Deliverable 4.4

Pathways for adopting Outstanding Open Science Communication addressed to Scientists, Journalists, Teachers, Policy Makers and Entrepreneurs

Version 1.4

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ENJOI - ENgagement and JOurnalism Innovation for Outstanding Open Science Communication
This project received funding from the European Union's Horizon 2020 Research and Innovation program under Grant Agreement n°101006407
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REVISION HISTORY

Revision	Date	Contributor	Description
v1	11.08.2023	Science for Change	First version
v2	21.08.2023	ENJOI consortium	Document reviewed by partners
v3	29.08.2023	Science for Change	Document reviewed by SfC
v4	31.08.2023	Formicablu	Final version and document uploaded

QUALITY ASSURANCE

To ensure the quality and correctness of this deliverable, we arranged an internal review and validation process. The deliverable was drafted by the work package leader. All partners contributed and reviewed the overall draft. Finally, the final version was submitted to the project coordinator for final review and validation.

DISCLAIMER

This deliverable contains original, unpublished work except where clearly indicated otherwise. It builds upon the experience of the team and related work published on this topic. Acknowledgment of previously published material and others' work has been made through appropriate citation, quotation, or both.

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1. SUMMARY

In ENJOI we designed and delivered two rounds of Engagement Workshops (EWs) and Labs that involved specific targets such as scientists, journalists, communicators, activists, teachers, policymakers and various other representatives of civil society. More than 100 participants around Belgium, Italy, Portugal and Spain discussed and co-created a set of Standards, Principles and Indicators (SPIs) to improve the quality of science communication and journalism. During the EWs and Labs, the participants also contributed to the ideation of tools that address the specific needs of several stakeholders, regarding science communication and journalism, in general, and the co-created SPIs, in particular.

WP4 and WP6 funneled in the feedback and the ideas, adapting them into specific and tailored tools for 5 selected target audiences and communities: Scientists, Journalists, Teachers, Policymakers and Entrepreneurs.

Besides the contributions from the participatory events, we mapped the tools that were developed in other science communication projects funded in 2018-2019-2020 under the H2020 Science with and for Society programme. This supported building a pathway that is innovative. This report contains specific proposals as a result of the testing and feedback process to adopt the SPIs in science communication for each target community.

The pathways will help and guide different groups to improve their science communication goals, spread their message, reach and interact with their audience through different tools. These will be accessible in the European Observatory for Outstanding Open Science Communication (OOSC), in the shape of applicable tools, resulting from the collective process of building the Manifesto and the SPIs. Moreover, they will also inform the building and establishment of the future European Competence Centre for Science Communication, its virtual platform, tools and services offered, within the COALESCE project.

Overall, this deliverable aims to promote the adoption of outstanding open science communication practices and encourage collaboration amongst the different stakeholders involved in promoting open science research and practice.

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2. PROJECT OVERVIEW

ENJOI (ENgagement and JOurnalism Innovation for Outstanding Open Science Communication) is exploring and testing engagement as a key asset of innovation in science communication distributed via media platforms, with a strong focus on journalism.

Through a combination of methodologies and in collaboration with producers, target users and stakeholders of science communication, ENJOI is co-creating and selecting a set of standards, principles and indicators (SPIs) to produce a Manifesto for Outstanding Open Science Communication (OOSC). ENJOI is deploying a series of actions via Engagement Workshops (EWs), Labs, field and participatory research, evaluation and testing phases.

ENJOI has also built an Observatory as its landmark product to make all results and outputs available to foster capacity building and collaboration of all actors in the field. The Observatory, currently hosted within the project website, will evolve into an independent product bound to remain online and actively nurtured well beyond the project end. Furthermore, the ENJOI Observatory will be integral to the COALESCE project, recently funded under the Horizon Europe scheme to build the European Competence Centre for Science Communication.

The ENJOI Observatory will provide useful insights, resources and tools to support science and generalist journalists in their work. ENJOI is working in four countries: Belgium, Italy, Portugal and Spain, considering different cultural contexts.

ENJOI's ultimate goal is improving science communication by making it more consistently reliable, truthful, open and engaging. Contextually, ENJOI will contribute to the active development of critical thinking, digital awareness and media literacy of all actors involved in the process.

3. INTRODUCTION

Many challenges facing humanity today, such as climate change, pandemics, and environmental degradation, require the public's understanding and support. Science communication is fundamental for ensuring that scientific knowledge is accessible, clear and interactive with a different range of audiences. Providing effective and open science communication tools can support mobilizing public action and participation in addressing these critical issues.

ENJOI co-created with scientists, journalists, communicators, activists, teachers, policymakers and various other representatives of civil society a set of SPIs to improve the quality of science communication and journalism (D2.2 and D2.4).

This was performed through a series of participatory events. First, we organised EWs in Italy, Belgium, Spain, and Portugal (D4.2) focusing on science communicators and journalists. Then we delivered another round of participatory events in the four selected countries. These were denominated the ENJOI Labs, and were an opportunity to bring the ENJOI SPIs of outstanding open science communication to a new audience. The methodology to involve the quadruple helix stakeholders was connected with the NEWSERA project (ENJOI Swafs-2019 sister project) bringing to ENJOI the view of citizens, industry & SMEs, career scientists and policymakers (D4.3).

In both EWs and Labs, the participants had to take part in a participatory exercise to develop possible tools that would help address the specific needs of several stakeholders regarding science communication and journalism, in general, and the co-created SPIs, in particular. The exercise, inspired and adapted from a design thinking methodology, was composed of a definition and ideation phases, providing users' needs, expectations, and demands of information and knowledge into specific prototypes.

Having tools that improve the communication of science is essential for fostering public understanding, encouraging scientific literacy, and driving societal progress. By bridging the gap between practitioners and consumers, these tools create a more informed and engaged society. Further on, the process of narrowing down the tools is explained.

4. MAPPING WHAT IS OUT THERE

4.1 Tools and resources from other Swafs-19 projects

In order to develop innovative tools, the tools and resources produced in previous different projects were mapped. In total, seven other science communication projects funded in 2018-2019-2020 in the H2020 Science with and for Society were included in this analysis, which were:

- CONCISE- Communication role on perception and beliefs of EU Citizens about Science
- GlobalSCAPE - Global Science Communication and Perception
- NEWSERA - Citizen Science as the New Paradigm for Science Communication
- ParCos - Participatory Communication of Science
- QUEST - QUality and Effectiveness in Science and Technology communication
- RETHINK - Rethink Science Communication
- TRESCA - Trustworthy, Reliable and Engaging Scientific Communication Approaches

We used their web pages as a source of research. Specifically, the information in the table below comes from the sections: results, outcomes, and/or resources. Final events, deliverables and videos promoting the projects themselves were not included because they were considered to be part of a bigger picture and not a resource in itself. Tools related to target audiences not connected to this deliverable were not included either. Only materials that are targeted to the same audiences that we have early defined in this deliverable were considered: Scientists, Journalists, Teachers, Policy Makers and Entrepreneurs. All the materials from the projects are present in Annex 1, and synthesized in the following table.

Briefly, we have found almost 50 tools and resources: educative-related (such as a MOOC, explanatory videos, education map, online courses), informative-related (workshops, interactive PDFs, blueprints, podcasts, infographics), networking (database), policy-related (policy briefs, White paper), practice-related (checklist, guidelines, impact framework, toolkits) and others that are described below.

Table 1. Tools and resources obtained from the SwafS-19 sister projects, including main information, target audiences and format.

Tool/resource	Main information	Target	Format	Project
Communication role on perception and beliefs of EU citizens about science	Policy brief with recommendations for policy makers and communicators about the role science communication plays on the origin of beliefs, perceptions and knowledge concerning scientific issues.	Policy makers/ journalists/ scientists	Policy brief	CONCISE
DATABASE	The CONCISE database presents examples that may serve as an inspiration to solve the barriers that researchers and professional communicators face when engaging in science communication.	Scientists/ journalists	Database	CONCISE
Public consultation	The CONCISE project has carried out five public consultations between September and November 2019. Over 500 European citizens have had the opportunity to share their opinions on science communication about four topics: vaccines, complementary and alternative medicine use (CAM), genetically modified organisms (GMO) and climate change.	Policy makers	Infographics and videos	CONCISE
RETHINK SciComm Training Navigator	The SciComm Training Navigator is much like a map, helping teachers and students navigate the complex world of science communication today. In the form of an interactive PDF, the navigator features twelve different activities meant to build on three targeted competencies of a good science communicator.	Teachers	Interactive PDF	RETHINK

	Both the competencies and the activities were created based on insights collected through RETHINK's research, and these insights are also outlined for reference in the navigator.			
Policy brief for policy makers	Improving digital science communication in Europe	Policy makers	Policy brief	RETHINK
Policy brief for scientists	Improving science communication in research institutions	Scientists	Policy brief	RETHINK
Policy brief for science communicators	Improving your digital science communication	Journalists	Policy brief	RETHINK
RETHINK explanatory videos	#1 video: Assessing quality of science communication online #2 video: How to reach underserved audiences #3 video: Making sense in Science Communication #4 video: Rethinkerspaces: Transform science communication practice through local networks of shared learning	All	Video	RETHINK
Scicomm Framework Roles	There is no one single objective way of communicating, which is why communicators inevitably need to choose between different potential roles to play in different contexts. The term role describes a characterization of the activities of an individual engaged in science communication (Pielke, 2007). Depending on which role a communicator plays, the communicator draws	All	Webpage- icons and text	RETHINK

	on different repertoires representing a certain perspective on the relation between knowledge production and use as well as a set of work-related activities that complement these (Turnhout et. al, 2013).			
IDEA-THON Visuals: sensemaking applied to science engagement practice	This idea-thon was an invitation to seize new conceptual tools brought forward by the RETHINK project and experiment with them, working on practical science engagement cases – or "problems". These are real life scenarios brought forward by participants of the idea-thon seeking the help of their peers.	All	Infographics	RETHINK
The Rethinkerspace Methodology	Rethinkerspaces are hubs of science communication aiming at creating communities of inquiry, experiment with new strategies and train actors in the field. Rethinkerspaces follow a 6-step methodology.	All	PDF-Infographic	RETHINK
12 Quality criteria for online science communication	Which criteria do experts consider as most important to evaluate quality in science communication online? The RETHINK project conducted a Delphi study to examine their opinions. The study encompassed two waves of surveys with 26 (wave 1) and 19 (wave 2) science communication scholars from across the world and resulted in 12 quality criteria for online science communication.	Journalists/ Scientists/ Teachers	PDF	RETHINK
Roles of those reaching underserved	This infographic illustrates the different roles science communicators assume – or should be assuming – to meet the	Scientists/	PDF	RETHINK

audiences	challenges and demands in the contemporary science communication landscape. On the basis of earlier RETHINK research on how science communicators employ innovative techniques to reach underserved audiences, six roles were formulated that can be – and are – adopted by science communication practitioners to enhance their connections with a wider range of audiences	Journalists	Infographic	
The six virtues for the reflective science communication practitioner	In the current digitalised, politicised, commercialised, and fragmented science communication ecosystem, practitioners are confronted with many challenges. How to navigate difficult interactions with science skeptics online? How to embrace the uncertainty that is inherent to science? And how to accompany the personal and contextual ways in which citizens make sense of science?	Scientists/ Journalists/ Teachers/ Entrepreneurs	PDF Infographic	RETHINK
12 QUALITY INDICATORS for Science Communication	The QUEST quality indicators support science communicators in countering misinformation, inspiring young people and improving societal discussion on controversial science topics.	All	PDF	QUEST
The QUEST Podcasts on Science Communication	Episode 2: Artificial intelligence Episode 3: Climate change Episode 4: Vaccines	Scientists/ Journalists	Podcast	QUEST

	Episode 5: Social media Episode 6: Media's coverage of the COVID-19 pandemic			
Checklist for scientists: Quality and effective science communication for public audiences	The checklist supports scientists in delivering their message and fine-tuning their communication skills to the public.	Scientists	Checklist - PDF	QUEST
Checklist for science communicators on social media	It helps science communication professionals engage with the general public on social networks.	Scientists/ Journalists	Checklist - PDF	QUEST
Guidelines for quality science communication in journalism	This resource provides a set of guidelines for journalists, editors and media professionals. It was developed on the basis of indicators and metrics identified in consultation with science journalists, science-focussed media, and members of the public.	Journalists/ Entrepreneurs	Guideline - PDF	QUEST
Explainers and suggestions for journalists	These resources aim to help journalists better understand the complexities of scientific concepts and statistical terms. They also offer guidance on how to report scientific findings and advise them on the effective use of statistics and data visualisations.	Journalists	PDF	QUEST
JECT.AI – digital support tool for science journalism	QUEST research has resulted in the development of new digital INQUEST capabilities to support journalists writing about stories with scientific content. These capabilities include the automated	Journalists	Software	QUEST

	discovery of new scientific and news information from less common sources, different science audience personas for disengaged segments of the public, and interactive science communication metaphors to use in storytelling.			
Toolkit for journalists reporting on science	Set of slides with a self-explaining presentation open to science communicators and trainers. The first part of the presentation focuses on the 12 quality indicators in science communication, and how they can ensure clear and effective communication. The second part consists of a 11-point checklist that helps journalists writing about science implement the quality indicators in their work.	Journalists	Presentation-PDF	QUEST
Toolkit for science communicators and trainers	Set of slides with a self-explaining presentation open to science communicators and trainers. The first part of the presentation is dedicated to the 12 indicators of quality in science communication. They illustrate the elements that ensure clear and effective communication. The second part is dedicated to a 14-point checklist to support quality science communication and therefore to make it clear and effective.	Scientists/ Journalists	Presentation-PDF	QUEST
Toolkit for science communication on social media	Set of slides with a self-explaining presentation open to science communicators and trainers. The first part of the presentation focuses on the social media landscape of today, characterised by disintermediation, Infodemic and Polarisation. The second part consists of advice aiming to help science communicators	Scientists/ Journalists	Presentation-PDF	QUEST

	produce high-quality communication in the social media context, and the final section provides tips for effective science communication on social media.			
QUEST Policy and Incentive Recommendations for EU Policy-Makers	QUEST Policy and Incentive Recommendations for EU Policy-Makers to support quality science communication	Policy makers	Policy brief	QUEST
QUEST Policy and Incentive Recommendations for Governance of Research Institutions	QUEST Policy and Incentive Recommendations for Governance of Research Institutions to support quality science communication	Scientists, teachers	Policy brief	QUEST
Blueprint for #CitSciComm with and for Career Scientists	NEWSERA Blueprints for citizen science communication (#citscicomm) with and for quadruple helix stakeholders (citizens and society at large, academic scientists, public sector and policymakers, industry and SMES) and science and data journalists is an instrument that can serve a general audience, including those who are planning to start a citizen science (CS) project, those who want to improve and/or rethink their communication strategies in order to increase specific target audiences, or those who want to enlarge their scope of action by involving the different actors of the quadruple helix model and the media.	Scientists	Blueprint	NEWSERA
Blueprint for #CitSciComm with and for policymakers	NEWSERA Blueprints for citizen science communication (#citscicomm) with and for quadruple helix stakeholders	Policy makers	Blueprint	NEWSERA

	(citizens and society at large, academic scientists, public sector and policymakers, industry and SMEs) and science and data journalists is an instrument that can serve a general audience, including those who are planning to start a citizen science (CS) project, those who want to improve and/or rethink their communication strategies in order to increase specific target audiences or those who want to enlarge their scope of action by involving the different actors of the quadruple helix model and the media.			
Blueprint for #CitSciComm with and for industries and SMEs	NEWSERA Blueprints for citizen science communication (#citscicomm) with and for quadruple helix stakeholders (citizens and society at large, academic scientists, public sector and policymakers, industry and SMEs) and science and data journalists is an instrument that can serve a general audience, including those who are planning to start a citizen science (CS) project, those who want to improve and/or rethink their communication strategies in order to increase specific target audiences or those who want to enlarge their scope of action by involving the different actors of the quadruple helix model and the media.	Entrepreneurs	Blueprint	NEWSERA
Blueprint for #CitSciComm with and for science journalists	NEWSERA Blueprints for citizen science communication (#citscicomm) with and for quadruple helix stakeholders (citizens and society at large, academic scientists, public sector and policymakers, industry and SMEs) and science and data	Journalists	Blueprint	NEWSERA

	journalists is an instrument that can serve a general audience, including those who are planning to start a citizen science (CS) project, those who want to improve and/or rethink their communication strategies in order to increase specific target audiences or those who want to enlarge their scope of action by involving the different actors of the quadruple helix model and the media.			
Guide of science communication in citizen science projects and citizen science journalism	A must-have tool for all those who want to start or rethink their own communication strategies.	Scientists/ Journalists	Guide	NEWSERA
Policy brief	Main findings and impacts from the NEWSERA project as well as policy recommendations in science communication of citizen science initiatives.	Policy makers	Policy brief	NEWSERA
Misinformation checklist	When involved in citizen science initiatives, citizen scientists become themselves science communicators being able to influence their closer social spheres as well be considered as primary sources of information for the media. As such, citizen science could be considered a powerful tool for debunking misinformation, disinformation and fake news. A checklist on how to do it was co-created under NEWSERA.	All	Checklist	NEWSERA
NEWSERA Impact Indicators table for CitSciComm	The document presents a set of indicators defined by the NEWSERA consortium for the evaluation of communication	Scientists	Table	NEWSERA

	specifically aimed at the quadruple helix agents (citizens and society as a whole, academia, industry and SMEs, public sector and policymakers) and journalists, by citizen science projects. NEWSERA established a multilevel impact assessment framework for the analysis and evaluation of communication tools and strategies co-designed by Science Communication projects. Based on this framework model, the NEWSERA Indicators were organised in three key macro-areas, Communication, Participation of quadruple helix stakeholders and Impact, each with three related sub-areas, and indicators.			
Online Course on Science Communication	The TRESCA project has developed a massive open online course (MOOC) to improve current practices of communicating scientific knowledge. The MOOC consists of seven modules that are made up of educational videos and learning resources. As a participant, you will learn how digitalization has influenced the development and communication of scientific knowledge. The focus of the course lies on how an overflow of information has made it difficult for the public to decipher what is accurate or inaccurate information.	All	Online course	TRESCA
Training Workshop Materials – Global Relevance in Science Communication	As part of the GlobalSCAPE project, Leiden University has developed training workshops for science communication practitioners around the world. One of the workshops was dedicated to the topic of Global Relevance in Science	Scientists/ Journalists/ Teachers/ Entrepreneurs	Workshops-videos	GlobalSCAPE

	communication.			
Training Workshop Materials – Justice, Equity, Diversity & Inclusion in Science Communication	As part of the GlobalSCAPE project, Leiden University has developed training workshops for science communication practitioners around the world. One of the workshops was dedicated to the topic of Justice, Equity, Diversity & Inclusion in Science communication.		Workshops-videos	GlobalSCAPE
Supporting Global Science Communication: A White Paper on Recommended Next Steps	This White Paper outlines a set of recommendations of future goals to strive toward to ensure the field of science communication remains relevant, impactful, and inclusive in a global context, thus improving the fragile relationship between science and society. To achieve these recommendations, science communicators must receive sustained support from funding bodies and policy makers.	Policy makers	White paper	GlobalSCAPE
Knowledge Capsule – Diary Study results	GlobalSCAPE organised a diary study as part of its research activities. In this exercise, science communicators were invited to participate in a research study about their day-to-day professional experiences, challenges and decisions while communicating research or science with public, non-academic audiences. This study followed regular reports over twelve months to track what happens for practitioners in science communication over this timeframe. 900 participants joined the baseline study, and 500 participants joined the diary study for	All	Infographic	GlobalSCAPE

	the full duration.			
Programmes and courses in science communication with the PCST Teaching Forum	A worldwide database of programmes and courses in science communication	Teachers/ Scientists/ Journalists/ Entrepreneurs	Database	GlobalSCAPE
Organising a support scheme: tips from GlobalSCAPE	GlobalSCAPE organised workshops all over the world, engaging science communicators in a one-day skill-building session. In order to help participants from lower-income background to attend the session, GlobalSCAPE provided financial support through a Mobility Scheme covering travel costs induced by workshop participation. They have learnt a lot from this experience and compiled our top tips to organising an effective support scheme. If you are looking to provide a similar support programme as part of an activity you are organising, have a look at their recommendations.	Scientists/ Teachers	PDF	GlobalSCAPE
"TRAIN THE TRAINERS" PACKAGE	The Trainer Card deck is a reflection tool and contains guidelines for the design, iteration, and evaluation of science stories. The guidelines on the cards are posed in the form of questions to stimulate thinking and spark discussion. The questions on these cards are based upon quality criteria for science dissemination that were generated by a systematic review.	All	PDF and Miro	PARCOS

PARCOS STORYTELLER	This interactive PDF enables you to create data-driven stories with your audience, from collecting data to engaging the reader.	All, especially journalists and scientists	Interactive PDF	PARCOS

There are also the following resources already produced during the ENJOI project and made available through the Observatory:

Table 2. Tools and resources obtained from the ENJOI project, including main information, target audiences and format.

Tool/resource	Main information	Target	Format
ENJOI Manifesto for an Outstanding Open Science Communication for OOSC	The ENJOI Manifesto is addressed to all the people involved in science communication, with a special focus on science journalism. We combined literature analysis, expert consultations, media landscape research, co-creation design and implementation with a variety of stakeholders to build a matrix of Standards, Principles, and Indicators (SPIs) for outstanding open science communication. The ENJOI Manifesto summarizes the spirit of those SPIs, and is a living document to help foster critical thinking, media literacy, and digital awareness for all in society.	All	Manifesto
SPIs	Standards, Principles and Indicators to navigate the jungle of science communication.	Journalists/ Entrepreneurs	Webpage with infographics

Media Landscape	Investigation of the existing media landscape in science journalism and communication through the prism of engagement, data, innovation, and solutions. Insights stemming from this research are the result of a participatory methodology, involving and engaging a variety of science information producers, users and stakeholders to assess high quality in science communication and journalism	All	Interactive webpage

4.2 Results from ENJOI and criteria for the tools

Complementary to the desk-research approach of resources and/or tools within other SwafS-19 projects, we collected information from the participatory workshops that were developed between January and December 2022, in seven face-to-face events and one online, using participatory and/or co-creation methods that were adapted thanks to the cascade model used in the project (methodology described in D3.2). This approach allowed the collection of feedback, iteratively from one EW or Lab to the next one, to improve the co-creation method used.

As aforementioned, during the EWs and Labs, one specific activity was designed to define and ideate tools, products, or services that address specific needs, expectations and demands for information and knowledge of several stakeholders about science communication and journalism, in general, and the co-created ENJOI SPIs, in particular.

The ideas that emerged from the participatory workshops were collected and reported by the partners in charge of the EWs and Labs in a template available at D4.2, D4.3, D6.1 (confidential), and D6.2 M35.

Table 3. Ideas of tools that emerged from the Engagement Workshops

Italy	• Audience "thermometer" • Audience survey (New York Times style: how much do you know about the most relevant 10 news of the week?) • Young board for excellent scicomm • Events for the public
Belgium	• Science in the Newsroom • Horizon scicomm: scicomm as integral part of research • Scicomm research network
Spain	• Software for key performance indicators (KPIs) • Virtual platform with science communication content • Database of experts in science and science communication • Guide about good practices
Portugal	• Platform/app (online) - To ensure the correct interpretation of scientific information • Game (online) - To increase media literacy through a process of learning

	by doing, captivating diversified publics to produce and disseminate scientific content • Debates throughout the country (north to south, in person) - To disseminate 'good practices' of science communication and journalism

Table 4. Ideas of tools that emerged from the Labs

Italy	• Open source platform to evaluate science journalism • Crowdfunding platform for (science) journalism • Diffusion tracker
Portugal	• Development of a community of researchers, graphic designers, and professional communicators to help researchers to communicate their research • Interactive guideline to support researchers to select the most suitable format and channel to communicate their research based on audiences' preferences/stakeholders' needs • Online platform that integrates a database of researcher and journalists and a ranking of high-quality media outlets (to support communication dept. and researchers)
Spain	• *Enjoily*: *Grammarly* of SPIs addressed to communication professionals • Scicomm quality stamp • Checklist with peer review
Belgium	• A collection of best practices/good examples of where the SPIs were applied

The outcomes from each country were discussed with the partners in charge and FC.ID is currently developing two prototypes per country. As innovative aspects, both the mapping of existing tools developed by SfC in this D4.4, as well as, the feasibility and practical use of the solutions, will be incorporated. The prototypes are being produced in the national language of the countries where they are being tested and evaluated (Spanish, Portuguese, and Italian), except in the case of English for Belgium. The prototyping phase for the EWs' tools was executed between October 2022 and April 2023 while the Lab's tools will be finished in November 2023.

The criteria used to select the ideas to prototype per each of the countries were:

- Novelty and level of innovation of the idea (content and/or format)

- Feasibility to produce a prototype with the resources available (budget and timing)
- Level of complexity
- Target end-users (e.g., difficult audiences, such as policy-makers or teenagers)
- Diversity in the goals and objectives
- Diversity in their formats (online and physical tools)

A careful examination of the tools proposed in the EWs and Labs by the different participants were complemented with the mapping of what was already developed in other Swafs-19 projects related to science communication (section 4.1 of this Deliverable). The final set of tools is the following:

Table 5. Chosen tools according to the country and target in the project.

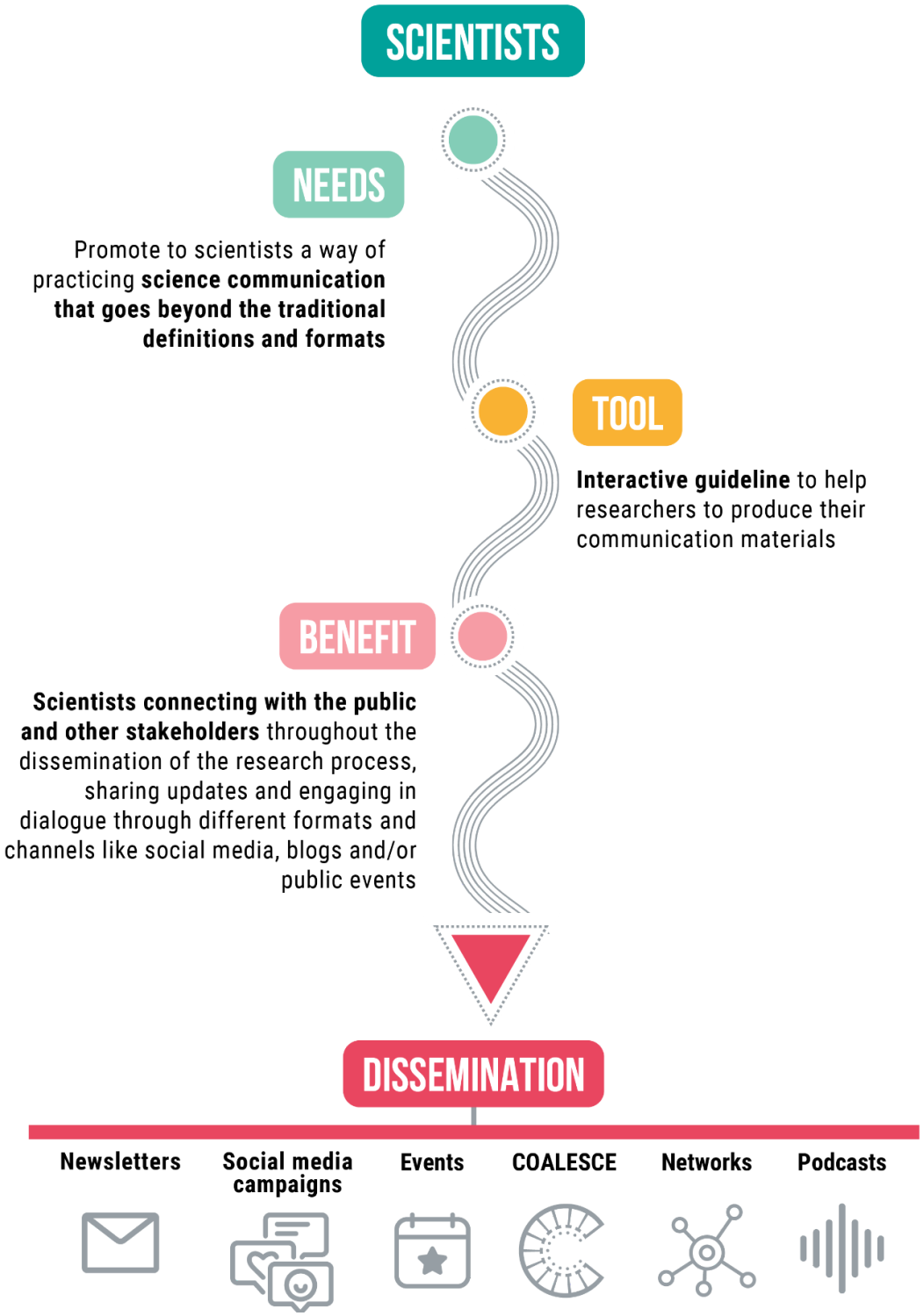
Tool	Target	Country
Checklist of good practices in science communication	Journalists	Spain
Roadmap to support the recognition of science communication in the scientific career at the EU level	Policy makers	Belgium
Online platform to help journalists to understand how information in scientific articles is organized	Journalists	Portugal
Toolkit to improve science communication skills of high school students	Teachers	Italy
"Enjoily"- "Grammarly" of SPIs addressed to communication professionals	Journalists/ Entrepreneurs	Spain
Guideline of good practices (SPIs in practice) and examples	Journalists/ Entrepreneurs	Belgium
Interactive guideline to help researchers to produce their communication materials	Scientists	Portugal
"Evaluation platform" to provide direct feedback to journalists (GlobalScience.it)	Citizens	Italy

5. PATHWAYS FOR ADOPTING OUTSTANDING OPEN SCIENCE COMMUNICATION (OOSC)

The pathways for adopting outstanding open science communication help to identify the needs of each target audience in terms of science communication that emerged from the EWs and Labs, while providing innovative tools that aim to foster capacity building and critical thinking skills, as well as, support several stakeholders in their communication activities.

Besides the pathways, it is recommended to consider the dissemination of these tools that will be further connected with WP6 and WP8 of the ENJOI project. In this section, we have schematically represented each of the pathways for better comprehension, and wider dissemination and contribute to a more effective adoption of the OOSC by the different targets

Pathways for adopting Outstanding Open Science Communication addressed to Scientists, Journalists, Teachers, Policy Makers and Entrepreneurs



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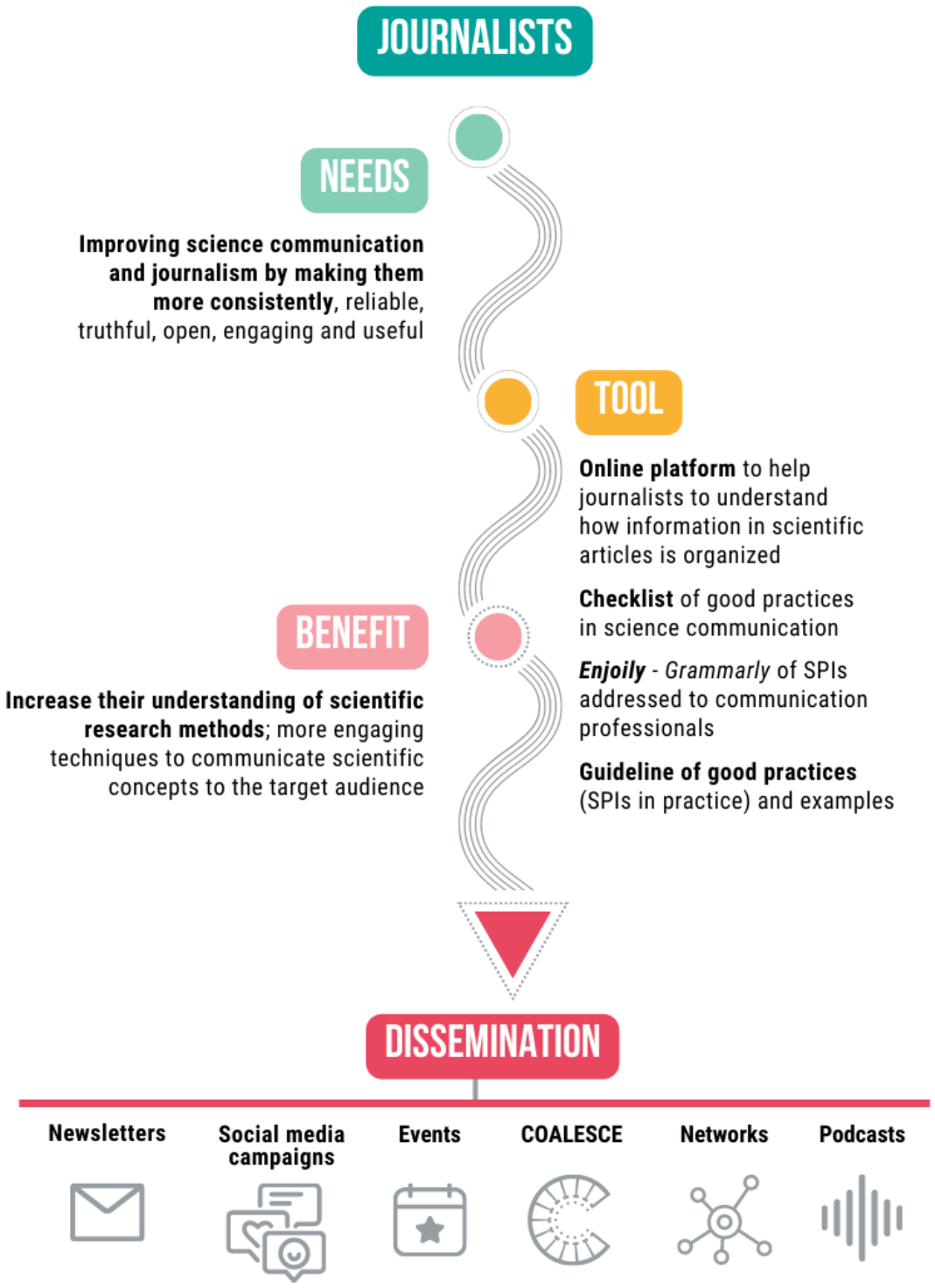

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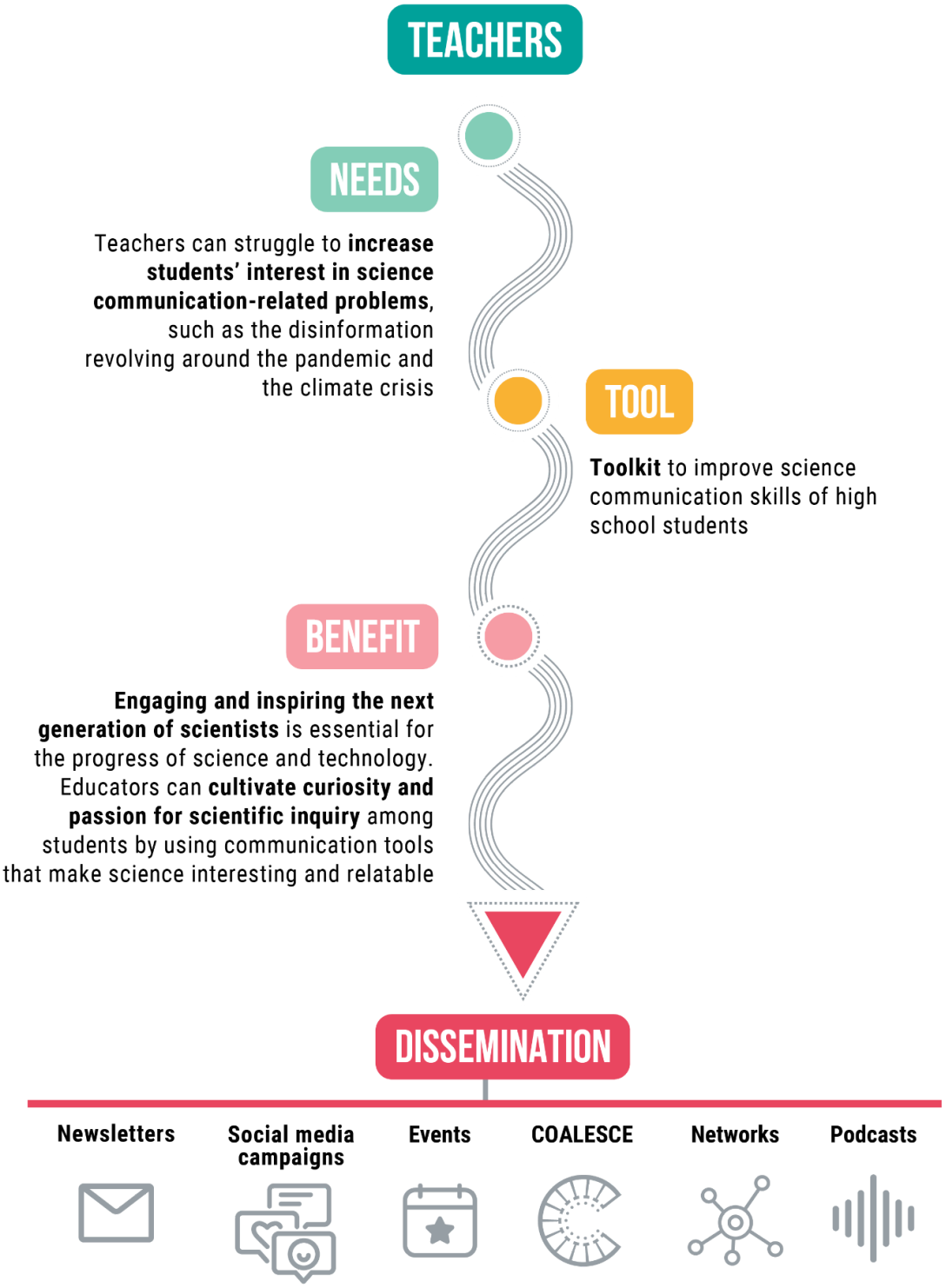

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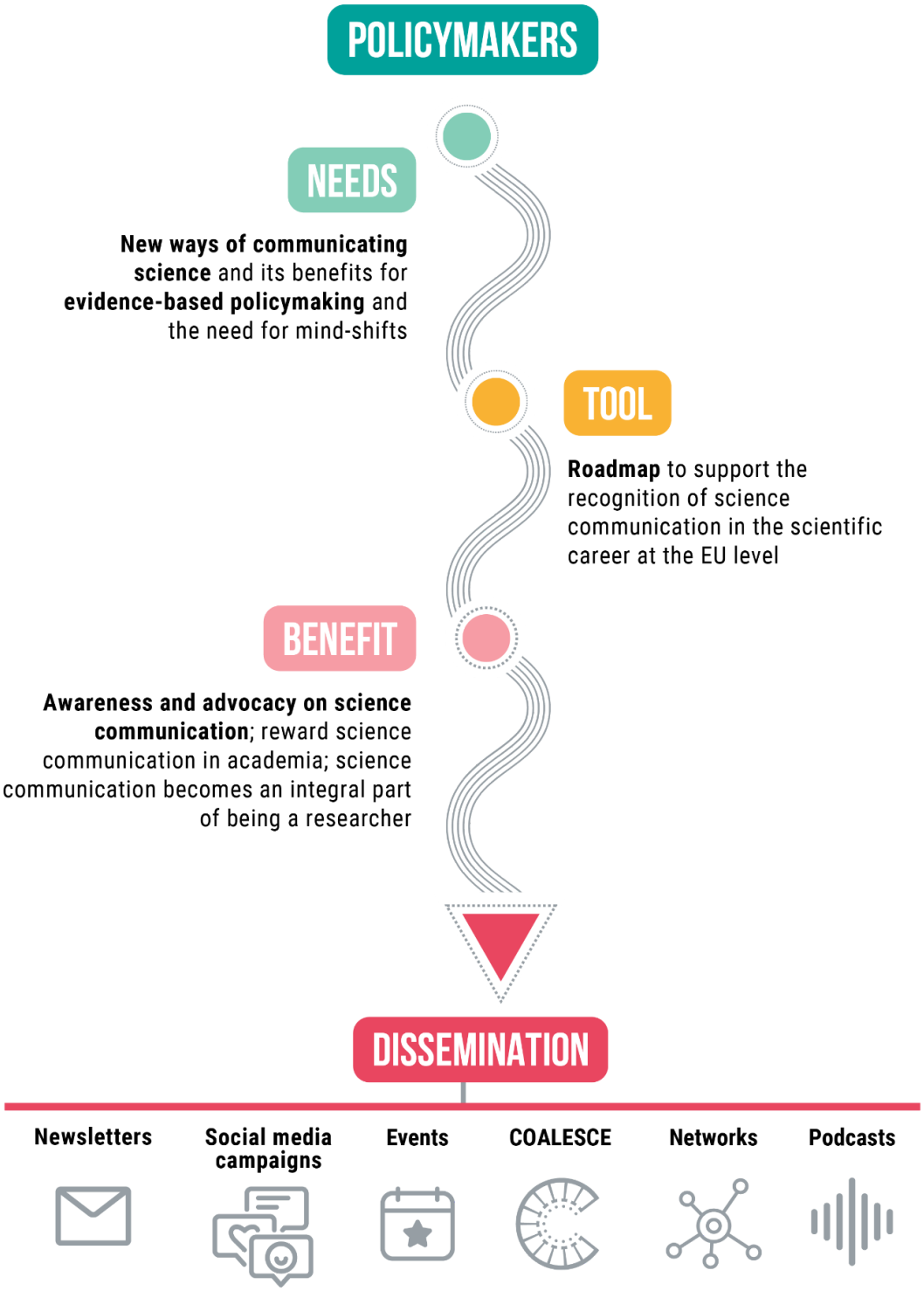

ENJOI - ENgagement and JOurnalism Innovation for Outstanding Open Science Communication
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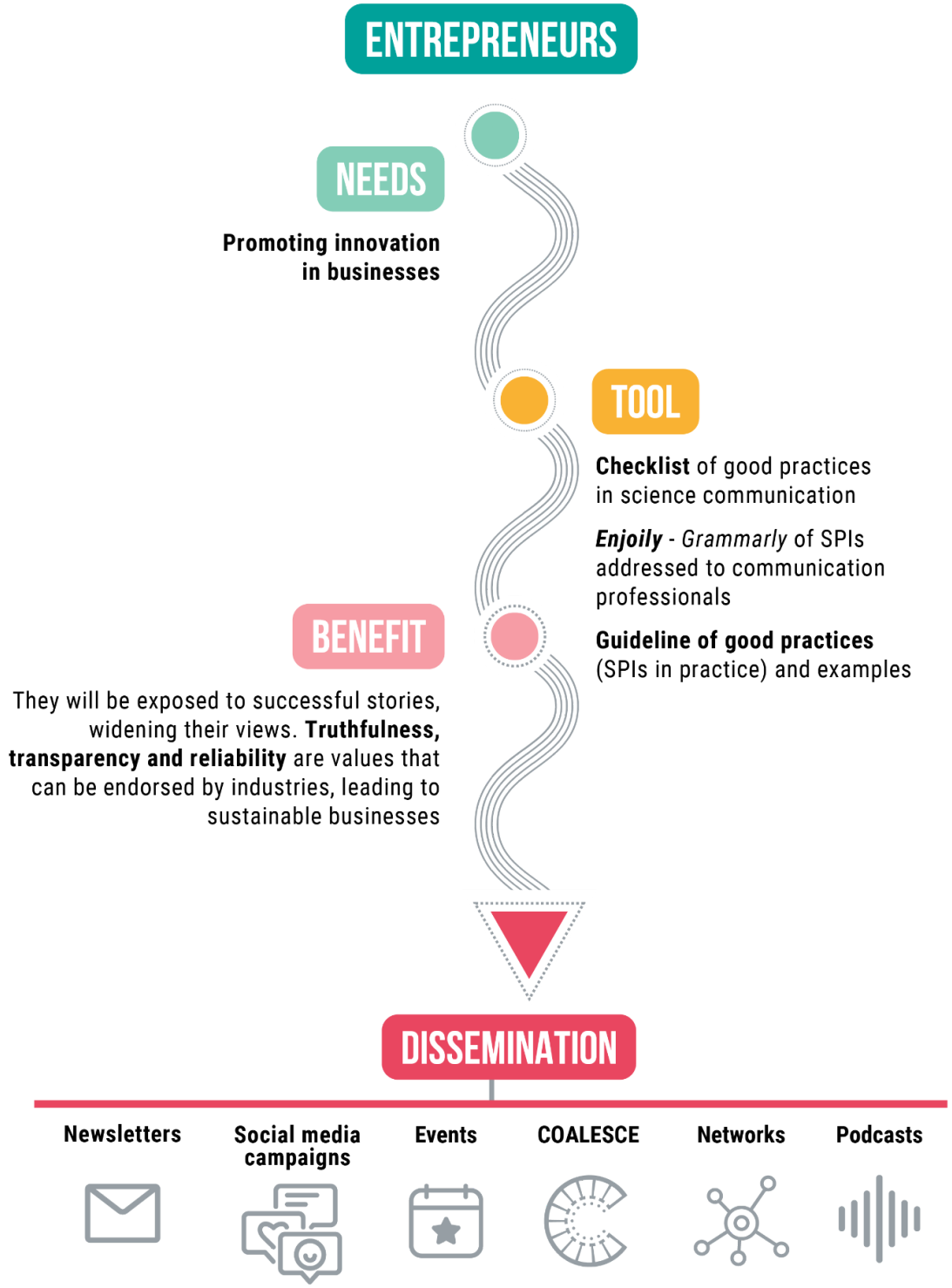

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5. CONCLUSION

Having tools is critical to support, in a very concrete way, theoretical training and discussion about the quality of science communication. It is a way to show and help people (communicators in their very diverse range of activities from institutional to educational to activism) in their daily practice, which very often get overwhelmed with the need to respond quickly and act even faster, with the risk of many of the ideal principles getting lost or not engaging effectively with their target audiences.

Frequently, products and tools available do not meet the expectations of the people who have to use them in their real lives, ultimately risking not being as useful as they could or intended to be. Moreover, a lack of standardization, endorsement or centralization of these tools is still a bitter reality. Therefore, the tailoring process of the tools, welcoming suggestions and ideas built with and for the potential users, and co-creating each of the ENJOI tools became a significant asset of the project, accounting for openness, diversity and inclusiveness.

The next steps of the ENJOI tools development include their dissemination in the ENJOI Observatory for OOSC (WP7), in their original languages and/or translated into English. The Observatory is a landmark product in the project to make all results and outputs available to foster capacity building and collaboration of all actors in the field. The Observatory, currently hosted within the project website, will further be integral to the COALESCE project, recently funded under Horizon Europe.

COALESCE (Coordinated Opportunities for Advanced Leadership and Engagement in Science Communication in Europe) will consolidate, develop and integrate the generated knowledge and connections in science communication to build the European Competence Centre for Science Communication. The project is going to build on the knowledge and evidence-based practice of all previous H2020 SwafS-19-2018-2019-2020 winning projects: NEWSERA, TRESCA, QUEST, GlobalSCAPE, ParCos, CONCISE, RETHINK and ENJOI included. It will ensure the effectiveness of best practices for science communication based on existing forms of excellence in science communication, public participation and co-creation developed from the joint efforts of the coordinators of the previous Horizon 2020

SwafS-19 sister projects. It will thus foster the integration of the tools proposed under ENJOI as well as others that accomplish outstanding quality criteria standards.

Diverse science communication pathways are not just about disseminating information but also about fostering a two-way dialogue, promoting curiosity, and inspiring people from all backgrounds to engage with and contribute to science. And that is what this deliverable provides with the promotion and interaction of the tools through the pathways.

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7. ANNEX I

7.1 Full list of the project's results

NEWSERA:

- Blueprint for #CitSciComm with and for Career Scientists
- Blueprint for #CitSciComm with and for policymakers
- Blueprint for #CitSciComm with and for industries and SMEs
- Blueprint for #CitSciComm with and for science journalists
- Guide of science communication in citizen science projects and citizen science journalism
- Policy brief
- Misinformation checklist
- Deliverables
- NEWSERA Indicators for CitSciComm
- Videos
- Events

QUEST:

- Five factsheets that give recommendations for creating contexts that promote quality science communication by researchers and research institutions, journalists and the media sector, museums and on social media.
    - QUEST Policy and Incentive Recommendations for EU Policy-Makers
    - QUEST Policy and Incentive Recommendations for Governance of Research Institutions
    - QUEST Policy and Incentive Recommendations for Media Decision-Makers
    - QUEST Policy and Incentive Recommendations for National Governments and Agencies
    - QUEST Policy and Incentive Recommendations for Museums Governance and Museum Associations
- Guidelines for QUEST stakeholder engagement approach
- GUIDELINES For quality science communication IN JOURNALISM

- 12 QUALITY INDICATORS for Science Communication
- The QUEST Podcasts on Science Communication:
    - The QUEST Podcast – Episode 6: Media's coverage of the COVID-19 pandemic
    - The QUEST Podcast – Episode 5: Social media
    - The QUEST Podcast – Episode 4: Vaccines
    - The QUEST Podcast – Episode 3: Climate change
    - The QUEST Podcast – Episode 2: Artificial intelligence
    - The QUEST Podcast – Episode 1: Science communication at museums and galleries
- Explainers and suggestions for journalists
- JECT.AI – digital support tool for science journalism
- Guidelines for quality science communication in journalism
- Presentation: Toolkit for journalists reporting on science
- Presentation: Toolkit for science communication on social media
- Checklist for science communicators on social media
- Checklist for scientists: communicating science to the public
- Presentation: Toolkit for science communicators and trainers
- Handbook: Academic Writing for Museum Communicators
- Guidelines for quality science communication in museums & science centres
- Checklist: diversity, equality, and inclusion in the museum space
- DELIVERABLES

CONCISE:

- Communication role on perception and beliefs of EU citizens about science
- DATABASE

- Public consultation
- National Policy Brief – PORTUGAL (in Portuguese)
- National Policy Brief – ITALY (in Italian)
- National Policy Brief – SPAIN (in Spanish) | Handle.net
- Book: Citizens' Political Discourses on Climate Change and Vaccines: A Comparative Study Between Spain and Poland. In D. Palau-Sampio, G. López García, & L. Iannelli (Ed.), Contemporary Politics, Communication, and the Impact on Democracy (pp. 329-351).
- Book: CONCISE's Public Consultations – PDF version | EPUB version – for e-readers | Handle.net link |
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- Events:
  - In Spain
  - Final online seminar: Path of trust for better science communication
  - EU Policy Dialogue on Science Communication
- Deliverable 1.4 - Teaching science communication in Europe
- Deliverables

TRESCA:

- Online Course on Science Communication
- Final Conference: Connections, Conversations and Science Communication - Day 1
- Final Conference: Connections, Conversations and Science Communication - Day 2
- Deliverables

RETHINK:

- RETHINK briefs: Improving the practice of science communication
- RETHINK SciComm Training Navigator
- RETHINK explanatory videos
- Policy brief for policy makers
- Policy brief for scientists
- Policy brief for science communicators
- Scicomm Framework Roles
- IDEA-THON Visuals: sensemaking applied to science engagement practice
- The six virtues for the reflective science communication practitioner
- The Rethinkerspace Methodology
- 12 Quality criteria for online science communication
- Roles of those reaching underserved audiences
- Deliverables

GLOBALSCAPE

- Training Workshop Materials – Justice, Equity, Diversity & Inclusion in Science Communication
- Knowledge Capsule – Diary Study results
- Training Workshop Materials – Global Relevance in Science Communication
- Science Communication in the world: what's next? - final event
- Supporting Global Science Communication: A White Paper on Recommended Next Steps
- Organising a support scheme: tips from GlobalSCAPE
- Programmes and courses in science communication with the PCST Teaching Forum

PARCOS

- GUIDEBOOK ON THE USE OF ARTS-BASED METHODS
- PARCOS STORYTELLER
- "TRAIN THE TRAINERS" PACKAGE
- Deliverables
- DELIVERABLE 3.4 Evaluation Report on Science Communication Guidelines

ENJOI

- ENJOI Manifesto for an Outstanding Open Science Communication for OOSC
- Focus Report On Solution Journalism
- Analysis report on the use of data and open science results
- Digital Engagement Focus Report
- Literature review about the science-journalism relationship
- The ENJOI Engagement Methodology for target users and quadruple helix stakeholders
- Qualitative analysis of selected science communication pieces in four languages
- How to support a healthy science communication environment?
- ENJOI Factsheet #1: Analysis Report on the use of data and open science results
- ENJOI Factsheet #2: Focus Report on innovative digital formats

- Methodology for continuous evaluation
- Co-designing innovative multi-stakeholder engagement for OOSC
- Developing a roadmap
- SPIs