



Circular and Dynamic Manufacturing Supply Chain Orchestration and Optimisation

CIRCULOOS Open Call #1 – Expression of Interest
Guidelines for Applicants

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CIRCULOOS Expression of Interest summary

When? <i>Timeframe</i>	From 31 May 2024 until March 2025
Who? <i>Target entities</i>	<ul style="list-style-type: none"> • Manufacturing SMEs (MSMEs) and micro-SMEs • DIHs or eDIHs • Academic institutes (Universities), research institutes and other not-for-profit research entities.
How? <i>Application pages</i>	<ul style="list-style-type: none"> • Matchmaking: https://ramp.eu/#/service-request/list-public (RAMP) • Open Call 2 & 3 pre-registration: F6S CIRCULOOS page (F6S)
What? <i>Supporting activities</i>	<ul style="list-style-type: none"> • Webinar 1 – 19 June 2024 <i>Topic: CIRCULOOS Open Call 2 objectives, open call guidelines, information about RAMP & Ask me Anything (AMA).</i> • Webinar 2 – Fall 2024 <i>Topic: CIRCULOOS Open Call 2 objectives; role of DIHs.</i> • Matchmaking event – October 2024 <i>Topic: Interested parties pitch their offering and look for matches for open Call 2 and Open Call 3</i> • Continuous Matchmaking Activities – June 2024 to March 2025 <ul style="list-style-type: none"> ○ Continuous request for service tool of RAMP: the objective is to help applicants to find partners to team up in a consortium, and apply for CIRCULOOS open call #2 and #3 ○ Search for a matching partner from the available entities in RAMP, among those who have already applied and published their interest.

Webinar #1 AMA

“Open Call 1:
guidelines & info
about RAMP

19th June 2024

Webinar #2 AMA

“Open Call 2:
objectives & Role
of DIHs”

Fall 2024

Matchmaking event

Interested parties
pitch their offer &
look for matches
for open Call #2
October 2024

Matchmaking Activities

Continuous on
the RAMP
platform
June 2024 to
March 2025

1 What is the CIRCULOOS project?

CIRCULOOS helps micro, small and medium-sized production companies redefine their supply chains through Circular Economy.

Understanding a single product as a resource, which undergoes multiple transformations throughout its lifetime (i.e. change), manufacturing SMEs can be seen as 'service providers' which act to transform this product. From this viewpoint, the orchestration of any number of manufacturers is a parallel example from the ICT world. The micro-services architecture model was developed to enforce an efficient management scheme over an ecosystem of services. Through well-defined service models and interfaces very efficient orchestrators can be put in place to deliver seamless interactions, while maintaining the integrity of individual services. Taking this parallelism back to the manufacturing world, CIRCULOOS develops:

- the means for all actors with a part in each phase of reuse, repair and remanufacture to describe their service models in usable data models.
- the orchestrator mechanisms to aggregate and execute services in this multi-actor ecosystem.
- the optimization logic for efficient collaboration
- the systematic and dynamic assessment of circular and sustainability profile of products produced.
- the Marketplace, which acts as a hub for the subscription of new actors to this multi-service ecosystem and as a sustainability enabler.
- cybersecure framework for trustworthy data sharing among the supply chain actors, by extending the existing IOT RAMP platform.
- key AI and robotic functionalities to support the transition to disruptive circular products and/or services.

○ The vision & challenges to solve

Environmental and sustainability challenge

Reports indicate that doubling the circularity rate of 8.6% will cut 39% of emissions, and 28% of virgin resource usage. The manufacturing industry, which heavily relies on materials like steel, aluminum, and plastic, sees these as 30-45% of total costs. From 1995 to 2015, the share of global emissions from production materials increased from 15% to 23%. Raw material production contributes to 19% of global greenhouse gas (GHG) emissions, with waste management adding another 3%.

To achieve a reduction of 80-95% in global GHG emissions from 1990 levels by 2050, strategies must go beyond just low carbon energy and efficiency. They should include improved resource efficiency, recycling, repair, refurbishment, reuse, and overall reduction in raw material consumption, aligning with a circular economy approach.

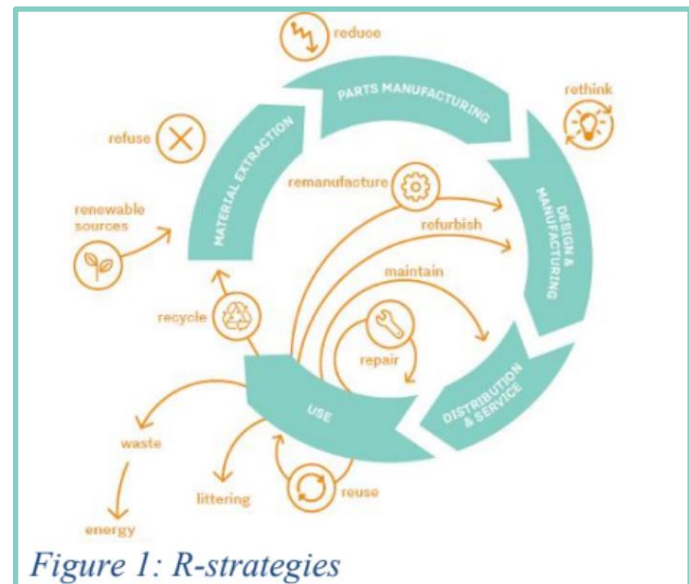
The R-strategies (Repair, Reuse, Recycle, Refurbish, Remanufacture, Repurpose) aim to extend product lifespans and minimize waste. The CIRCULOOS project focuses on these strategies, especially those that necessitate re-engineering of production processes and are challenging for small and medium-sized

enterprises (SMEs) to implement. CIRCULOOS aims to facilitate collaboration among various actors through its data management and AI tools on the RAMP platform, which helps in mapping organizational cooperation for a circular economy.

RAMP enhances factory flexibility, reduces resource usage, and allows for equipment reconfiguration (like robots and assembly lines) while maintaining quality, working conditions, delivery, and time constraints.

Market opportunity and growth challenge

“Circular economy presents a unique market opportunity upwards of \$4.5 Trillion, by 2030. Waste is designed out, and products are instead looped back into the production system at end of use. Growth is decoupled from scarce resources and materials are kept within productive use as soon as possible”¹and “is attributed to greater circulation of materials, limited waste volumes directed to landfills, driven by accelerating digitisation, increased efficiency and cost optimisation”². However, growth can be achieved only if valuable resources do not exit the supply chain as waste and only if the resources required for production are made available on time. This link reveals the connection between growth and efficient communication between the actors.



Cybersecurity challenge

The manufacturing sector is the second-most attacked industry³, yet the sector lags behind when it comes to security. Smart factories are exposed to the same vulnerabilities and attack methods/vectors, similar to what other networks face and as more and more devices are connected to the internet, factories are exposed to more Cyber Risks. Industry 4.0 organisations face new challenges, including: expanded attack surface, cybercriminals interest in industrial enterprise, underestimation of general threat levels lack of understanding of specific threats that result in suboptimal selection of controls. Such challenges cannot be addressed solely by technical approaches and solutions, focus should be placed on the people, process, and technology components of these challenges.

Necessary data sharing practices are not enabled, nor spread

The value and culture of data sharing is not fully spread and captured along the manufacturing supply chains and there is still limited evidence on how data sharing can drive circular value and contribute to the

¹<https://theprint.in/opinion/a-circular-economy-isnt-just-planet-friendly-its-a-trillion-dollar-market-opportunity/604408/>

²<https://www.globenewswire.com/news-release/2021/10/27/2321903/28124/en/Global-Waste-Recycling-and-Circular-Economy-Market-Report-2021-Revenue-was-457-14-Billion-in-2020-is-Expected-to-Expand-to-517-26-Billion-in-2021-at-a-Growth-Rate-of-13-3.html>

³<https://www.techradar.com/news/industry-40-suffering-major-security-issues>

shift to circular economy⁴. Overall, MSMEs do not fully understand the benefits of sharing data, and still need to cope with two challenging scenarios. First, the interfaces and data models in manufacturing supply chains are not standardised across data sharing ecosystems and there is no common solution compatible for all the actors. Second, cybersecurity features and data governance agreements are often developed on a case-by-case basis, the level of standardisation is also quite limited in this regard. Thus, the role of open standards and shared best practices is a cornerstone to help MSMEs address actual data sharing challenges regardless of their digitisation state.

Skills challenge - Towards CM and Industry 5.0

By 2025, 50% of all employees will need reskilling and 53 million jobs across the EU will be automated by 2030 (World Economic Forum's Future of Jobs Report⁵). 14% of manufacturing workers are at risk of unemployment (Brussevich, et al, 2020⁶), that is why upskilling towards CM is essential. Manufacturing is providing 32M jobs in 25 industrial sectors with over 2 million companies, and access to digital skills is one of the three top constraining factors for enabling digitalization, I4MS-4TS (2022)⁷ indicated that one of their main barriers was the lack of skilled employees required to adopt advanced manufacturing technologies. MSMEs need training measures and facilitate upskilling strategies to guarantee the future implementation of Circular Manufacturing adopting Industry 5.0 by SMEs where possible, upskilling them to adapt their knowledge to the new technology requirements, as teaching 'future resilient' skills can help workers adapt to automation. Reaching their targets, MSMEs require upskilling structured in a way to respond to the context manufacturing SMEs are embedded in.

○ How CIRCULOOS will solve the challenges

In the face of these challenges CIRCULOOS aims to deliver the tools to enable MSMEs to become full members of the Circular Manufacturing value chain. These tools orchestrate and continuously optimise the supply-chain end-to-end and integrate planning and execution monitoring to enable transparent and on-time communication. Combining these with direct calculation of the product sustainability and circularity profile, for both internal and external partners, this environment will enable them to configure and execute disruptive circular manufacturing processes for **sustainable production** that covers the entire **life cycle of products; either by recovering the value of product that ended-up as waste or from recycled and remanufactured products.**

To achieve this objective the project aims to deploy:

- **Circular end-to-end supply chain orchestration for collaborative workflows which incorporates planning and execution metrics** and integrates advanced and multimodal visualisation and analytics. The visualisation is delivered by comprehensive Digital Twins of the supply chains formulated, the factory processes and product design phases.

⁴ "Data sharing for circular economy in the Nordics", Nordic innovation, September 2021.

⁵ https://www.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

⁶ <https://www.imf.org/en/Publications/WP/Issues/2020/06/12/Who-will-Bear-the-Brunt-of-Lockdown-Policies-Evidence-from-Tele-workability-Measures-Across-49479>

⁷ https://i4ms.eu/working-group-on-digital-skills-upskilling-and-reskilling-in-the-manufacturing-sector/?utm_source=rss&utm_medium=rss&utm_campaign=working-group-on-digital-skills-upskilling-and-reskilling-in-the-manufacturing-sector

- **Supply Chain Optimisation** that monitors the global (across the supply chain) and local (within the factory) processes and execution, inputs and outputs and configuration parameters, to enable data-driven AI decision making, this way supporting continuous optimisation of targeted and measured performance and sustainability parameters.
- **Dynamic Sustainability Assessment** functionalities that investigate alternative supply-chain scenarios (varying in terms of materials used, processing technologies, suppliers involved and/or activated circular economy practices) in place of the existing schemes, quickly measuring their performance in terms of environmental sustainability and circular economy profile.
- **Supply Chain Data Spaces for seamless**, multi-level data flow across the supply chain partners, supporting the reuse of materials in novel products, the extension of the life-cycle of finished products (remanufacturing), and data-driven decisions for collaboration of parties offering matching services in the most dynamic and efficient way.
- **Cybersecure and trustworthy data sharing across the supply chain** by employing a distributed, trusted and efficient Identity and Access management system, that together with the associated trust framework will coordinate the identities of all IoT objects and ensure trustworthy
- **CM specific tools** for the automatic recognition of recyclable parts by modern Machine Vision tools and Advanced Robotics, to enable optimised flows in the selection process.
- **Novel circular business processes** will be demonstrated supporting reusing, reducing, and recycling material in production and consumption systems. The new collaborative production models will provide quantifiable results on the sustainability increase across the supply chain, in terms of efficient use of raw materials, of by-products, of waste and energy and of emissions reduction.
- CIRCULOOS leverages the above with the **RAMP integrated innovation IOT** platform and the **European network** around it to deliver a CM ecosystem and platform for Manufacturing SMEs.
- **Skills upskilling and reskilling** will be provided in RAMP and through online courses, webinars, and best practice guides and success stories based on the pilots and Experiments for Demonstration (EXDs).

2 What is the CIRCULOOS Expression of Interest?

CIRCULOOS aims to establish a Circular Manufacturing (CM) ecosystem by starting from the existing RAMP DIH network of over 30 DIHs in Europe, thus becoming the European Hub for Circularity in the European regions. Circular supply chain collaboration will be demonstrated and tested in 3 pilots (internal) and over 16 demonstrators (Open Calls) for new sustainable products.

In these sense, **CIRCULOOS Expression of Interest (EOI)** - aims to attract and engage different kinds of supply chain actors in the manufacturing domain addressing a variety of industries (*e.g. Basic metal, construction, electrical equipment, furniture, leather, machinery and equipment, motor vehicles, wood products, plastic, and others sectors related to the project objectives*) which want to embark in circular business with other complementary entities forming **Innovative Circular Supply Chains**.

The Expression of Interest manifests the interest to adopt circular practices, and willingness to collaborate with other regional actors to build novel circular chains, that support those challenging circular strategies, such as Refurbish, Re-manufacture, Re-purpose.

The ultimate goal is to **implement these circular strategies** and demonstrate novel business models and production operations that enhance circularity indexes of the final product and production processes. The selected supply chains should adopt and validate the series of tools that are offered by CIRCULOOS project and enhance them as necessary with reusable components, which should be useful also for other circular supply chains and will be integrated in RAMP platform.

All received Expressions of Interest will be published publicly so that the interested parties can find each other and build and submit suitable, innovative supply chains of common interest. Matchmaking activities will also be supported by CIRCULOOS project but also the interested parties can connect with each other to form suitable value chains and prepare and submit applications for funding in the upcoming Open Call #2 and Open Call #3.

3 Who can apply?

The CIRCULOOS EOI is open to single entities that are eligible under Horizon Europe rules, with products or services that can be implemented **within the manufacturing and supply value-chain**, and willing to adopt one of the R-strategies: Recycling, Remanufacturing, Repair and Refurbishment.

The following type of entities are invited to submit their interest and participate in the programme activities:

- Manufacturing European mid-caps, MSMEs and micro-SMEs (as defined in EU law – EU recommendation 2003/361⁸) with a commercial activity in the manufacturing industry as a producer, or a technology/ service supplier for applications in the manufacturing industry
- Entities that can adopt the role of: Recyclers, upcyclers, repairers, waste collectors, or other entities enabling the circular loop
- DIHs or eDIHs.
- Academic institutes (Universities), research institutes and other not-for-profit research entities.

⁸ EC recommendation for Small and Medium- sized Enterprises (SMEs) 2003/361/.
https://ec.europa.eu/growth/smes/sme-definition_en

The target areas of the entities include, but are not limited to: basic metal, construction, electrical equipment, furniture, leather, machinery and equipment, motor vehicles, wood products, plastic, and other sectors related to the project objectives.

Applying entities must be based in:

- The Member States (MS) of the European Union (EU), including their outermost regions.
- The Overseas Countries and Territories (OCT) linked to the Member State⁹;
- Horizon Europe associated countries (those that have signed an agreement with the EU as identified in Article 7 of the Horizon 2020 Regulation): according to the updated list published by the EC¹⁰;
- UK applicants are eligible under the conditions set by the EC for Horizon Europe participation at the time of the deadline of the call.

4 How to apply?

The participation in the CIRCULOOS EOI and support activities requires that all interested parties register themselves and/or their companies on the **RAMP platform**: <https://ramp.eu/#/service-request/list-public>

The registration is open at any time during the matchmaking stage (from October 2024 to March 2025). However, registering before or during the official launch of the Expression of Interest will allow more time to participate in relevant match-making events and webinars that will be held under the responsibility of CIRCULOOS.

Interested entities are also invited to pre-register on F6S, to get updates and newsletters on Open Call #2 and Open Call #3 by submitting their information at the [F6S CIRCULOOS page](#).

5 What is the offer?

○ Matchmaking activities

Entities participating in the CIRCULOOS EOI gain access to a number of matchmaking and information-oriented activities organised by CIRCULOOS that will help them prepare their application in the forthcoming Open Call #2 and Open Call #3 that will fund them with up to 240K€/ team.

○ Webinar 1 to all potential applicants

Outlining the main objectives of CIRCULOOS Expression of Interest and guidelines, and scope of subsequent open call will be presented.

⁹ Entities from Overseas Countries and Territories (OCT) are eligible for funding under the same conditions as entities from the Member States to which the OCT in question is linked.

¹⁰ https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/list-3rd-country-participation_horizon-auratom_en.pdf

○ Webinar 2 to DIHs

Outlining the main objectives of CIRCULOOS open call and guidelines. It will clarify the role of DIHs during the matchmaking process, and proposal preparation, as well as the potential role during the Open Call 2 implementation. It will also cover information about the RAMP platform, its presentation, tools, the registration process, and the matchmaking opportunities, to support the ongoing formation of circular value chains (*Date to be determined*)

To be able to apply to Open call Open call #2, entities should form a consortium of at least two value chain entities, centered around manufacturing organisations from all sectors, all manufacturing industries, and should include organizations that enable a circular loop.

CIRCULOOS will compile a list of registered entities available, and willing to match in a consortium. Other types of matchmaking activities will be held, including online events where participants will have the opportunity to meet each other and collaborate.

The process of Consortium matchmaking will be entirely held through the RAMP platform (<https://ramp.eu/#/service-request/list-public>), that provides different tools to find your desirable partner.

Note: Please check the section on "Information for Open Call #2 and #3 - Consortium structure" for specific consortium requirements.

6 Information and applying to Open Call#2 & Open Call #3 funding

The current EOI is a first step, focusing on matchmaking activities, to facilitate access to funding that will be available in the CIRCULOOS Open Calls #2 (Demonstrators) and #3 (Value-chain extension/scaleup). Its main objective is to match about 32 MSMEs with 16 suppliers towards the design and implementation of at least 16 demonstrators.

Note: Participation in activities enabled by this Expression of Interest is optional and your participation in them does not constitute any guarantee of any benefit in your submission or selection to the CIRCULOOS open call #2.

Grant & maximum funding per third-party

CIRCULOOS Open Call #2 aims to select appropriate value chain demonstrators, which are composed by consortia of 2-4 entities and will provide **funds up to €60K per partner**. The applicable funding rate for every project will be **60% of the eligible costs** for profit making entities, or 100% for non-profit or academic organisations.

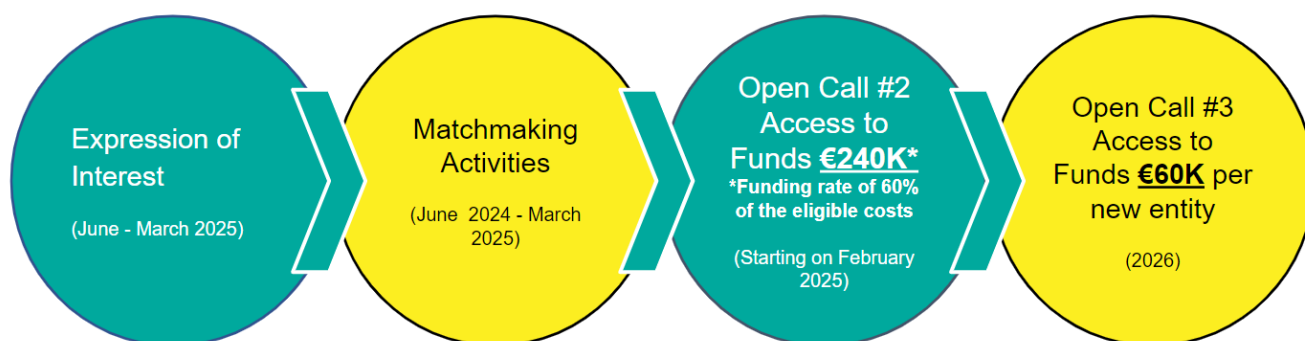
IMPORTANT NOTE: Applicants should be aware that to receive the 60% funding from CIRCULOOS Open Call #2, they must contribute 40% of their own funds.

This means that OC#2 projects with 2 partners can get up to €120K in total, with each partner getting no more than €60K. To receive this funding, the project must have a budget of €200K, requiring the partners to contribute **the remaining €80K of their own money**.

Therefore, the open call will provide **up to €240,000 (total lump sum) to up to 16 consortia**. Funds will be disbursed based upon the successful delivery of technical and business reports along the 12-month implementation program, scheduled to launch in February 2025.

The CIRCULOOS Open Call #3 will enable the extension of pilots and/or newly established value chains, by inviting single new MSMEs to benefit/contribute to the established value-chain, extending and scaling it up to improve the value chain sustainability performance, and thus, **opening a second round of funding: €60,000** per new entity. A limited number of applications by new MSMEs will be invited together with Open Call 2, up to 3-4, to build on the existing pilots, and more will be invited later to build on the value chains resulting from the Open Call 2 (this will be launched tentatively in 2026).

Note: To be clear on this another open call #3 will open in about 1,8 years, to extend the demonstrators that will be selected in Open Call #2.



○ Information for Open Call #2 and #3 - Consortium structure

Entities that apply to the forthcoming CIRCULOOS Open Call #2 will be required to **apply as a consortium** consisting of at least two circular supply chain entities up to a maximum of 4 entities (and 5 in exceptional situations¹¹).

Therefore, for Open Call #2, the minimum structure of the consortium must be:

- **One manufacturing MSME of Mid-Cap** (*funding of up to €50,000*)
- **At least one and up to two** other entities (*funding of up to €50,000*), namely **recyclers, upcyclers, repairers, or waste collectors**; or another role that enable the circular loop.
- **One DIH/RTO/MSME** which takes the role of one or more of the following: regional circularity hub, technology enabler and /or networking or dissemination partner, coordination partner (up to EUR 40,000). **This organisation does not count to the requirement to have at least two supply chain nodes.**

¹¹ Applicants willing to add a fifth entity to their consortium should first request it to CIRCULOOS coordinator

For Open Call #3 only submissions from single entities will be accepted. New selected entities will join consortium already established in Open Call #2.

Important clarifications regarding the concept of circular supply chains.

1. The circular supply chains should be innovative and enabled by the project, not already existing.
2. The circular supply chains should foster the exchange of data and digital cooperation of the chain nodes businesses.
3. The circular supply chains should result in novel market offerings and measurable improvements in sustainability and circularity indices across the value chain.
4. The challenge to be addressed should be clearly described and shared among the value chain nodes.
5. The business composing the value chain should show the circular process by moving products, materials and upgrading waste. Circular value chain nodes are not considered, suppliers, coordinators or other service providers not involved with circular business relationships, even if they contribute to enabling those.

7 Data protection

This Data Protection Policy notice states how European Dynamics S.A., owner and operator of the online platform “RAMP”, collects, uses, and discloses your personal data. It also defines your rights under the General Data Protection Regulation (GDPR).

Information we collect:

The personal data processed in RAMP depends on the extent that the user wants to use the RAMP services, and is the following:

- For user registration, the following data is required:
 - First name
 - Last name
 - E-mail
- Fields that users may optionally fill in, if they want them to appear as information in their public profile are:
 - Role in the organisation
 - Country
 - Linked company or organization (e.g. employer)

How we use your data:

Personal data is processed in order to provide the following services:

- Provide an online catalogue to find manufacturing, automation technology and consultancy companies and products.
- Enable service requests that are created by manufacturing companies, in which service providers (i.e., automation technology and consultancy services organisations) make proposals/offers. The goal is in the end that a partnership (service contract) is established between the two parties. Upon explicit user selection, a service request may be public, accessible by any RAMP registered user, or by invitation, to user-selected users with an organisation profile registered in RAMP.
- Allow users to use 3rd -party tools (applications), without the need to register again, but authenticate by using their RAMP account. User consent is required on every occasion when the service is used for the first time with a 3rd -party tool.
- Provide support on using RAMP.
- Improve RAMP functionalities.

Legal basis for processing:

The data processing is based on the explicit consent you provide during signing up to RAMP and by using the RAMP services, and is thus subject to the lawful processing provided by GDPR Art. 6, paragraph (1), points (a), (b) and (f). This concerns the legitimate interests of aggregating data that is used for the improvement of the RAMP functionalities, resolving software bugs, providing matchmaking services between manufacturers, requesting a service and service providers with appropriate expertise to provide such services, and assisting users when they request support through the RAMP contact form.

Where we store your data:

We maintain your personal information only in electronic form in our secure infrastructure, in the EEA. Personal data is stored and processed in European Dynamics ISO27001:2013-certified infrastructure. This includes industry standard security measures to ensure regulated access and resilience of information processed, including well-defined and documented information security policy and controls, technical controls such as those specified by established frameworks like Cyber Essentials, encryption and/or pseudonymisation when appropriate, backup, data partitioning, application-level protection and restoration process for personal data.

Data retention:

Data is retained until the user or their company/organisation is deleted from the RAMP Marketplace. This is triggered by the user's request, user self-deletion through the RAMP User Interface, or by the RAMP administrators. There is no further data retention period.

Data sharing:

Data may be shared in the following occasions:

- First name and last name may be shared during matchmaking activities and exchange of messages within RAMP. While the recipients cannot be predefined, the user dynamically decides the recipients of this data by actively engaging in message exchange with the said recipients.
- First name, last name, e-mail address and organization may be shared with 3rd-party tools (applications) to enable the use of those tools with a RAMP account. While the recipients cannot be predefined, the user dynamically decides the recipients of this data by actively launching the function and providing explicit consent on the specific data share.

Your Data protection rights:

You have certain rights under the General Data Protection Regulation (GDPR) in relation to your personal data. These include the right to:

- Access: Request a copy of the personal data we maintain about you.
- Rectification: Request that we correct any inaccurate or incomplete personal data we maintain about you.
- Erasure: Request that we erase your personal data.
- Restriction of Processing: Request that we restrict the processing of your personal data.
- Object to Processing: Object to our processing of your personal data.
- Data Portability: Request that we transfer your personal data to another organization or directly to you.

To exercise any of these rights, please contact us using the online form in the ['Contact Us'](#) section in RAMP.

Changes to the Notice:

We reserve the right to update this Notice at any time, without any prior notification. You may determine if any such revision has taken place by referring to the date on which this Notice was last updated. Your continued collaboration in the context of our agreed activities constitutes your acknowledgement and acceptance of such changes.

8 Contacts

- Contact: circuloos.eu@gmail.com
- Register via: <https://ramp.eu/#/service-request/list-public>
- More info at: <https://circuloos.eu/>

Legal Disclaimer

CIRCULOOS is an EU project funded by the Horizon Europe (HORIZON) research and innovation programme under grant agreement No. 101092295. The information and views set out in this Guidelines for applicants are those of the author(s) and do not necessarily reflect the official opinion of the European Union. The information in this document is provided “as is”, and no guarantee or warranty is given that the information is fit for any specific purpose. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein. The CIRCULOOS Consortium members shall have no liability for damages of any kind including without limitation direct, special, indirect, or consequential damages that may result from the use of these materials subject to any liability which is mandatory due to applicable law.

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