

Partnership for the Assessment of Risks from Chemicals

Deliverable D3.4

Database and roadmap for SYNnet

WP3



Partnership
FOR THE
Assessment
OF
Risks
FROM
Chemicals



Co-funded by
the European Union

This partnership has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101057014.

Technical reference

Work package	WP3 - Synergies, collaborations and awareness
Task	T 3.3 - Networking and synergies
Dissemination level 1	PU
Lead Beneficiary/ Responsible AE	NKUA (EL), INSA (PT)
Contributing Participants	NKUA (EL), INSA (PT), GCSL (EL), FMUL (PT), APA (PT), BPI (EL)
Responsible author(s)	Nikiforos Alygizakis (National and Kapodistrian University of Athens, Athens, Greece) Sónia Namorado (National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal) Niki Maragou (National and Kapodistrian University of Athens Athens, Greece) Maria João Silva (National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal)
Co-authors	Aglaia Koutsodimou, GCSL (EL) Eugenia Dessipri, GCSL (EL) Ana Virgolino, FMUL (PT) Isabel Moura, APA (PT) Vasiliki Hatzi, BPI (EL)
Reviewers	MB members
Due date of deliverable	28 February 2023
Actual submission date	25 May 2023
Second submission date	18 September 2023

Document history

Version	Date	Reviewer name/Institutions	Short description of changes
1	24/04/2023	Nikiforos Alygizakis / NKUA Sónia Namorado / INSA Maria João Silva / INSA	Draft version for review
2	01/05/2023	MB members	Draft version with comments provided by MB members
4	25/05/2023	Nikiforos Alygizakis / NKUA Sónia Namorado / INSA Maria João Silva / INSA	Final version submitted taking into account the comments from the reviewers
5	18/09/2023	Nikiforos Alygizakis / NKUA Sónia Namorado / INSA Maria João Silva / INSA	Updated version submitted to answer HaDEA's comments The table "Document History" has been added

Abstract

PARC has identified the promotion of cooperations with other R&I initiatives as one of its operational objectives. To achieve this objective, PARC has implemented a specific task (T3.3) that aims to establish collaborations and synergies with other scientific/regulatory/policy initiatives at national, EU, and international levels. T3.3 has created three online web-based forms that will help identify interested external activities, establish synergies, and track the progress and outcomes of the collaborations. The collected data will be used to develop a keyword recommendation system based on machine learning, and a SYNnet Analysis Dashboard will be developed to extract useful information on the performance of PARC's synergies. The tools developed within T3.3 will help to promote cooperation with other European initiatives, scientific projects, European Research Infrastructures (ERIC) and ongoing and future European projects. Ongoing communication, follow-up efforts, and regular monitoring will ensure the success of the system and the identified synergies.

Keywords

Synergies, collaboration, networking, external initiatives, online web-based forms, synergies progress tracking, keyword-based recommendation system, SYNnet Analysis Dashboard.

“Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.”

Table of contents

Technical reference	2
Document history	3
Abstract	4
Keywords	4
Authors and Acknowledgments	6
1. Background	6
2. Synergies established in Y1	6
3. Establishment of a database of synergies	8
4. Pro-active outreach of PARC to other initiatives-leaders	11
5. Development of roadmap for SYNnet	11
6. Opportunities for synergies	13

Authors and Acknowledgments

Nikiforos Alygizakis (National and Kapodistrian University of Athens, Athens, Greece), Sónia Namorado (National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal), Niki Maragou (National and Kapodistrian University of Athens, Athens, Greece), Maria João Silva (National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal).

WP3 co-leaders: Aglaia Koutsodimou (GCSL), Eugenia Dessipri (GCSL).

With Contributing Partners from APA, BPI, and FMUL.

1. Background

Research and innovation (R&I) partnerships developed within Horizon Europe need to coordinate and cooperate among themselves as well as with other relevant R&I initiatives, and reflect this in their governance models and joint actions. It is expected that the synergies and collaborations established will help in the achievement of policy impacts with the expectation that they take a systematic and transformational approach to the achievement of objectives.

As such, the Partnership for the Assessment of Risks from Chemicals (PARC) has set as its 5th operational objective (OO5) the promotion of cooperation with other R&I initiatives. This cooperation will be achieved through the identification and promotion of possible collaborations and synergies with external R&I projects, networks and activities, mainly at European and national level but also at international level (beyond Europe).

For the promotion of cooperation with other EU, national and international R&I initiatives a specific task was implemented within PARC to establish networking and synergies in order to increase results' dissemination, uptake and impact. The establishment of synergies and collaborations with external activities is critical for boosting the effectiveness of all relevant research activities in Europe, optimise the use of resources and improve the effectiveness of the work. When working on the same areas it is more fruitful to work together than running parallel activities thus avoiding overlaps. Moreover, the whole can be greater than the sum of all parts. Therefore, collaborations of groups working on the same area will enhance the outcomes of the work. It is worth mentioning that a first inventory of R&I activities that could be aligned with PARC's areas has already been prepared.

In PARC's Task 3.3 dynamic and interactive tools and activities will be used to identify similar interests on methods, data and/or knowledge sharing in order to enable effective collaborations and synergies with relevant R&I projects, and with other European and international Partnerships, Missions, Clusters, Networks and Research Infrastructures.

2. Synergies established in Y1

PARC has already been structured to foster synergies via various channels. During year 1, the PARC WP3 team set up the International Board and Stakeholder Forum. The national hubs were established within WP2 and PARC has implemented collaborations with JRC and OECD. Experts are already involved in the review of some PARC activities related to the development of NAMs, AOPs and IATAs. As such, regular interactions with the OECD Extended Advisory Group on Molecular Screening and Toxicogenomics (EAGMST) and the OECD Working Party for Hazard Assessment (WPHA) are already implemented.

Concerning HBM (Task 4.1), key international players in HBM research such as the Center for Disease Control (CDC NHANES), Statistics Canada (CHMS), and the relevant authorities in Japan, South Korea and Australia are being consulted to build further on their experiences.

Under Task 4.2 and Task 4.3, access to terrestrial and aquatic biota samples is being sought to develop synergies on the topic of performing suspect screening on sentinel species. Strong collaboration and exchange with the NORMAN database^[1] system and with national initiatives such as VANDALF^[2] is being organised.

To fill data gaps on hazardous substances such as BPA alternatives (Task 5.1), the establishment of a link to PrecisionTox^[3] is being sought to benefit from the 5-species 250 substances toxicogenomic approach to avoid duplication of work. The activity will also create synergies by sharing predicted and experimentally derived environmental hazard data to a novel integrative risk assessment platform developed in PRORISK^[4] that links chemical-biological interactions, through AOPs, effects on organisms and populations up to predictions of risks for ecosystem services and the socio-economic costs of environmental damage.

For the development of NAMs, AOPs and IATAs, Task 5.2 and Task 6.1 partners are enhancing synergies and avoiding overlaps with ongoing projects such as EURION^[5] (esp. projects GOLIATH, OBERON and EDCmet), by building on knowledge and experimental systems already established or under development, but with a focus on experimental systems not yet primarily addressed in these projects, as well as by extending the spectrum of metabolic disrupting chemicals and focusing on priority-listed families of substances. In the field of endocrine disruptors, bilateral discussions have already been organised with the platform PEPPER^[6].

Concerning reuse of data on chemicals in the environment, Task 7.2 is identifying existing and planned databases, data repositories and platforms relevant for PARC as well as bottlenecks for data reuse and synergies with existing data platforms such as ERA Planet (H2020)^[7].

Concerning SSbD (Task 8.1), strategically relevant networks outside PARC such as the IRISS project^[8] and networks initiated under other forthcoming calls under Horizon Europe will be identified to harness synergies.

For the elaboration of laboratory networks and information catalogues in environmental monitoring (Task 9.1), synergies with the EIRENE infrastructure^[9] are assured via RECETOX (MU).

During the first year of PARC, partners have identified European and International partnerships, projects, infrastructures and activities relevant for PARC, including H2020 and Horizon Europe projects, such as initiatives under the Soil, Ocean & Waters and Cancer Missions, and partnerships, such as the European Partnership for Alternatives to Animal Testing (EPAA).

Meetings have already taken place with some of these initiatives such as EPAA: the PARC coordinator participated in the annual EPAA conference (15 November 2022, Brussels) and discussed a possible collaboration between EPAA and PARC with regard to NAMs and the criteria to be met for regulatory acceptance has started under Task 6.4.

Collaboration with industry on specific PARC activities will also be organised through the Stakeholder Forum. For stakeholders that are members of the Stakeholder Forum, more active collaborations on specific topics will be organised. For example, some case studies related to the use of NAMs in the risk assessment of new cosmetic ingredients might be discussed with Cosmetics Europe under Task 6.3.

A specific focus is put on synergies and collaboration with new countries, notably with additional EU Member-States and other relevant countries, not yet participating in PARC. Discussion on the inclusion of Irish partners in PARC HBM activities are on-going, whereas outreach to Romania and Bulgaria to promote PARC has started.

^[1] NORMAN organises the development and maintenance of various web-based databases for the collection & evaluation of data / information on emerging substances in the environment NORMAN Database System (norman-network.com)

^[2] National Danish project aiming to develop and implement a risk assessment platform based on NTS and effect-based methods to identify CECs in wastewater, VANDALF – Linking of chemical and toxicological fingerprints – University of Copenhagen (ku.dk)

^[3] The goal of PrecisionTox is to improve chemical safety assessment to better protect human health and the environment by using non-traditional test species, multiple fields of knowledge, and powerful computational approaches to understand which chemicals are toxic and why. <https://precisiontox.org>

^[4] PRORISK is a European Training Network funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 859891 for the new generation of young scientists in the holistic assessment of chemical risks to ecosystem services and their potential socio-economic impacts. T (MSCA-ETN) to <https://prorisk-itn.eu/>

^[5] EURION is a cluster group of eight research projects from the Call SC1-BHC-27-2018 – New testing and screening methods to identify endocrine disrupting chemicals (EDCs). EURION is funded €50 million by the European Commission's Horizon 2020 Research and Innovation Programme, the largest public funding of this type of research in Europe. <https://eurion-cluster.eu>

^[6] PEPPER is a Public-private platform for the pre-validation of endocrine disruptors characterization methods. <https://ed-pepper.eu/>

^[7] ERA-PLANET will provide advanced decision support tools and technologies aimed to better monitor our global environment and share the information and knowledge in different domain of Earth Observation. <http://www.era-planet.eu/>

^[8] www.ivl.se/english/ivl/poroject/iriss.html

^[9] Environmental Exposure Assessment Research Infrastructure (EIRENE) aims to fill the gap in the European infrastructural landscape and to pioneer the first EU infrastructure on human exposome. EIRENE RI was designed as a geographically balanced network of distributed research infrastructures. www.eirene-ri.eu

3. Establishment of a database of synergies

The objective of Task 3.3 is to explore and establish collaborations and synergies with other relevant scientific/regulatory/policy initiatives at national, EU and international level. In the framework of the above objective, the working group of Task 3.3 of PARC created the following three online forms:

(1) APPLICATION FORM FOR THE EXTERNAL ACTIVITY/PROJECT: Identification of interested external activities or projects that could establish synergies with PARC.

(2) REGISTRATION FORM OF THE SYNERGY: Information on the established synergy.

(3) EVALUATION FORM OF THE SYNERGY: Information on the progress and outcomes of the synergy.

In more detail, the Application Form intends to identify (i) the external projects/activities that would like to express their interest to collaborate with PARC by collecting information regarding their name, description, field, scope, funding and contact details and (ii) the potential synergies that could be created with specific WPs of PARC and the interested external project/activity. Information on the establishment of synergies with PARC and the above application form are available at PARC's website on the page dedicated to SYNnet (<https://www.eu-parc.eu/synnet>). An appropriate call of interest for external projects/activities will be disseminated through the social media channels of PARC. PARC partners will also be asked to disseminate the application form among their networks. The collected information will be used for the creation of a database of external projects/activities candidates for PARC synergies. Based on the collected information, the working group of Task 3.3 will identify projects under PARC that could be involved in a synergy with that external activity/project and will bring into contact the interested external parties with PARC's WP/Task/project leaders for the evaluation of a possible synergy setting. This action will be dynamic and the database will be updated periodically every 4 months. The online Application Form can be found in the following link https://redcap.link/PARC_external_activity and the detailed questions and answer options – where adequate – are presented in Table 1.

Table 1. Questions and answer options (where adequate) of Application Form

APPLICATION FORM FOR THE EXTERNAL ACTIVITY/PROJECT	
Question (<i>Answer options</i>)	
1	Name of the external activity/project

2	Acronym of the external activity/project
3	Website of the external activity/project
4	Description of the external activity/project
5	Field of the external activity/project (<i>Human health, Environment, Both</i>)
6	Keyword of the external activity/project 1
7	Keyword of the external activity/project 2
8	Keyword of the external activity/project 3
9	Keyword of the external activity/project 4
10	Keyword of the external activity/project 5
11	Keyword of the external activity/project 6
12	Scope of the external activity/project (<i>National, EU, International</i>)
13	Funding of the external activity/project
14a	Potential synergies foreseen in the framework of PARC's WP (<i>WP2 - A common science-policy agenda</i> <i>WP3 - Synergies, collaborations and awareness</i> <i>WP4 - Monitoring and exposure</i> <i>WP5 - Hazard Assessment</i> <i>WP6 - Innovation in regulatory risk assessment</i> <i>WP7 - FAIR Data</i> <i>WP8 - Concepts and toolboxes</i> <i>WP9 - Building infrastructural and human capacities</i>)
14b	Pop-up list with the Tasks of the selected WP or WPs
15	Potential synergies foreseen between the external activity/project and PARC. Please give details how it could be implemented
16	Possibility for clustering (with various PARC WPs and also with other external projects/activities)? Indicate which ones
17	Name of the person filling the form
18	Email of the person filling the form
19	Organization of the person filling the form
20	Comments

Provided that an agreement has been reached between the external project/activity and a PARC project, the established synergy will be registered by filling the Registration Form. This form requires information including the name, duration, objectives and type of the synergy (data/knowledge sharing, basic research, methodology, development, etc.), the PARC WP or WPs involved and potential external exchange institutions, the social and scientific expected impact of the synergy, the duration of the synergy, as well as the institutions involved and the contact points of the external and internal (PARC) parties. The online Registration Form can be found in the following link https://redcap.link/PARC_new_synergy and the detailed questions and answer options – where adequate – are presented in Table 2. The working group of Task 3.3 will create a database with information on the established synergies which will be updated periodically every 4 months and will be used for the monitoring of their progress.

Table 2. Questions and answer options (where adequate) of the Registration Form

REGISTRATION FORM OF THE SYNERGY	
Question (<i>Answer options</i>)	
1	Name of the synergy
2	PARC WP or WPs involved in the synergy (<i>Dropdown list of WPs 1 – 9</i>)
3a	Is the synergy developed in the context of a PARC project? (<i>Yes, No</i>)
3b	Which project? (<i>in case of "Yes" answer in 3a question</i>)
3c	Possibility of clustering within PARC (<i>Yes, No</i>)
3d	Possibility of external clustering (<i>Yes, No</i>)
4	Which institutions will be involved in the synergy?
4a	Which institutions will be involved in the PARC internal cluster?
4b	Which institutions will be involved in the external cluster?

5	Internal contact points (name, e-mail, organisation)
6	External contact points (name, e-mail, organisation)
7	Objective of the synergy
8	Type of synergy (dialogue only, data sharing, knowledge sharing, methodology development, basic research, applied research, regulatory science, other)
8a	Topics for clustering within PARC (Yes/No), (if Yes, please indicate which ones)
8b	Topics for external clustering (Yes/No), (if Yes, please indicate which ones)
9	Specify other
10	Social and scientific expected impact of the synergy
11	Start date
12	End date
13	Possibility of synergies with various phases over time (Yes/No), (if Yes, please explain and indicate respective start and end periods date)

The working group of Task 3.3 will follow up on the registered synergies included in the corresponding database every 12 months and after the conclusion of the synergy or synergy phase. Synergy phases are defined for synergies without defined start and end dates which might rather work in waves during the whole life-time of PARC. The participants (external and internal) will complete the Evaluation Form which requires information on the achievement of the objectives of the synergy or the respective phase which were set in the beginning, description of the benefits obtained in the framework of the synergy or in the phase being evaluated and who were the beneficiaries (industry, government bodies or academia). The Evaluation Form also includes information on the number of institutions, clusters, if applicable and experts and information on the fulfilment of the predefined timeline of the synergy or stated period. The Evaluation Form intends to collect information on lessons learnt from the completed synergies or phase, proposals for improvement for upcoming synergies or ongoing synergies phases and information on future perspectives regarding generation of new projects/activities on the relevant topics of the completed synergy or phases. Concerning the already established synergies, the responsible researchers will be contacted to fill out the forms and report on the evolution of the synergies. The online Application Form can be found in the following link https://redcap.link/PARC_synergy_evaluation and the detailed questions and answer options – where adequate – are presented in Table 3.

Table 3. Questions and answer options (where adequate) of the Evaluation Form

EVALUATION FORM OF THE SYNERGY	
	Question (Answer options)
1	Name of the synergy
2	Was the objective defined for the synergy or for the phase achieved? (No - Yes, partially - Yes, completely)
3	How many institutions were involved in the synergy or in the specific phase?
4	How many experts were involved in the synergy or in the phase under evaluation? (If possible, please indicate the number of experts by category: students, permanent staff, external experts, etc)
5	Outputs resulting from the synergy or the related phase (if applicable)
6	Where there direct benefits for industry, government bodies or academia? If yes, please specify.
7	What type of resources (financial, human resources, time, infrastructures, other) were saved due to this synergy or specific phase? Please give a numerical estimation if possible.
8	Was there a gain of extra resources due to this synergy or phase?
9a	Did the activities proceed according to the timeline? (Yes, No)
9b	What was the time delay? (in case of "No" answer in previous question)
10	Please describe the lessons learned (what went well, what went bad)
11	Are there any new activities or projects resulting from this synergy or phase? If yes please specify.
12	Do you have any suggestions to improve Task 3.3 work on synergies?

4. Pro-active outreach of PARC to other initiatives-leaders

Task 3.3 is responsible for driving pro-active outreach efforts for PARC, fostering connections with various initiatives and projects. To successfully realize this objective, the task receives essential support from the coordination team, the work package and the task co-leaders. As the work package and task co-leaders themselves actively engage in pursuing new EU calls, the research proposals they develop may be aligned with the PARC's mission.

Task 3.3 encompasses a comprehensive strategy that involves close collaboration with the coordination team, work package and task co-leaders to complete the Pro-active Outreach Form (Table 4), accessible at the following link: https://redcap.link/parc_synergies_survey. This form is to be filled out annually. Input from the Pro-active Outreach Form contributes to an enriched database of synergies, thereby amplifying the impact of the PARC project's outreach endeavours.

Table 4. Questions and answer options (where adequate) of the Pro-active Outreach Form

PRO-ACTIVE OUTREACH FORM OF PARC TO EXTERNAL PROJECTS	
	Question (<i>Answer options</i>)
1	Please fill out your role within PARC (<i>WP co-leader, Task co-leader, Other role</i>)
2	Which WP/Task/Another role are you co-leading?
3	R&D Programme Name
4	Acronym
5	Website
6	Objectives
7	Scope
8	Funding
9	Areas of collaboration
10	Collaborative activities
11	Comments
12	Are you willing to be a contact point between PARC and the specified programme? (<i>Yes, No</i>)

5. Development of roadmap for SYNnet

The goal of Task 3.3 is to enhance the collaboration between PARC and projects external to PARC by implementing a system for identifying, tracking and later establishing potential synergies. This will be achieved by making available the application form for the synergies on the PARC website, which will be filled out by external projects seeking to cooperate with PARC. WP/Task leaders who are already working with external projects will inform these projects about the form and encourage them to fill it out. Once the application forms have been completed, WP/task/project leaders will review them and approve the identified synergies by filling out a "Registration form of the synergy" form (Figure 1). This form will include clear goals, scientific outputs, timelines, and commitments for the collaboration.

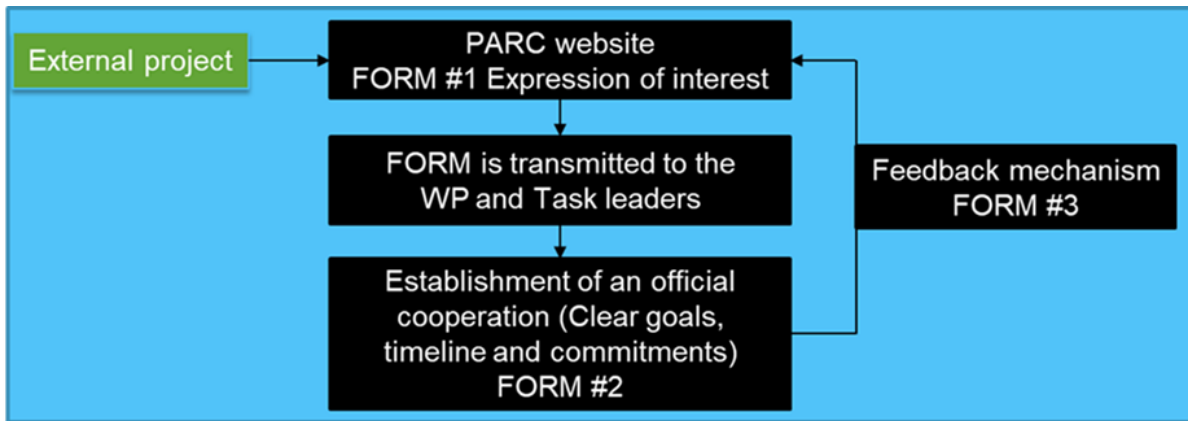


Figure 1. Establishment of synergies between external projects and PARC.

It is expected that a significant number of forms will be completed, resulting in a large amount of data being added to the underlying database. Task 3.3 will reach out to identified initiatives and encourage them to fill out the application form as a starting point in the process of setting synergies with PARC. The collaboration of WP/Task/Project leaders is expected for the dissemination of this form.

For the synergies already set and for the projects actually ongoing the information required will be registered and the report evaluation system will be performed as close as possible to the guidelines stated for the new ones, any deviation will be properly justified.

The collected data will be used to develop a keyword recommendation system based on machine learning, which will help future external projects to more easily and efficiently identify potential synergies with PARC (Figure 2). It is hoped that this system will increase the number of synergies between external projects and PARC, as well as stimulate more cooperation between the two.

As the database will continue to grow, a SYNnet Analysis Dashboard will be developed to extract useful information on the performance of PARC's synergies. Key Performance Indicators (KPI) such as the number of synergies, and successful and unsuccessful synergies (more details available in deliverable D1.6), will be derived and used by the management board to make decisions and take any necessary actions. Ultimately, the aim of Task 3.3 is to support PARC's goal of playing a central role in the collaboration of various European projects dealing with the environment, food, and human health.

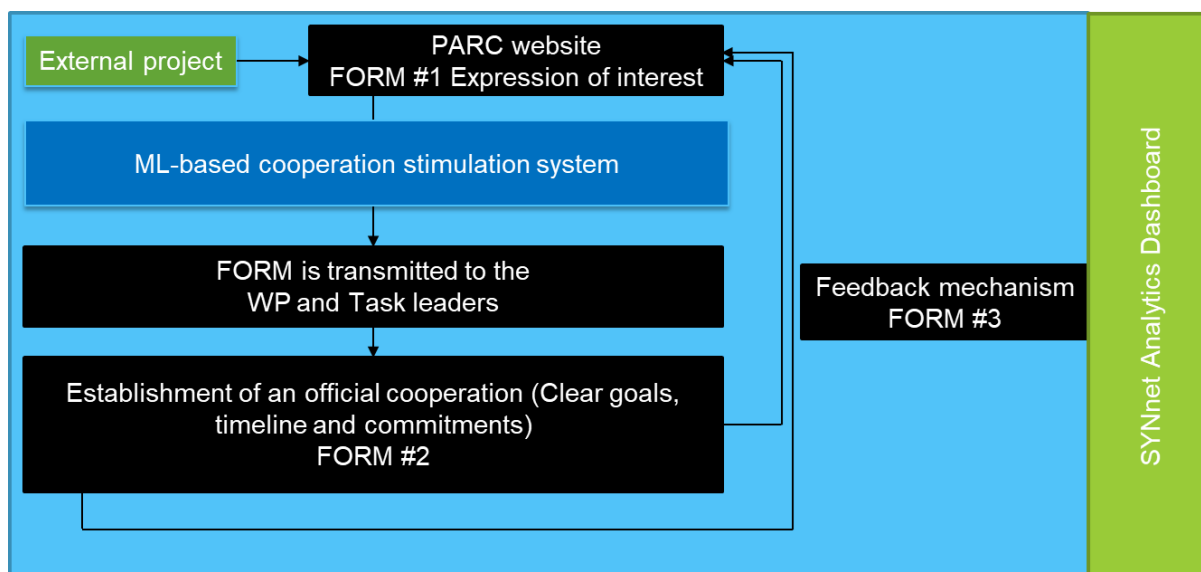


Figure 2. Development of SYNnet using a keyword-based recommendation system and the SYNnet Analytics Dashboard.

In addition to the implementation of the form and recommendation system, Task 3.3 will also promote communication and outreach efforts to inform external projects and organizations about the opportunities for collaboration with PARC. This will be achieved through targeted marketing campaigns, participation in relevant conferences and events, and building better collaboration with relevant stakeholders. Dedicated meetings, namely the SYNnet Forum, will be organized in years 2, 4 and 6 as a way to bring together researchers from PARC and external initiatives so that they can get to know each other's work and envision ways to collaborate and establish synergies.

Furthermore, to ensure the success of the system and the identified synergies, regular follow-up and monitoring will be conducted. This will include regular check-ins with WP/task/ project leaders and external project partners to assess progress and identify any potential issues. Appropriate adjustments to the collaboration will be made to ensure that the goals and timelines are met. To further increase the efficiency of the system, a centralized platform will be developed to store and share all the data and information related to the identified synergies. This platform will be accessible to all the partners to share information, collaborate, and track the progress of the synergies.

6. Opportunities for synergies

As a starting point European Partnerships, Missions, Clusters, Networks, Research Infrastructures and projects with whom PARC might establish synergies will be identified. Contacts with these initiatives will be promoted in order to collect information and the procedure for the establishment of synergies and collaborations will be followed.

Previous work on the identification of these initiatives is presented below.

Regarding EU partnerships, specifically in the Health cluster, PARC might explore possibilities to apply innovative techniques, tools and methods (e.g., data mining, machine learning) for data analysis and computational analyses that might be shared with the Innovative Health Initiative (<https://www.ih.europa.eu/>). On the other hand, priorities identified by PARC could be shared by the ERA for Health (<https://era4health.eu/>) and vice versa. In the Food, Bio economy, Natural Resources, Agriculture and Environment cluster, knowledge and data sharing about common challenges and use (production, recycling), chemical monitoring frameworks and synergies between SRIAs might be envisaged with Water4All (<https://www.water4all-partnership.eu/>), Sustainable Blue Economy Partnership (<https://bluepartnership.eu/>) and European Partnership for Safe and Sustainable Food Systems. PARC will also encourage collaboration with the European Biodiversity Partnership (<https://www.biodiversa.eu/>) to establish coherent science-based chemical risk assessment (RA), knowledge sharing, and consensus on obtained evidence and policy-making to face the current biodiversity crisis. The SSbD assessment toolbox developed in PARC could be shared with the Circular Bio-based Europe Joint Undertaking (<https://www.cbe.europa.eu/>) to identify any critical properties of chemicals, products, materials, packaging at an early stage of innovation. In the Digital, Industry and Space cluster, communication and collaboration with the European Metrology Partnership (<https://www.euramet.org/research-innovation/metrology-partnership>) will be looked into to assess the performance of methods and laboratory proficiency testing. The SSbD assessment toolbox proposed by PARC might be beneficial for the Processes4Planet Partnership (<https://www.aspire2050.eu/p4planet/about-p4planet>), as might collaboration in the exploration of the potential of chemical recycling. In other pillars, an efficient exchange on FAIR data between PARC and the European Open Science Cloud (EOSC, <https://eosc-portal.eu/>) partnership will promote common concepts related to data collection, storage and reuse, harmonisation, reporting, as well as related to other research outputs, according to the FAIR principles.

PARC will explore links to the Soil Health and Food Mission (<https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon->

[europe/eu-missions-horizon-europe/soil-health-and-food_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/soil-health-and-food_en)), as PARC covers environmental health aspects of chemicals RA, screening and monitoring, with a particular focus on the ecological impact of chemicals in soils. PARC will try to support the Restore our Oceans and Waters Mission (https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/restore-our-ocean-and-waters_en) in the framework of the zero-pollution strategy, by designing sampling protocols for monitoring co-occurrence of substances, their metabolites and degradation products in the environment, and specifically in oceans, and implementing these, when possible, with existing sampling programmes. PARC will also develop monitoring tools and methods linked to article service life and circular economy. PARC is directly referred to in the Cancer Action Plan (https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/eu-mission-cancer_en) and will promote a regular dialogue and information exchange on relevant PARC findings.

Synergies with other EU programmes will be explored, in particular regarding Research infrastructures. PARC has the potential to establish interactions with ongoing or new ERIC to support the creation of virtual laboratories and decision-support applications such as the Biobanks and Biomolecular Resources Research Infrastructure Consortium (BBMRI-ERIC, <https://www.bbMRI-eric.eu/>) and the Life Science Data Tools and Resources ESFRI Research Infrastructure ELIXIR (<https://elixir-europe.org/>). In addition, the Research Infrastructure for Environmental Exposure assessment in Europe (EIRENE RI, <https://www.eirene-ri.eu/>) coordinated by RECETOX - Masaryk University has recently been included as a new project in the European Strategy Forum on Research Infrastructures (ESFRI) 2021 Roadmap. This represents an opportunity for synergies with activities developed in parallel with PARC and for additional national funding of the Partnership to help structuring the significant infrastructures needed.

PARC will also explore the possibility to establish synergies with ongoing and future European projects. The ASPIS cluster (<https://aspis-cluster.eu/>) that includes the Horizon 2020 Research and Innovation programme funded projects ONTOX, PrecisionTox and RISK-HUNT3R aims to advance safety assessment of chemicals without the use of animal testing. The EURION cluster (<https://eurion-cluster.eu/>) includes 8 projects funded by the Call SC1-BHC-27-2018 – New testing and screening methods to identify endocrine disrupting chemicals (EDCs) from Horizon 2020 and each project in the cluster is focusing on a different aspect of new testing and screening methods identifying EDCs.

To guarantee the effectiveness of all the process a SWOT analysis was carried on, identifying the Strengths (S), Weaknesses (W), Opportunities (O), and Threats (T), examining both internal and external factors in order to demonstrate that the process is enhancing PARC vision/goals.

S:

1. Networks: The high number of institutions and researchers involved in PARC, each with its own network of contacts, can more easily lead to the establishment of collaborations and synergies.
2. Expertise and knowledge: PARC involves top experts in the different scientific fields contributing to risk assessment, which makes PARC an excellent potential partner to work with an external activity due to the valuable knowledge and skills its researchers have.
3. Resources: PARC's resources, including data and tools, can be a significant strength in any collaborative work as there are specific resources available in PARC that may not be available externally.
4. Innovation: PARC is working in thematic areas (monitoring, hazard assessment and innovation in risk assessment) that will bring innovative tools which could be an asset for external projects.

W:

1. Resource constraints: Budget limitations can hinder the execution of activities not initially planned but that could be carried out as collaborative work with external activities.

2. High workload due to many PARC projects: PARC is running simultaneously many projects.
3. Constrains due to multicultural participants: There are researchers from many European countries and beyond and there may be difficulties in reaching scientific consensus in critical decisions.
4. 4. Co-funding restrictions in regulations may hinder the use of other EU funds to co-financing certain PARC projects (for the 55% co-finance part). Furthermore, collaborations with other partnerships receiving private funding, such as the US EPA, could become more complex.

O:

1. Exploitation of new tools and know-how developed by researchers outside Europe. PARC can get benefited by the access granted to these new tools and know-how.
2. Attraction of early-stage researchers from different disciplines and cultural background can give the opportunity to PARC to combine different ideas and present a universal idea in the regulatory environmental and health safety.
3. Increase the impact of the PARC outputs by reaching a broader scientific audience. Synergies can give the opportunity to disseminate and uptake the PARC tools to the worldwide scientific and regulatory communities.

T:

1. Competition with other partnerships or projects. If external research projects or activities have already established synergies among themselves and are already engaged in the work, it may be harder for PARC to establish synergies in that area.
2. Other partnerships or projects can generate different approaches, and this may eventually make it hard for PARC to convince the regulators about its outputs.
3. If synergies with private sector are not established, then industrial partners and corporations can lobby against the PARC outputs.
4. Disagreements may arise from regulators originating from third countries or from other international projects.

Task 3.3 will further identify relevant external R&I projects, networks and activities and contact them in order to inform them about the procedure for the establishment of synergies and collaborations to be followed and to collect information. The establishment of synergies and collaborations will be critical for boosting the effectiveness of PARC research activities.