TREASURE

D7.5 Review of networking with other projects and roadmap

31/05/2023 (M24)

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003587

Technical References

Project Acronym	TREASURE
Project Title	leading the TRansition of the European Automotive SUpply chain towards a circulaR future
Project Coordinator	POLITECNICO DI MILANO (POLIMI)
Project Duration	36 months as of 1 June 2021

Deliverable No.	7.5
Dissemination level [1]	PU
Work Package	WP7
Task	7.3
Lead beneficiary	MOVEO NextMove
Contributing beneficiary(ies)	
Due date of deliverable	31/05/2023
Actual submission date	

Document history		
V	Date	Beneficiary partner(s)
V1.0	24/05/2023	MOVEO NextMove
V1.1	15/06/2023	MOVEO NextMove
VF	27/06/2023	MOVEO NextMove

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EXECUTIVE SUMMARY

The Deliverable 7.5 Review of networking with other projects and roadmap is a public report.

The purpose of it is to establish a community that supports the innovation transfer and business and social aspects evaluation and enable further dissemination and exploitation of project results.

To do that, NextMove is working within its ecosystem to build a roadmap and a community around circular industry, and with other partners at European level.

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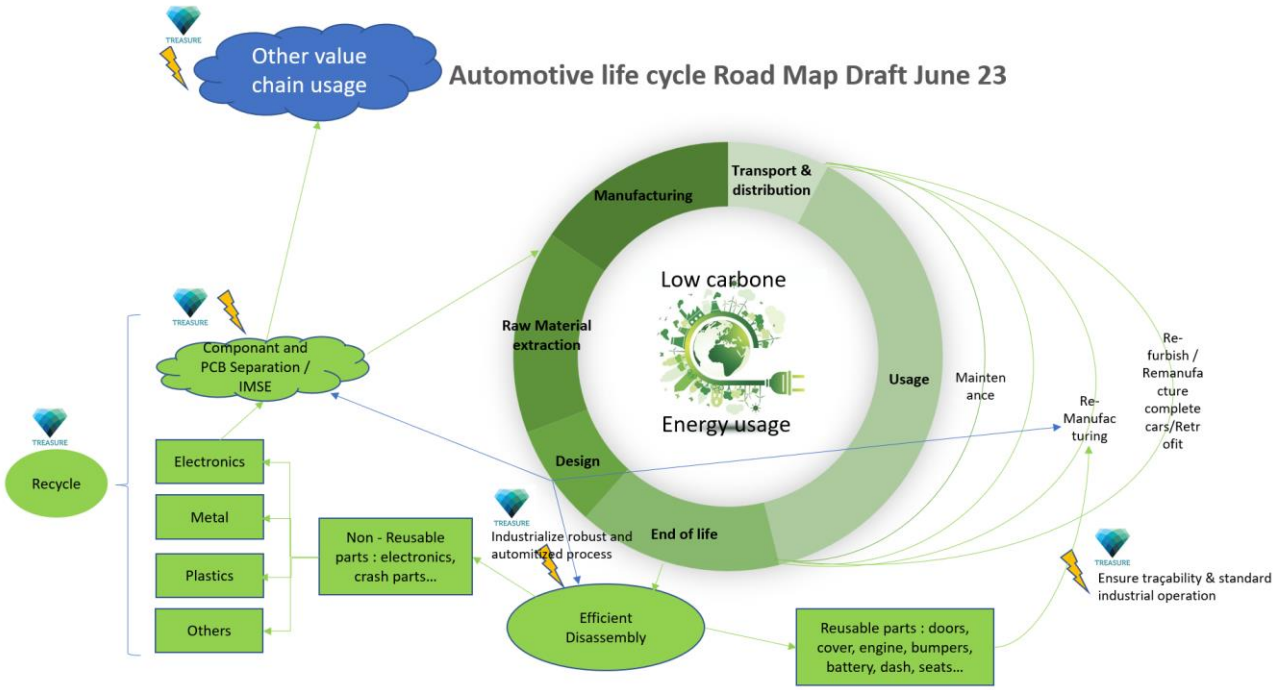
1. Building a roadmap to make awareness

The purpose of this roadmap is to support establishing a community that could support the innovation transfer, business and social aspects evaluation, as well as enable further dissemination and exploitation of project results.

With this aim, NextMove has performed an assessment and conducted exchanges with several actors of its ecosystem, which have been identified as models in terms of best practices, in order to build a common road map of circular industry which will be updated month by month. This roadmap will present the global picture, vision, as well as best practices, so that it will be shared through future events, also with other value chains and related sectors like energy, Civil aeronautics, etc. This will allow to extend dissemination even outside the boundaries of the automotive industry.

Here is a simplified synthesis of the road Map:



Based on life cycle assessment principles, this Map is starting from design, reflecting how choices of materials, design, sourcing, etc. must integrate a new dimension. Eco-design, bio sourced material, carbon impact on the alternatives chosen, use of recycled materials, retro design to improve sustainability or to allow a better repairability or disassembly to impact on usage phase so that elements can last longer by being repaired, and after that phase, can be easily disassembled and materials properly separated so that recycling can be properly performed.

The focus of Treasure is on quantifying to what extent the product/parts we consider in Treasure can contribute to Circular Economy and providing the source for recycled materials by increasing recycling rates of the parts through the combination of disassembly activities (as explored in WP5&6) combined with most optimal modular recycling in existing recycling infrastructures (WP3, WP5&6) This is also clearly visualised by the Metal Wheel and recycling feed sheet included in the recycling optimisation model (see D3.3)

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This can seem simple or obvious for entities who work daily on this subject, but currently, within most organisations, only few people can have this full vision. The purpose is to help them to realise it and act accordingly.

Regarding raw material extraction, a focus is put on potential re-use of material, as part of recycling activities to recover materials contributing to CE, reduce impact on available resources and on carbon impact as a global picture. This item is linked to Design phase and to quality of selection, as well as disassembly and technical possibilities, to master mechanical and visual properties of the material after recycling. Technical possibilities for recycling, by linking disassembly to physics-based optimisation of recycling by optimally designing parts and disassembly to derive parts which match most optimally with the processing options for different material combinations linked in design with Best Available Techniques for (metallurgical and other final treatment) recycling processes.

Design for recycling can be driven by the learnings from understanding the full complexity of recycling (as captured in the recycling simulation model) based on pinpointing and quantifying the problems in recycling (losses, emissions because of design)

As per the Manufacturing aspect, a focus is put on Operational Ratio, Energy performance, scraps and waste management and packaging. Treating properly scraps when perfectly knowing the material and its specificities is much easier than at the end of life. Separation and disassembly need to be performed in such manner, or innovation implemented, that different material combinations/group/ separate different materials, notably in electronics where separating components is crucial to maximize the possibilities of recycling processing to recover most optimally materials/metals; knowledge of content, disassembly methodology and standard are important.

Concerning transport and distribution aspect, a focus is put on local ecosystem and synergies, as much as possible.

The main potential is on usage: by conceiving models differently, the consumer's mindset will change, and industry will be able to make last parts longer, by repairing, refurbishing, re-using, exploiting differently, retrofitting, etc. To do that, the automotive and mobility industry need to organize the technical and economic model so that it can work as a virtuous loop, for example:

- Ensure an efficient disassembly, repair…
- ensure traceability of each operation and vehicle, to identify component inside each model…

We have current good practices in the ecosystem regarding full vehicles refurbishing or electrical scooters, or sub assembly around the engine, 2nd life of batteries…

To be efficient in the dissemination and in the collection of other good practices and identify the needs of different actors, NextMove has built a declination of the roadmap throughout a

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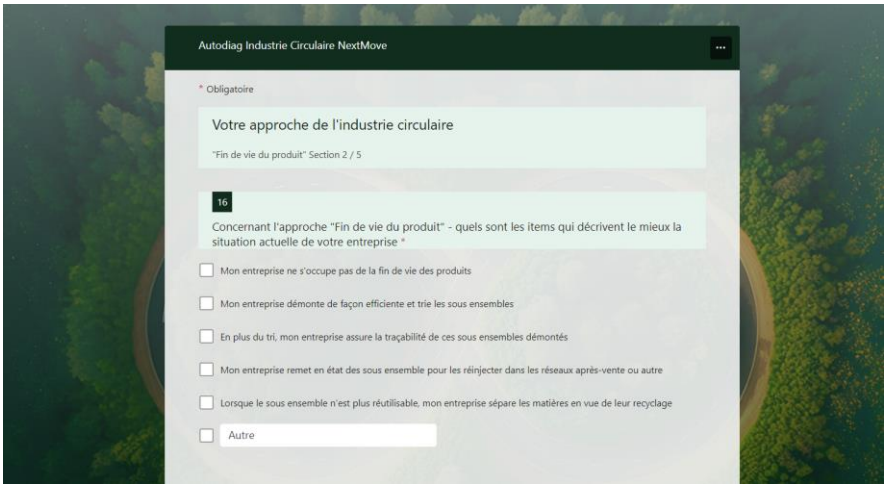
self-assessment digital tool that is currently under testing phase, before being disseminated within NextMove cluster members.

This will allow to collect data regarding each topic, which will be then exploited to nourish the content of dissemination events.

In the same way, the road map is based on Life cycle assessment principles and will allow companies, labs and local authorities (among others) to better understand the global picture. For each topic of the life cycle, these actors will discover the global scope, questioning themselves and identifying the good practices that could be shared, as well as identifying their potential needs and improvements.

For instance, if we consider the “end-of-product life”, here are some examples of questions and their translation:



1st step: Define the current situation of the company (*multiple answer are accepted*):

- ☐ My organisation is not involved in end-of-product life management yet
- ☐ My organisation has implemented efficient and standardized disassembly process and performs a relevant selection of subassembly.
- ☐ The disassembled subassembly is fully tracked and traced.
- ☐ My organisation has standardized refurbishment activities, ensuring traceability and is reinjecting parts in aftermarket business.
- ☐ When the sub-assembly is no longer reusable, my company separates the materials for recycling.

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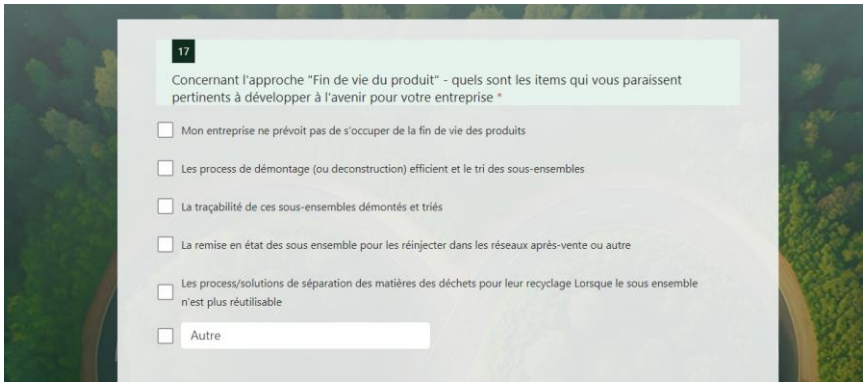
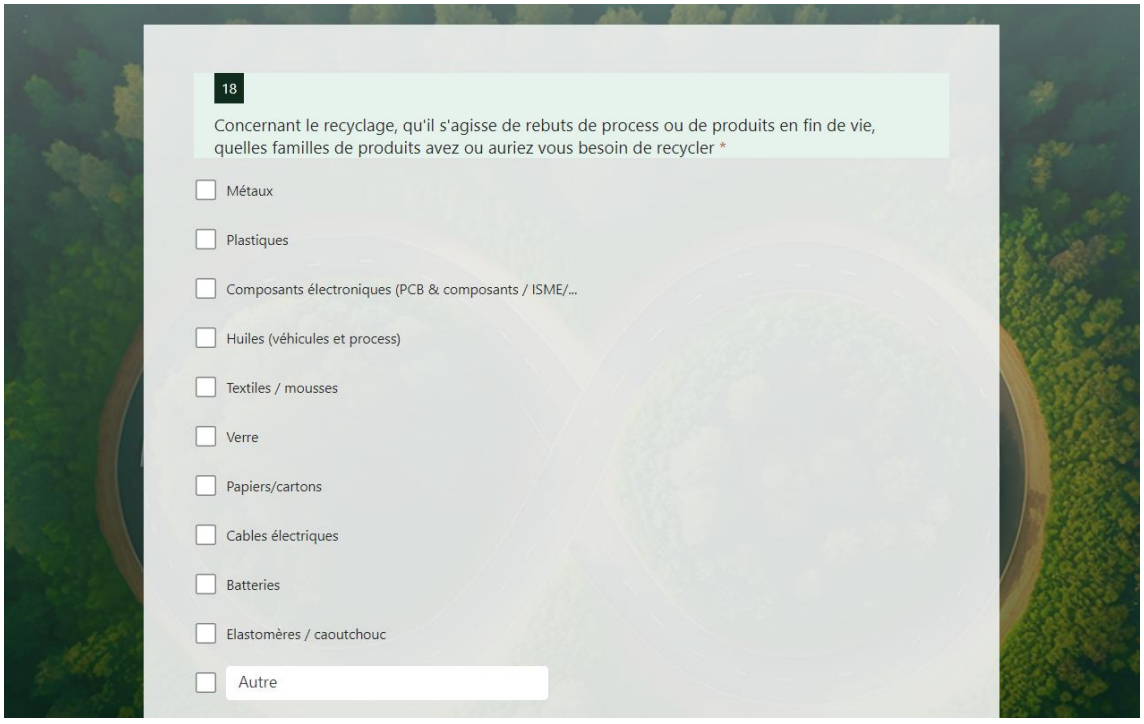
2nd step: following the same principle, the questions concern the future



developments/improvements planned:

- Do you find interesting for your organisation to be involved in end-of-product life management?
- Do you find interesting for your organisation to implement efficient and standardized disassembly process and perform a relevant selection of subassembly?
- Do you find interesting for your organisation to organize full track and trace of the disassembled subassembly?
- Do you find interesting for your organisation to standardize refurbishment activities, ensure traceability, and reinject parts in aftermarket business?
- Do you find interesting for your organisation to repair subassembly as many times as possible or to exploit other usages/recycling only when impossible to repair anymore?

3rd step: is focused on the family of materials, which need to be recycled.



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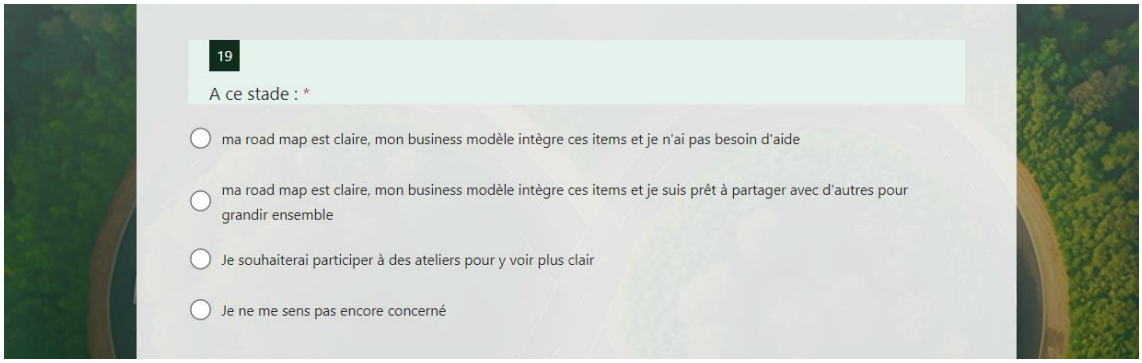
4th step: we identify potential good practices, to share them with the TREASURE community, or to enrich future workshops/events with the participation of these entities. The aim is to build a data base gathering both valuable good practices, as well as organisations interested in these topics, which will nourish the participants list of the TREASURE summer school planned for 2024.



2. Prepare dissemination events.

The objectives of this event would be to share the road Map, some practical and significant examples and output with other value chain and create synergy and potential extension in their use cases. We imagine an introduction conference, followed by B2B meetings, based on the data gathered with the self-assessment tool.

To prepare the success of this event, in addition of following closely the output from the other work package of the project, we are currently extending our network with : SMEs that are either disassembling efficiently and ensuring traceability at EoL – or company doing performant remanufacturing during life of the vehicle– companies organizing standardized car refurbishment or retrofit to increase life duration of the car – Electronics company (either willing to develop IMSE technology – or working in validation process of re-use of electronic component) - company reusing car component for other core business than automotive– labs or accelerator connected to industry allowing to speed up the phase between R&D prototype and mass production in different kind of application… We are also working closely with industrial training activity centre (doing learning by practice). We are deeply involved in this project and support the organization to allow all this changes to happen by transforming current skills to future required skills and preparing managers to differently build their vision of circular economy, based on life cycle analysis.

All this will allow us to find the suitable area to organize a successful summer school with the relevant ecosystems.

3. Develop the community at European Level

Regarding the development of this community on the European level, we are using the support of our representative based in Brussels, which attends the main events and meetings of EUCAR and EFFRA and inform us of the key updates, which might influence the activities of the project.

In the meantime, this road map will be like a backbone to allow a large public to better understand the global picture that will be used to introduce the summer school event in M36,

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as a technical, strategical, and economical introduction to networking event that should facilitated deep and long-term relationship and collaboration within extended ecosystems.

In the meantime, we are building a synthesis of connection with other European project within the Treasure Partner and advisory board.

For example, regarding previous actions:

In January 2018 and April 2021, POLIMI organized mutual presentation with FENIX Project (www.fenix-project.eu/); the purpose of this was to share information regarding Disassembly and recycling of PCB from smartphone and Conditional Based Maintenance (CBM) analysis.

The main objective of FENIX is the development of new business models and industrial strategies for three novel supply chains to enable value-added product-services. To this aim, three pilot plants will be implemented:

1. A modular, multi-material and reconfigurable pilot plant producing 3D printing metal powders.
2. A modular, multi-material and reconfigurable pilot plant producing customized jewels.
3. A modular, multi-material and reconfigurable pilot plant producing 3D printing advanced filaments.

In February 2015 and January 2018, POLIMI also organized mutual presentation with PSYMBIOSYS project (www.cordis.europa.eu/project/id/636804); the purpose of this was to develop a PSS engineering environment.

At the same period of time, POLIMI also organized a mutual presentation with MANUTELLIGENCE project (https://cordis.europa.eu/project/id/636951); the purpose was to integrate best-class methods and tools for Product/Service System (PSS) design & engineering

In 2016/2017 and 2020/2022, MARAS organized project/research with FAIRPHONE (https://www.fairphone.com/en/); the purpose was to perform a Recycling assessment and Design for Recycling of the FP2 &3 smartphone models. The result is presented on this page: https://www.fairphone.com/nl/2017/02/27/recyclable-fairphone-2/

31rst May 2023, UNI organized a mutual presentation with CIRCTHREAD project (https://circthread.com/); a partner of CIRCTHREAD has been invited as panelist in a workshop organized by UNI within Treasure project

In 20212021, MOVEO/NEXTMOVE has organized a mutual presentation with XCEED Project (https://www.automotiveworld.com/news-releases/xceed-the-new-blockchain-solution-for-the-certification-of-vehicle-compliance-is-moving-a-step-further-in-europe/); the purpose was to assess and understand blockchain usage on the use case and how End To End compliance and traceability was performed to potentially use and connect it during aftermarket life cycle

On July 2022, MOVEO NEXTMOVE has also proposed a production paper about decarbonation to the European Manufacturing Conference (20220715-position paper Industries)

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For the coming months, we expect additional connection with the following projects throughout common event:

POLIMI and MARAS expect to share with CIRC-UITS www.circuitsproject.eu to demonstrate circular practices in automotive and mass electronics sectors by reusing/remanufacturing semiconductors.

TNO plan to share with ECOTRON www.ecotron-project.eu about improving circularity of IME through disruptive manufacturing processes, technologies, and materials.

POLIMI and NextMove expect to share with FREE4LIB www.freeforlib.eu about how to improve recycling and remanufacturing of End-of-Life Li-ion batteries.

POLIMI also expect to share with DACAPO www.portal.effra.eu/project/15719 about creation of digital tools/services for improving the adoption of CE in manufacturing value chains, with AUTOTWIN www.auto-twin-project.eu to deeper understand process mining approach for Automated Digital Twin generation, operations, and maintenance in circular value chains and with CIRCULAR TWAIN www.circular-twain-project.eu to understand their AI platform for integrated sustainable and circular manufacturing.

UNIVAQ plan to share with PEACOC https://www.peacoc-h2020.eu/ to prepare Pre-commercial pilot for the efficient recovery of Precious Metals from European end of life resources with novel low-cost technologies, also with NEWRE erion.it/en/project-new-re; New-RE recycling is based on hydrometallurgical processes, through which REEs contained in PMs from hard disk drives and electric vehicles and other wastes are leached from acidic organic solutions.

UNIZAR expect to share with Future Fast Forward Project (https://www.futurefastforward.es/) about the promotion of electric vehicle through the involvement of all value chain actors - from manufacturers to recyclers. It is the biggest Spanish automobile project of the history. Another contact is planned with REDOL (https://www.linkedin.com/company/redol/); REDOL is an EU funded project that aims to turn Zaragoza, the capital of Aragon, into a zero-waste city by 2040 by: (1) Redesign 5 value chains for Solid Urban Waste in Aragon (packaging, plastics, CDW, textiles, WEEE); (2) Upgrade management technologies to collect, sort and classify SUW; (3) Improve the processing routes of sorted materials to avoid landfilling and (4) Apply cutting-edge digital tools to optimize value chains and interaction among key players

UNIZAR is also thinking about contacting RECOURCES project (https://ebn.eu/project/resource-project/); The RESOURCE project will study the private funding opportunities needed in circular projects and facilitate those projects' development by developing new PDA (Project Development Assistance) services. More precisely RESOURCE will: (1) Build an integrated expertise pool to support technically, economically, and legally the regional circular economy pilots SMEs; (2) Develop innovative financing schemes and business models; (3) Facilitate concrete investments.

MOVEO/NextMove is thinking to exchange again with XCEED, as project are growing and the blockchain platform could make sense to be open to aftermarket traceability connections.

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4. Abbreviations

EOL	End Of Life
SME	Small & Medium Enterprise
IMSE	In-Mold Structural Electronics
PDA	Project Development Assistance

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