sciences, Mathematics and statistics, computing	1

(f) Number of respondents familiar with S+T+ARTS, by working area

- Creative and Cultural sectors: 1
- No answer: 1
- Business / Industry: 1
- Research/ Academia: 7

4.2. Engagement drivers for respondents familiar with S+T+ARTS

The respondents familiar with S+T+ARTS (10 individuals, corresponding to 13,9% of the total of respondents) were asked to identify their role in S+T+ARTS, as well as benefits of participating in S+T+ARTS actions and how they assess in general the initiative.

In Figure 15, we can consult the roles performed. The majority of the respondents (50%) are followers and/or members of S+T+ARTS social media or website or newsletter. Figure 16 lists the benefits of S+T+ARTS identified by respondents.

Figure 15. Number and proportion (%) of respondents familiar with S+T+ARTS, by role played in S+T+ARTS Community, 2022

What role do you have in S+T+ARTS?

Role	Value
I am a follower and/ or member of S+T+ARTS social media or website or newsletter	5 / 50,0%
I established collaborations with S+T+ARTS projects to organize activities (e.g. events, etc.).	3 / 30,0%
I was/am a partner in a S+T+ARTS Project	2 / 20,0%
I participated/ am participating in a residency/ experiment funded by S+T+ARTS	0
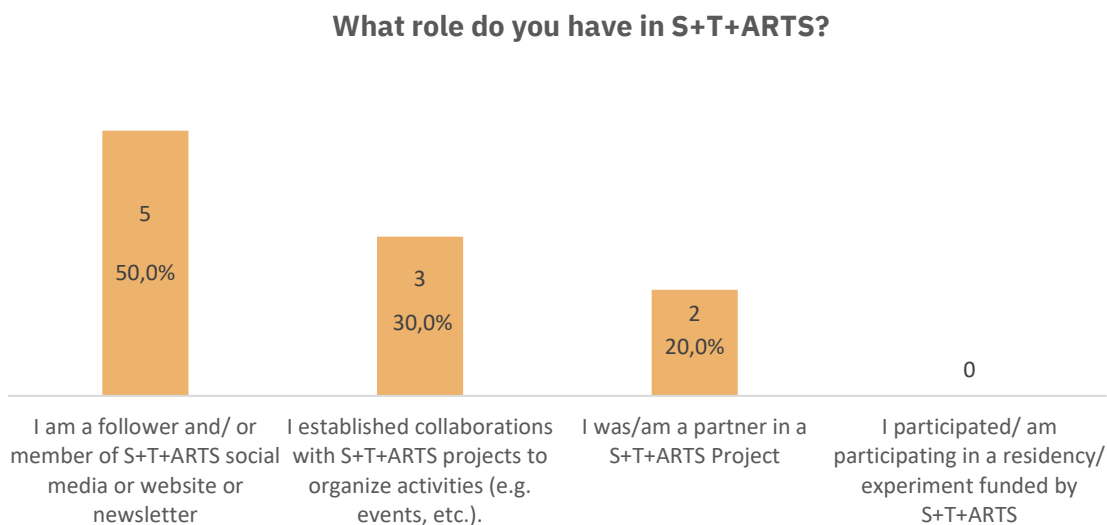
Figure 16. Benefits of S+T+ARTS identified by respondents familiar with this initiative (no. and %), 2022

Benefits of S+T+ARTS

Benefit	Value
Stimulates me to embrace multidisciplinary/ interdisciplinary work	7 / 70,0%
Helps me to think out-of-box	7 / 70,0%
Introduces me different and innovative solutions	5 / 50,0%
Helps me to get to know and connect with interesting individuals or entities	3 / 30,0%
Helped me to develop a work/ result	1 / 10,0%
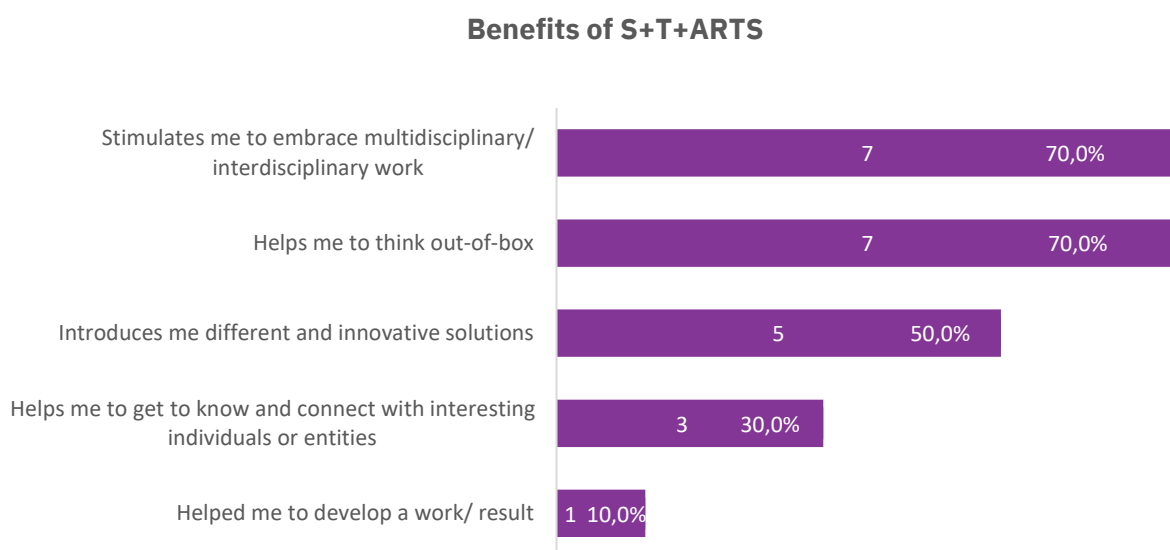
In general, respondents consider S+T+ARTS initiative as beneficial and very important (Figure 17). When asked if and **how S+T+ARTS could benefit more**, respondents do not have quick answers. Some of the respondents do not have ideas on how S+T+ARTS could benefit them more. Other respondents consider relevant to:

✓ have more S+T+ARTS Regional Centres;

✓ help technology experts and scientists to develop solutions that are more human-centric;

✓ include S+T+ARTS approaches in scientific projects;

✓ have more options to work together.

Figure 17. Relevance of S+T+ARTS, in the opinion by respondents familiar with this initiative (no. and %), 2022
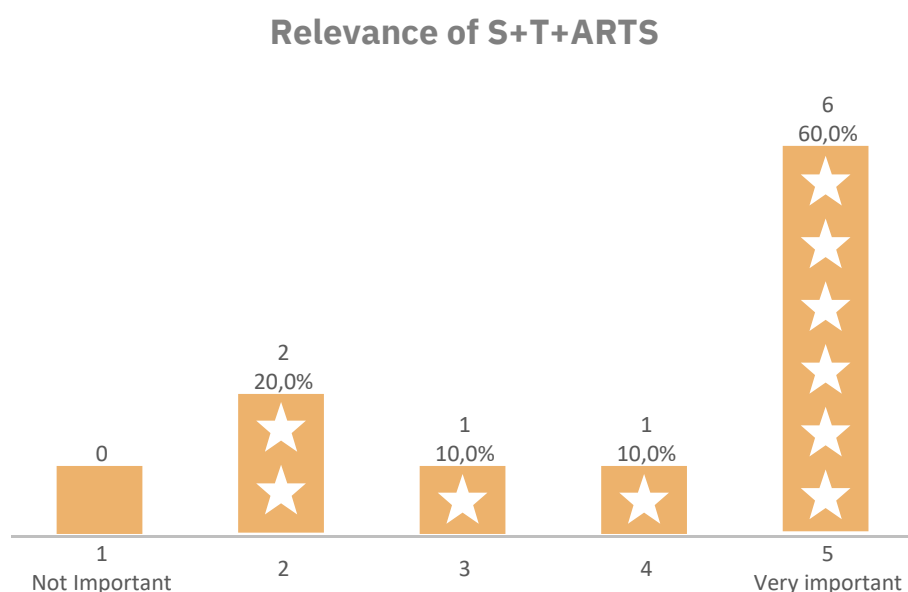
4.3. Engagement drivers for respondents not familiar with S+T+ARTS

The respondents that are not familiar with S+T+ARTS (62 individuals, corresponding to 86% of the total of respondents) were asked to identify aspects that would trigger their interest and involvement in S+T+ARTS. About 31% of these respondents (19) mentioned to not know how to answer this question or preferred to not answer, some of them identifying the lack of knowledge on S+T+ARTS as the cause of their answer. About 3% of the respondents (2) clearly stated to not be interested in STARTS, against 66% (41) who mentioned to be interested in S+T+ARTS.

The individuals not familiar with S+T+ARTS but interested on it identified some key drivers for their involvement in the initiative. The answers received can be aggregated in three main groups, as presented in Figure 18:

- the first group, identified by 10 respondents (24% of the total respondents interested in S+T+ARTS), aggregates answers looking to know and understand S+T+ARTS and how this initiative can benefit the respondents. To assess and establish an involvement in S+T+ARTS, respondents need to have a deeper knowledge on S+T+ARTS first. This group of answers demonstrate the need for a continuous dissemination and communication of S+T+ARTS initiative, its ambition, vision and activities.

- the second group of answers, identified by 11 respondents (27% of the total respondents interested in S+T+ARTS), reveals an interest in understanding the specific role of art and how it can benefit respondents' work. To implement an involvement in S+T+ARTS, for this group of respondents, it would be beneficial to know proved successful works resulting from sci-tech-arts collaborations. This group of answers confirms the need for a continuous organisation of actions showcasing sci-tech-arts collaborations, best practices and success cases.

- finally, the third and biggest group of answers, identified by 24 respondents (59% of the total respondents interested in S+T+ARTS), present the respondents' need on opportunities to concretize the involvement in S+T+ARTS and interdisciplinary projects: funding, collaboration opportunities, exchange and matchmaking opportunities. This group of answers exhibits the need to continuously provide means and resources to ensure the involvement of new individuals and organisations in S+T+ARTS community.

Figure 18. Reasons behind respondents' interest in taking part of S+T+ARTS, 2022

What would make you interested in taking part of S+T+ARTS?
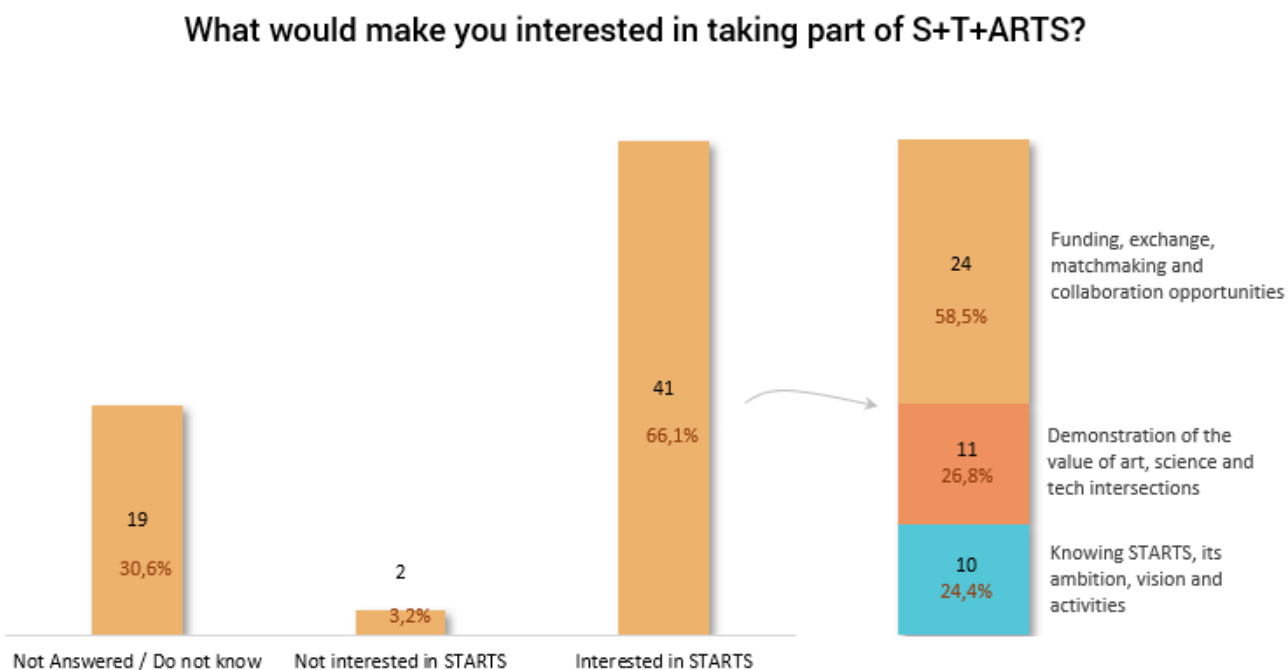
5. CONCLUSION: KEY FINDINGS

With this study, we aimed at knowing and understanding the factors that lead individuals and organisations taking part (or not) of initiatives promoting collaborations between science, technology and arts. And, in specific, we aimed at assessing the S+T+ARTS performance and power of engagement.

In this report, we started by presenting the **characteristics of the sample gathered** (Chapter 1). We successfully got the feedback from 72 individuals, from 27 different countries, different genders, ages, education degrees, fields of education, working areas and working sectors. This allowed us to gather the opinion from individuals potentially with different experiences and knowledge to share and enrich our analysis.

In Chapter 2, we focused our analysis on the **familiarity with sci-tech-arts initiatives or projects, their benefits and weaknesses**. About 56% of the respondents mentioned to be familiar with initiatives or projects promoting science, technology and arts collaborations, while 44% mentioned to not be familiar with these types of initiatives. **Age** seems to have an influence in the familiarity, as higher familiarity is found in older ages of respondents. In terms of **field of education**, in our sample, the familiarity is higher within individuals with degrees in "Life sciences, Physical sciences, Mathematics and statistics, computing" (68%); "Social sciences, journalism, business, administration and law" (61%); "Humanities and arts" (58%); and "Engineering, architecture, manufacturing and construction" (50%). When considering the **working area**, the familiarity with this type of initiatives tend to be higher among individuals working in "Research/ Academia" areas and "Creative and Cultural Sectors".

Several **benefits** were identified in relation to initiatives promoting science, technology and arts collaborations. The benefits highlighted by a higher number of respondents familiar with sci-tech-arts initiatives were:

- ✓ Stimulated me to embrace multidisciplinary/ interdisciplinary work (No.: 31 | 78%);

- ✓ Helped me to get to know and connect with interesting individuals or entities (No.: 28 | 70%);

- ✓ Helped me to think out-of-box (No.: 27 | 68%);

- ✓ Introduced me different and innovative solutions (No.: 25 | 63%).

Various **weaknesses** were also identified by respondents familiar with sci-tech-arts initiatives. We can group these weaknesses in five main groups:

- ○ *Operational/ administrative weaknesses:* in this group, respondents refer to constraints related to financing support/budget (which in their opinion is not sufficient); lack of continuity of projects/ initiatives; and the higher complexity and demanding of administrative and reporting obligations.

○ *Technical and methodological weaknesses:* in this group, respondents highlight the difficulties to engage and unlock synergies between different entities in the cross-disciplinary work (such as municipalities, foundations, industries) due to their different motivations, visions and ambitions. Respondents also referred: the typically longer duration of interdisciplinary research, which can move away entities looking for shorter-term results; the need to improve the uptake of technology developed from the market; and the need for higher support to design in the industrial solutions or digitalization of arts.

○ *Exploitation weaknesses:* in this group, respondents mentioned weaknesses related to the economic exploitation of sci-tech-arts results (which, in their opinion, remain underexplored, without plans for economic and labour returns) and the applicability of results of sci-tech-arts projects in reality (which sometimes seem to not have applicability, in the view of the respondents).

○ *Dissemination weaknesses:* among the weaknesses identified, respondents mentioned a specific constraint related to the difficulty to publish results in scientific journals: on the one hand, high-ranked and recognisable journals generally focus in just one discipline; on the other hand, publishing is not the key goal to everyone involved in sci-tech-arts collaborations.

○ *Communication weaknesses:* in this group, we find weaknesses related to communication to the general public. In the viewpoint of respondents, there is a need to dedicate more time and resources to present the projects and results to the general public (locally and internationally). At the same time, respondents call the attention to the fact that sci-tech-arts initiatives can approach very technical topics, making it difficult to reach the general audience. Some respondents add to this point, the difficulty to find technicians and professionals interested and with necessary competencies to communicate with the general public, which results in a need for new mediation methods.

Figure 19. Number of respondents familiar with sci-tech-arts initiatives, by type of weakness identified for these initiatives, 2022

Number of respondents by type of weakness of sci-tech-arts initiatives
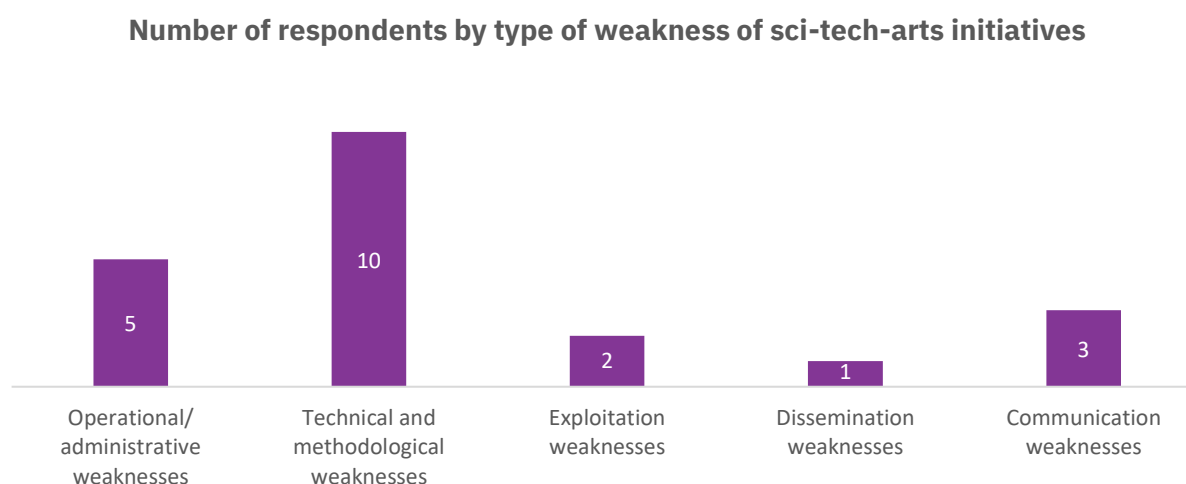
In Chapter 3, we gave one step forward in our analysis and assessed the **interest of individuals in continuing or getting involved for the first time with sci-tech-arts initiatives**, namely through a participation in a Sci-Tech-Arts Experiment/ Residency. Our goal was to evaluate the potential to grow of sci-tech-arts initiatives and projects. The majority of the respondents (68, corresponding to 94% of the total of respondents) revealed to be interested in taking part of a sci-tech-art experiment, including the respondents that are not familiar with sci-tech-arts collaborations. For these respondents, eight main reasons are behind their interest. In Figure 20, we can see these reasons listed for individuals familiar with sci-tech-arts initiatives and not familiar.

Figure 20. Key reasons behind respondents' interest in taking part of a Sci-Tech-Art experiment (number of respondents), 2022

Key reasons behind respondents' interest in taking part of a Sci-Tech-Art experiment

■ Respodents familiar with Sci-Tech-Arts Initiatives   ■ Respodents not familiar with Sci-Tech-Arts Initiatives
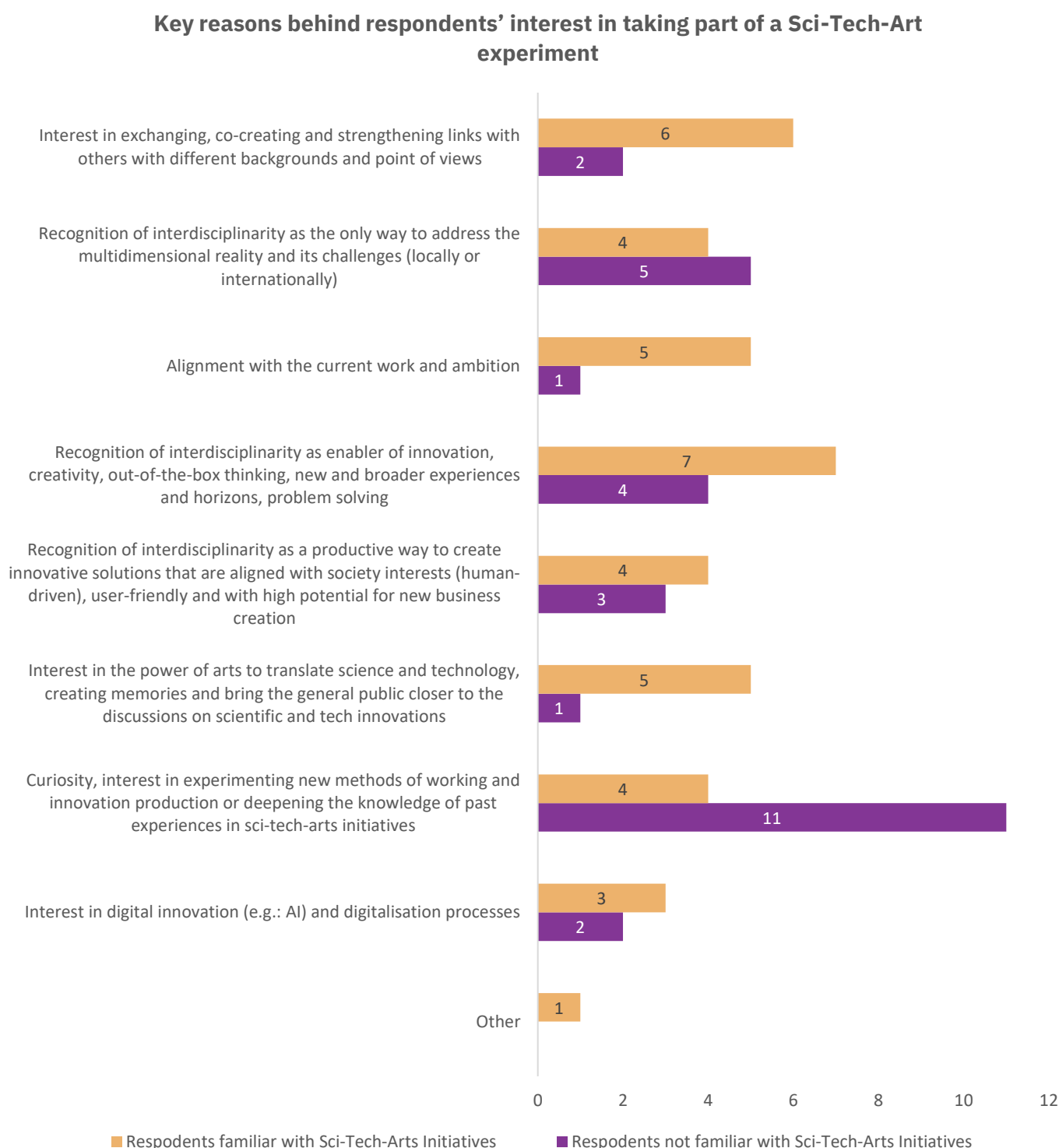
For individuals familiar with these initiatives, the main reasons for their interest in continuing involved in sci-tech-arts initiatives and projects are:

- ✓ Recognition of interdisciplinarity as enabler of innovation, creativity, out-of-the-box thinking, new and broader experiences and horizons, problem solving (18%);

- ✓ Interest in exchanging, co-creating and strengthening links with others with different backgrounds and point of views (15%);

- ✓ Alignment with the current work and ambition (13%);

- ✓ Interest in the power of arts to translate science and technology, creating memories and bring the general public closer to the discussions on scientific and tech innovations (13%).

For individuals not familiar with these initiatives, the reasons for their interest in getting involved in sci-tech-arts initiatives and projects are:

- ✓ Curiosity, interest in experimenting new methods of working and innovation production or deepening the knowledge of past experiences in sci-tech-arts initiatives (38%);

- ✓ Recognition of interdisciplinarity as the only way to address the multidimensional reality and its challenges (locally or internationally) (17%);

- ✓ Recognition of interdisciplinarity as enabler of innovation, creativity, out-of-the-box thinking, new and broader experiences and horizons, problem solving (14%);

- ✓ Recognition of interdisciplinarity as a productive way to create innovative solutions that are aligned with society interests (human-driven), user-friendly and with high potential for new business creation (10%).

Finally, in Chapter 4, we focused our attention on the S+T+ARTS initiative. One of the key goals of our analysis was to assess the **S+T+ARTS initiative performance**. In this chapter we presented the point of views of our respondents.

About 14% of the total respondents (10) mentioned to know S+T+ARTS. When comparing with the number of respondents familiar with sci-tech-arts initiatives (40, representing 56%), this number reveals that only a quarter (1/4) of the respondents familiar with sci-tech-arts initiatives affirmed to know S+T+ARTS. This number becomes lower when considering the immediate memory, as only 7 respondents recognised S+T+ARTS when asked to list initiatives promoting sci-tech-arts collaborations.

In terms of sociodemographic characteristics (nationality, age, gender, education degree, working area), **respondents familiar with S+T+ARTS** present characteristics in line with the characteristics of the whole group of respondents familiar with sci-tech-arts initiatives.

When asked about the roles performed in the S+T+ARTS Community, the respondents familiar with this initiative are mainly followers and/or members of S+T+ARTS social media or website or newsletter (50%). In general, respondents consider S+T+ARTS initiative as beneficial and very important. Thanks to S+T+ARTS, respondents were able to get the following benefits: stimulates

me to embrace multidisciplinary/ interdisciplinary work (70%); helps me to think out-of-box (70%); introduces me different and innovative solutions (50%).

When asked if and **how S+T+ARTS could benefit more**, respondents do not have quick answers. Some of the respondents do not have ideas on how S+T+ARTS could benefit them more. Other respondents consider relevant to:

- have more S+T+ARTS Regional Centres;
- help technology experts and scientists to develop solutions that are more human-centric;
- include S+T+ARTS approaches in scientific projects;
- have more options to work together.

Among the respondents that are not familiar with S+T+ARTS, about 66% (41 respondents) mentioned to be interested in getting involved with this initiative. For this, respondents identified three main drivers for their involvement:

- ✓ Better knowledge and understanding on S+T+ARTS, its ambition, vision and activities and how this initiative can benefit the respondents.
- ✓ Enhanced understanding on the specific role of art, and how intersections between science, technology and arts can occur and benefit respondents' work.
- ✓ Opportunities to concretize the involvement in S+T+ARTS and interdisciplinary projects: funding, collaboration opportunities, exchange and matchmaking opportunities.

__IN CONCLUSION__, the data collected allows us to affirm that individuals and organisations have an interest in sci-tech-arts initiatives, in general, and in S+T+ARTS, in particular. Based on the interest revealed by almost all respondents, we can expect that more individuals and organisations will take a participation in these initiatives.

Nevertheless, the data collected also showed us some weaknesses and constraints of these initiatives that might prevent higher levels of interest in participating in these initiatives. Based on the data collected, individuals and organisations would be interested in having:

[Operational and administrative dimension]

- ✓ Higher financing support /budget;
- ✓ Projects that have longer duration and/or have some type of continuity;
- ✓ Less complex and demanding administrative and reporting obligations;

[Technical and methodological dimension]

- ✓ More or enhanced methods to quickly unlock synergies and align interests between different stakeholders;
- ✓ Different co-creation methodologies, adjusted to different ambitions to get results in a short, medium or longer-term;

- ✓ More methods contributing to the uptake of technology developed from the market;

- ✓ Higher support to design in the industrial solutions or digitalization of arts;

[Exploitation dimension]

- ✓ Higher economic exploitation of sci-tech-arts results, with plans for economic and labour returns;

- ✓ Enhanced testing of results, ensuring their applicability in reality;

[Dissemination dimension]

- ✓ Support to publish results in scientific journals;

[Communication dimension]

- ✓ More time and resources to present the projects and results to the general public (locally and internationally), through different type of events (conferences, exhibitions, etc) to reach different audiences;

- ✓ Support to enhance communication of technical topics;

- ✓ New mediation methods to support the communication of results to the general public.

In the specific case of **S+T+ARTS**, considering the feedback collected, we can conclude that, to successfully attract more stakeholders into the initiative, it will be relevant to continuously:

- ✓ Disseminate and communicate on S+T+ARTS initiative, its ambition, vision and activities.

- ✓ Organise actions showcasing sci-tech-arts collaborations, best practices and success cases.

- ✓ Provide means and resources to ensure the involvement of new individuals and organisations in S+T+ARTS community.

For the individuals already engaged in S+T+ARTS, it would be relevant to:

- ✓ have more S+T+ARTS Regional Centres;

- ✓ help technology experts and scientists to develop solutions that are more human-centric;

- ✓ include S+T+ARTS approaches in scientific projects;

- ✓ have more options to work together.

ANNEX I - LIST OF INITIATIVES/ ORGANISATIONS PROMOTING SCI-TECH-ARTS COLLABORATIONS

Respondents familiar with sci-tech-arts initiatives were asked to list the initiatives they know. Tables below list the organisations, projects and initiatives identified by respondents.

In the lists, we did not include the S+T+ARTS initiative or its projects identified by respondents. For this, we invite you to visit S+T+ARTS website and know its whole range of projects and activities:

WWW.STARTS.EU

Organisations	Country	URL
Ars Electronica Center, in Linz	Austria	https://ars.electronica.art/news/de/
Artivive	Austria, Canada, Korea	https://artivive.com/about/
Liszt Institute - Hungarian Cultural Center Brussels	Belgium	https://culture.hu/en/brussels/aboutus-en
BioARTech	Finland	https://www.ulapland.fi/EN/Webpages/BioARTech-Laboratory
Le Fresnoy École Internationale des Arts Contemporains	France	https://www.lefresnoy.net/en/
Science2Public	Germany	https://www.science2public.com/
SILBERSALZ Festival	Germany	https://www.silbersalz-festival.com/en
Adaf	Greece	http://www.adaf.gr/
BarabasiLab	Hungary, USA	https://www.barabasilab.com/art/about
SFI (research funding body in Ireland)	Ireland	https://www.sfi.ie/
Music Innovation Hub	Italy	https://musicinnovationhub.org/home-en/
Dutch Invertuals	Netherlands	https://www.dutchinvertuals.nl/
GLOW Eindhoven (Festival)	Netherlands	https://gloweindhoven.nl/
Oost NL (regional development agency)	Netherlands	https://oostnl.com/en
Sencity Festival	Netherlands	https://www.sencity.today/
STRP (Festival)	Netherlands	https://strp.nl/
NTNU ARTEC, the Art and Technology Task Force	Norway	https://www.ntnu.edu/artec
ANI - Agência Nacional de Inovação (Innovation Agency)	Portugal	https://www.ani.pt/
Braga Media Arts	Portugal	https://www.bragamediaarts.com/pt/

CRU Creative Hub	Portugal	https://crucreativehub.com/en/
Fundação da Juventude	Portugal	https://www.fjuventude.pt/pt/
PDF - Porto Design Factory	Portugal	https://www.ipp.pt/innovation/porto-design-factory?set_language=en
Porto Innovation Hub	Portugal	https://portoinnovationhub.pt/en/home-page/
ScaleUp Porto	Portugal	https://scaleupporto.pt/
UPTEC	Portugal	https://uptec.up.pt/
Medialab Matadero	Spain	https://www.medialab-matadero.es/
Phonos - Universitat Pompeu Fabra Barcelona	Spain	https://www.upf.edu/web/phonos/presentacio
Sonar+D	Spain	https://sonarplusd.com/
XOIA	Spain	https://xoia.es/cultura-turismo/
Vinnova - innovation agency	Sweden	https://www.vinnova.se/en/
Utopia Music	Switzerland	https://utopiamusic.com/

Projects or initiatives	URL
NEB New European Bauhaus	https://europa.eu/new-european-bauhaus/index_en
Creative Europe	https://culture.ec.europa.eu/creative-europe
EUROPEAN DIGITAL INNOVATION HUBs	https://digital-strategy.ec.europa.eu/en/activities/edihs
EIT Culture&Creativity	https://eit-culture-creativity.eu/
HUMAN+ programme (MSCA)	https://humanplus.ie/human-programme/
DARIAH initiative - Digital Research Infrastructure for the Arts and Humanities	https://www.dariah.eu/about/dariah-in-nutshell/
JRC SciArt project	https://joint-research-centre.ec.europa.eu/knowledge-research/centre-advanced-studies/jrc-sciart-project_en
WORTH Partnership Project	https://worth-partnership.ec.europa.eu/select-language?destination=/node/1
Kyriaki Goni	https://ars.electronica.art/export/en/kyriaki-goni/
DecoChrom	https://decochrom.com/
Research Institute of Measuring and Modeling for the Built Environment (MeMo)	https://www.aalto.fi/en/news/pioneers-in-3d-virtualisation-receive-the-first-national-open-science-award
Digital4Science EU initiative	https://ec.europa.eu/futurium/en/digital4science.html
MINGEI	https://www.mingei-project.eu/
Future of Work – Cluj Napoca (UIA financed)	https://www.uia-initiative.eu/en/operational-challenges/clujnapoca-cluj-future-work ; https://www.uia-initiative.eu/en/uia-cities/clujnapoca

Technical University of Cluj-Napoca - use of AI for music generation and for painting generation	
AYCH - Atlantic Youth Creative Hubs	https://www.aych.eu/
F-BAD	https://research.ulapland.fi/en/projects/future-bio-arctic-design-ii-fbad-ii
House of Digitalization	https://www.ecoplus.at/interested-in/house-of-digitalization/ https://www.virtuelleshaus.at/
EnhancedMicroAlgae - book	http://www.anfaco.es/blog_ct/index.php/2019/08/05/un-comic-nos-presenta-el-mundo-de-las-microalgas/
Nanoscale design using virtual reality	https://citius.gal/research/projects/deseno-a-nanoescala-mediante-realidade-virtual
FOL - book	https://futureoceanslab.org/es/2021/04/23/fol-publica-un-libro-de-divulgacion-cientifica-para-ninos/
Cityxchange	https://cityxchange.eu/
Cyma {Fos}	https://kranidiotis.gr/cyma-fos/
A way of resisting (Athens Data Garden), 2020	https://kyriakigoni.com/projects/data-garden
Creative Shift	https://creativeshift.eu/
JUMP – European Music Market Accelerator	https://www.jumpmusic.eu/
Virtual National Museum	https://www.aalto.fi/en/news/how-about-visiting-the-national-museum-from-the-comfort-of-your-sofa-on-a-flying-carpet
CUP 4 CREATIVITY (Innovative Urban Action)	https://www.uia-initiative.eu/en/uia-cities/budapest-ujbuda
Inspira STEAM	https://inspirasteam.net/
Spark AR (META)	https://www.facebook.com/business/tools/spark-ar-studio
Academy on the Move	https://televizijastudent.com/odrzana-zavrsna-konferencija-projekta-akademija-u-hodu
Ivanić-Grad City Library – celebration event "European Year of Railways"	https://www.algebra.hr/lab/kampanje/citateljski-klub/
Regionarts	https://projects2014-2020.interregeurope.eu/regionarts/
Shared Habitats / Expanded Ecologies (SHEE) - New European Bauhaus Weimar	https://www.uni-weimar.de/en/university/structure/university-management-team/university-directorate/new-european-bauhaus-weimar/projects/titel/shared-habitats-expanded-ecologies-shee/
Dreamachine, by Collective Act	https://dreamachine.world/
Media Arts & Sciences at the MIT Media Lab	https://www.media.mit.edu/graduate-program/about-media-arts-sciences
Affectivism	https://www.unige.ch/cisa/research/current-specific-research-projects/affectivism/
Transparent3D	https://cordis.europa.eu/project/id/886094
ULTIMATE stakeholder engagement	https://ultimatewater.eu/stakeholder-engagement/
UViMCA	https://uvimca.ics.forth.gr/
VAST – Values Across Space & Time	https://www.vast-project.eu/

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