CarE-Service

Circular economy business models for innovative hybrid and electric mobility through advanced reuse and remanufacturing technologies and services

Risk management and identification of side-effects

(Deliverable 2.3)

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Project Consortium

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Executive Summary

This deliverable is the work performed under CarE-Service WP2 "New circular economy business models and service engineering" and reports outcomes of Task 2.3 "Risk management and identification of side-effects". It consists, for business models identified in previous activities (T2.1 and T2.2), in the systematic characterization of the drawbacks of the proposed business models and services (i.e. the decrease of revenues from sales of new vehicles and parts due to the increase of re-use practices, the environmental impact generated in the new re-use value chains, etc.). A comprehensive logical framework of interlinked variables has been built in order to have a complete systematic view on the identified drawbacks and, on the other side, on the positive impacts of the realized innovations that can compensate their effect.

The new business model identified during T2.1 and T2.2 is an innovative car sharing service integrated with other transportation services, provided through electric vehicles managed in a circular economy logic through batteries reuse, metal parts remanufacturing and techno-polymers recycling.

The major side effects of the project will consist in less business for:

- OEMs, due to less cars sold;
- Battery pack suppliers and all the battery supply chain (battery re-use decrease the need of new batteries);
- Metal parts suppliers and metal works (remanufactured metal parts will compete new parts);
- Techno-polymeric raw material suppliers (recycled techno-polymers will compete with virgin raw material).

On the other hand, circular economy in the EV car sharing services will bring major positive impacts:

- Environmental: less CO_2 consumption thanks to EV but also thanks to less battery production and metal part manufacturing from raw materials;
- Global cost decrease at all the level of the value-chain: 2nd life battery, remanufacturing metal parts and recycled techno-polymer will be cheaper; EV made with those recycled and remanufactured products will be cheaper;
- Creation of new business: battery pack dismantling, testing and remanufacturing, metal part remanufacturing, techno-polymer recycling, additional business for car dismantler, new logistics business thanks to the ICT Platform and the Smart Mobile Modules that will be realized in the project.

This Task provides inputs for the development of economic models that can be used for the assessment of socio-economic impacts of new circular business models in T2.4: "Socio-economic simulation of new services and business models".

List of Acronyms

B2B: Business to business

B2C: Business to Consumer

BM: Business Model

CA: Consortium agreement

CC: Consumer Committee

EC: European Commission

EV: Electric vehicle

GA: General Assembly

GA: Grant agreement

IB: Innovation Board

ICT: Information and Communication Technology

IPR: Intellectual Property Right

NDA: Non-disclosure agreement

PC: Project Coordinator

PM: Project Manager

QAP: Quality Assurance Plan

RD: Dissemination/Exploitation Risk

RI: Implementation/Validation Risk

RO: Organisational Risk

RT: Technological Risk

SC: Steering Committee

SG: Stakeholders' Group

WP: Work Package

Table of Content

1 INTRODUCTION

The aim of this deliverable is to analyse the side-effects and drawbacks emerging from new circular business models and mobility services identified in previous project activities (Task 2.1 Task 2.2). Side effects and drawbacks identify the negative consequences potentially introduced by the new business models and services.
With this goal, a logical framework of interlinked variables positively and negatively affecting the performance of new business models and mobility services was elaborated in the B2B circular scenarios of batteries, metals, techno-polymers, as well as in the B2C scenario of new mobility services. The systematic identification of those variables allows to include in the overall assessment of new business models and mobility services not only their benefits, which are the driving reason of the proposed circular economy approach on electric vehicles, but also their negative consequences, which might undermine their success. Furthermore, this approach allows to consider interlinks among positive and negative variables, that are often neglected when taking a specific technological assessment perspective.

2 METHODOLOGY

The methodology for the identification of drawbacks and side effects consisted of the following steps:

1) First identification of drawbacks and side effects by a restricted group of partners that combined their multi-disciplinary knowledge to identify drawbacks. In particular, the activity was led by the partner Avicenne that, by operating as a consulting company in the global market of batteries, could provide its wide business and marketing intelligence knowledge. CNR contributed in this phase by proposing a model to exhaustively identify and represent interlinked variables. The model consisted of two main instruments:

- Tables for the systematic identification of pros and cons of each business scenario for all involved actors: involved actors in the value chain was the result of D2.1 for B2B business models and D2.2 for B2C business models. Taking an organizational view, the compilation of such tables requires the systematic and exhaustive analysis of the effects of circular business models and mobility services. Thus, it supports the analytical identification of all positive and negative consequences of business models and mobility services;
- Maps of interlinked variables for each industrial scenario, i.e. maps for the representation of variables determining drawbacks and of their interrelations. Variables in the maps are identified considering the pros and cons that emerged in the previous tables.

In this first phase of the task, tables and maps were built for the B2B and B2C project scenarios, i.e. the establishment of circular economy practices in the batteries, metals and techno polymers recovery streams, as well as the offering of innovative mobility services.

2) The initial proposal of tables and maps was improved and validated including the wider perspective of OEMs, companies in the recycling and remanufacturing chains, ICT platforms specialists and logistics providers, in a validation workshop that was organized in the frame of a project General Assembly (Madrid, 28-30/10/2019). In such a workshop, project partners representing those perspectives were split in four groups and were requested to comment, improve and validate the initial proposal. Results of the workshop were used to enlarge the initial framework and to finalise the maps of drawbacks and side effects. In the next chapter results are presented for each addressed business scenario.

3 RESULTS: Drawbacks and side effects

Drawbacks and side effects were analysed for the four main business scenarios addressed in the project: the offering of innovative mobility services and the establishment of new circular business models in the battery, metals and techno-polymers recovery chains from electric vehicles.

3.1 Drawbacks and side-effects of B2C-Mobility Services

The new shared mobility services will generate positive impacts for **consumer** in terms of reduction of mobility costs and "easy of transportation" due to the integration of all transportation means and non-ownership model. However, vehicle non-ownership may constitute a drawback for some customers, since owning a car is still something that many customers prefer. In addition, in general, sharing models' risk to limit the "mobility freedom", i.e. the possibility to move at any time without planning the trip.

Considering **automotive OEMs**, increase of sharing transportation would reduce the sales of cars to private individuals, which is now the main market of car manufacturers. On the other hand, sales of cars to sharing/renting/fleet companies will increase due to their increased activity. In addition, it can be expected that customers in this revenue stream will renovate their vehicles more frequently compared to private citizens, due to their need to offer customers up-to-date vehicles.

From the **car sharing/renting companies'** perspective, the diffusion of new mobility services in Europe will have the positive effect to increase their market and turnover, due to the higher number of customers that will be served. In addition, according to the CarE-Service goals, the value-added of the provided services will increase, generating new reasons for strategic differentiation from competitors and new sources for potential additional profits. However, as a side effect, a higher competition will be faced not only in the direct market, but also in the use of available resources and infrastructure needed for operations of electric vehicles (charging stations, energy, maintenance, etc.). Furthermore, the complexity of the business will considerably increase due to the new circular economy paradigm in fleets management and to the integration of sharing/renting services into wider integrated service models including other transportation means (Train, e-bikes, subway, airports).

Taking the perspective of End-Of-Life actors, **remanufacturers** will mainly face advantages from the establishment of circular economy-based mobility services. In fact, the introduction of re-used/remanufactured parts in vehicles as a standard fleets management paradigm will generate significant market increase for them. However, increased market and the CarE-Service platform will generate new competition from companies that will enter this sector. Market will increase also from **recyclers**' point of view. In addition, the latter could establish more solid partnerships with OEMs in order to include recycled materials into fleets vehicles (and new vehicles in general). However, for recyclers, drawbacks could be faced as a consequence of the wider re-use/remanufacturing approach, that will prolong the usage of parts before they are recycled. Consequently, parts quality at the recycling time will be lower and their value reduced. Furthermore, the availability of recyclable parts will be postponed in time, due to longer use cycles.

Considering the **suppliers of new parts for electric vehicles** (batteries, metals and techno-polymers), an evident side-effect of the new business models will be the increased competition of re-manufactured/re-used parts: the increased future availability of such parts will offer customers the option to choose between new and not-new (cheaper) parts, with a consequent market reduction for the first ones. However, on the other hand, producers of new parts could consider the opportunity to adapt their business to the re-use/remanufacturing market, i.e. producing new parts with higher re-use/remanufacturing potential and even entering themselves in the new market (becoming producers of new parts and remanufacturers at the same time).

Dismantlers will potentially increase their business because of the systematic disassembly and management of high value-added parts of electric vehicles, that at the moment they do not handle and are not ready to treat. On the other hand, they will have to acquire knowledge on the new electric vehicles products and will have to modify their sites in order to host disassembly operations that imply particular attention to safety and ergonomics.
Finally, **maintenance companies** will benefit from the establishment of the envisaged circular economy paradigm, since this will imply that vehicles will potentially need more maintenance/upgrade services. In fact, such a service (prolonging vehicles use life through periodic remanufacturing and upgrade operations) could represent a new value proposition per se which could potentially differentiate automotive service providers and increase their market. On the other side, they will have to invest in order to introduce new technologies and processes to offer structured and efficient maintenance/upgrade services for electric vehicles, which represent in fact a new product of higher complexity and with higher safety standards. Indeed, in case maintenance is provided by OEMs, the reduction of sales of new vehicles could be compensated by the increase of maintenance/upgrade activities. Table 1 summarises main pros and cons for each involved actor.
In addition to the positive and negative impacts for the various stakeholders, the new mobility services and circular economy business models will have impacts on the environment and sustainability. For example:

- The diffusion of electric car sharing will increase environmental sustainability due to lower emissions and lower number of circulating vehicles (because of higher saturation). However, on the other side, it will require more energy to be produced.
- Circular economy of electric vehicles will reduce negative environmental impact thanks to re-use, remanufacturing and recycling but, on the other hands, remanufacturing, recycling and reverse logistics processes will generate themselves an environmental impact.
- Then, as a side effect, taxes collected by the government on gasoline will decrease.

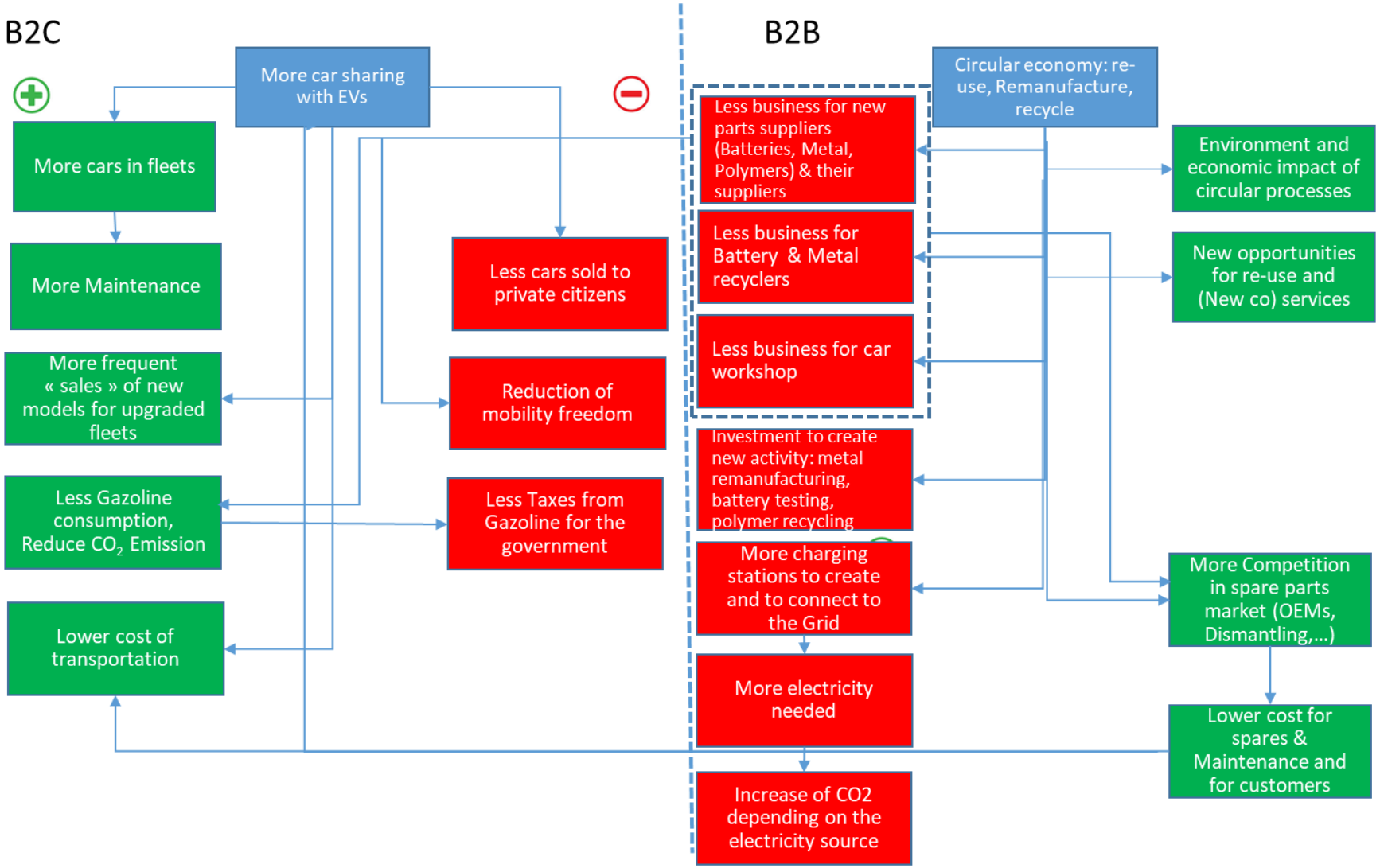
Combining all this information, the map of side effects of new mobility services and circular business models is proposed in Fig.1.

In addition to general drawbacks and side-effects above reported, an analysis was carried out to identify more specific drawbacks and side-effects in the three re-use value chains (batteries, metals and techno-polymers), considering the peculiarities of the three streams of materials. Information was collected during a workshop organized in the frame of a project general assembly (in Madrid, October 2019). In such a workshop, project partners were split in groups based on their competence and expertise in the three value chains. Results are reported in paragraphs 3.2-3.4.

Actors	Pros	Cons (Side effects)
Consumers	• Reduced mobility cost • No vehicle ownership burden	• Losing vehicle ownership • Reduction of mobility freedom
OEM	• Increase sales for fleets (B2B) • Higher cars substitution rate	• Reduced sales to private individuals (B2C)
Car sharing companies & Fleet management companies	• More customers and market increase • Higher added value of provided services	• More competition as the number of car-sharing companies increase • More competition in the use of resources • Increased business complexity
Remanufacturers	• Increased market for remanufactured parts	• Higher competition of newcomers in the remanufacturing business
Recyclers	• Increased market for recycled materials • Higher integration with OEMs	• Lower value of recycled parts • Postponement in time availability of recyclable parts
New part's providers (Battery, metal and techno-polymer)	• Potential integration with remanufacturing/recycling businesses • Higher value of new parts in order to be remanufactured/recycled	• Competition with remanufactured parts
Dismantlers	• Business opportunities	• New knowledge and investments to manage disassembly of electric vehicles
Maintenance companies	• New market and business opportunities thanks to circular economy of electric vehicles • Differentiation from traditional maintenance providers	• New processes and technologies (investments) for maintenance and upgrade of electric vehicles

Table 1. Main pros and cons for actors of the re-use chains (B2C)

Figure 1. New car sharing with EVs and services Side effect map



3.2 Side effect and positive impact by actors for Battery Reuse

Battery re-use could mean different business models:

- Battery pack re-use directly in a new application, typically, stationary application where energy density is not so important than in the EV business.
- Battery pack and module dismantle, then test the cell, the module, the pack and make a new pack with old module or old cells.
- Battery pack reuse directly in a car: some cars may need to have a full capacity battery to get high range but some other cars, used by short-distance driver may need less energy and the old battery could be enough.

In this regard, Table 2 provides a study of possible drawbacks for each player impacted by the battery re-use business model.

The main side effect of battery reuse, but also battery recycling, is the business decrease for all the battery supply chain: **Battery suppliers** will sale less product. That mean that **raw material extractors**, **component producers** (cathode, anode, electrolyte, separators), **cell producers**, will all loose business. On the other hand, pack producer will be less dependent on cell supply chain located mostly in Asia. Cell suppliers and component suppliers will be less dependent on raw material suppliers and recycling or reuse batteries is a way to secure the supply chain. Cobalt is mainly extracted in Congo while Lithium is coming from South America, poor countries in which extraction is also carried out without proper safety measures and sometimes by children. Then, reuse of battery will reduce CO2 emission coming from battery manufacturing, component manufacturing and raw material extraction.

From the **customer** perspective there will be economic benefits due to lower battery price whilst, technically, the durability of charging and discharging rate of the batteries is still doubtful. Customers can be found in completely new applications (stationary application, e-bikes) or in the same initial application.

For the **OEM**, side effects are not clearly identified today as the legislation is not yet known. Depending on the legislation, OEM could have to warranty the old battery and may be responsible in case of accident when used in a new application. Again, depending on the future legislation, the OEM may be not in charge of recycling anymore.

For **Fleet management and car sharing**, they could be responsible of the battery during the second life and depending on the legislation may have to manage this. On the other hand, they may benefit from revenues coming from old batteries.

In the case re-using the battery in the same application, the price of reused parts is lower, but the lifetime and the range of the car will be lower, too.

For **remanufacturers**, the re-use of battery has clearly a positive impact as they will have more business to dismantle the pack, test the elements and repack the battery. On the other hand, as it is clearly a new business, we will see an increase of the competition due to new remanufacturers entering the market that could be specialist in batteries, pack dismantlers, OEM, battery testing companies. Today there are clearly multiple possible business model depending on the level of vertical integration. Because of battery re-use in a 2nd life, **Recyclers** business will be postponed. Logistic providers will have to face with higher risk for storage and transportation of old batteries. On the other hand, they will have more business due to increase transportation needs of reverse logistics.

The logistical network (storage, transportation) will have to manage more dangerous product as an old battery is less safe than a new one. Old battery transport and storage will be more expensive. On the other hand, more business will be generated due to increase transportation needs of reverse logistics.

Actors	Pros	Cons (Side effects)
Raw material extractors		• *Less business due to both battery recycling and battery re-use*
Cell component suppliers	• *Less dependence on the rare materials: Cobalt, Lithium…*	• *Less business due to both battery recycling and battery re-use*
Cell suppliers	• *Less dependence on the cell component supply chain*	• *Less business due to both battery recycling and battery re-use*
Battery pack suppliers	• *Less dependence on cell supply chain located mostly in Asia today*	• *Less business due to both battery recycling and battery re-use*
Customers	• *Lower price of battery* • *Less dependence on the battery supply chain*	• *Life time of the battery*
OEM (Car Manufacturer)	• *Depending on the future legislation the OEM will may be not in charge of recycling*	• *Manage the proper warranty of the old battery*
Fleet management companies (B2B)	• *Sales of old batteries*	• *Could be responsible of the old battery during the 2nd life*
Car sharing companies (B2C)	• *Sales of old batteries*	• *Could be responsible of the old battery during the 2nd life*
Remanufacturers	• *New business: cell, module and pack test and re-packed*	• *Competition of new remanufacturing companies entering the market* • *Investment have to be made to enter the business*
Recyclers		• *Postpone battery availability for recycling*
Logistics providers *carriers & transporters*	• *More business due to increase transportation needs of reverse logistics*	• *More risk related to transport and storage of old batteries* •
Car Dismantlers	• *More business if they manage the battery dismantling*	• *Invest to create specific areas for batteries dismantling*

Table 2. Main actors' side-effects table for Reusing Battery (B2B)

3.3 Side effect and positive impact by actors for Metal parts (Remanufacturing)

Table 3 summarizes pros and cons of new metals remanufacturing business model for involved actors.

N**ew part supplier** and **steel works** and will experience business decrease due to higher use of remanufactured parts compared to new ones. On the other hand, new parts suppliers may be involved in the metal part remanufacturing.
Metal raw material suppliers will be penalized due to the lower need of new metals for new products. but, due to the loss of performance of remanufactured metals, it is are not significantly impacted because metal parts that are not reused are send for recycling today.
For **OEM & car workshop**, which are the main target of re-designed concept, there will be an increase of product portfolio with the aim of new Circular Vehicle design with possibility of upgrading and maintaining the parts. In addition, there will be a fulfilment of CO2 reduction regulation on manufacturing the vehicles with using reused and remanufactured parts for OEM. OEM & car workshop will probably get remanufactured metal parts at lower cost than new parts, but they will have to deal with less quality.
The **consumer** may perceive vehicles with lower quality compared to original ones. On the other hand, the consumer could also benefit indirectly from lower service price offered by the car sharing services thanks to lower car cost.
Car sharing companies and fleet management will receive benefits with less expensive car.
From the **remanufacturing** point of view, this type of businesses will be a totally new opportunity to increase market share and profits: at the moment there is no company doing reforming of automotive parts for cars. Thus, it will be a completely new business to be undertaken by new players or by car dismantler themselves. However, those players producing remanufactured metal parts will have to manage carefully the quality due to intrinsic loss of performance induced by the process.
For **Recyclers**, they will have to wait longer to source metal parts to be recycled (the business will be postponed).
Logistics and carriers' businesses will grow due to the increased request of parts transportation (reverse logistics and flows among various supply chain actors), supported by the CarE-Service Platform.
This new business mode will cause a market loss for **suppliers of new metal parts**, due to the new circular parts acquisition strategy.
On the other hand, a new business that do not exist today will grow. The metals remanufacturing business will be carried out by new entrants or existing players like car dismantlers or metal parts suppliers. **Dismantlers** will experience benefits and opportunities for increased market share. In addition, there will also be clear social and environmental benefits due to less raw material consumption and emissions.

Actors	Pros	Cons (Side effects)
New parts providers	• *Could enter the remanufacturing metal parts business*	• *Less revenues, new competitors*
Raw material suppliers		• *Lower request of new metals for new parts due to competition of remanufactured parts*
Steel works		• *Less revenues*
OEM	• *Increase the product portfolio: New car/Vehicles with Circular Economy purpose* • *Reduce the metal part cost* • *Fulfillment of future regulations for re-manufacturing and reduce of CO2*	• *Parts with lower value and lower quality*
Consumers	• *May benefit to have lower price services thanks to lower cost car paid by the fleet management*	• *Perceive less quality cars*
Car workshop	• *Lower cost of the remanufactured metal part*	• *Have to manage the quality of the remanufacturer part*
Car sharing companies & Fleet management companies	• the upgrade of cars through remanufactured metals *will Reduce the cost*	• *Perceive less quality cars*
Remanufacturers	• *Completely new business*	*Must manage the quality of the remanufacturer part*
Recyclers		• *Less revenues or at least postponed of the business*
Logistics providers carriers & transporters	• *More business due to increase transportation needs of reverse logistics*	
Dismantlers	• *No change, if they NOT go into the re-manufacturing market*	

Table 3. Main actors' side-effects table for remanufacturing metal parts (B2B)

3.4 Side effect and positive impact by actors for Techno-polymer recycling

Currently recycled techno-polymers come from post-industrial use (i.e. they are production scrap, thus material with good technical properties because it has not been used). The novelty of the business model consists in recycling techno-polymer parts from post-consumer use. Presently, car dismantlers do not recycle techno -polymer parts for the automotive value chain, rather they sell them as spare parts or throw them away as waste. With new partnerships, there may be possibilities to create value in more ways such as through recycling of techno-polymer parts that have previously been considered waste. Remanufacturing process are not yet possible in the techno-polymer value chain since it is not possible to rework on plastics that have been damaged.

For this techno polymer recycling Business Model, the following side effects are analysed based on the table of stakeholder's effects.

The first side effect is the loss of revenues for **raw material suppliers**. Year after year, recycled polymer will increase and subtract market to suppliers of virgin raw material.

Tier one suppliers will benefit from lower cost raw material coming from recycling. It could be good for their margin and increase the product portfolio but, on the other hand, it will also add competition between product coming from new and recycled raw materials.

OEM and car workshops will increase their product portfolio and make products "greener": cars manufactured with recycled materials. Then OEM could expect lower cost for techno-polymer coming from recycling.

Car dismantler will have new opportunities to sell dismantled techno-polymer to recyclers at higher price, but they will have to invest in technical and human resources to properly selectively recover the post-consumers techno polymers.

Finally, **scrap dealers** will clearly lose business, but **logistics' providers** will increase their revenues due to an increase of transportation needs for reverse logistics.

Actors	Pros	Cons (Side-effects)
Tier 1 suppliers	• *Increase of the product portfolio with product coming from recycling*	• Less business and more competition for tiers 1 supplier due to lower cost of components made from recycling techno polymers.
Raw material suppliers		• *Less revenues, less raw material sold thanks to techno polymer recycling business*
OEM	• *Increase the product portfolio: new car/Vehicles with Circular Economy purpose* • *Could expect lower cost for techno polymer coming from recycling*	
Car workshops	• *Increase the product portfolio: new car/Vehicles with Circular Economy purpose*	

	• *Could expect lower cost for techno polymer coming from recycling*	
Car Dismantlers	• *Business opportunities to sale at higher price techno polymer to the recyclers*	• *Investment in new technologies* • *Lack of knowledge*
Recyclers	• *Big opportunities* • *Waste reduction* • *No deficit of material quality*	
Polymer scrap dealers	• *May enter the recycling business*	• *Loss of business*
Logistics providers: *carriers & transporters*	• *More business due to increase transportation needs of reverse logistics*	

Table 4. Main actors' side-effects table for techno-polymers recycling (B2B)

4 CONCLUSION

The deliverable has been focused on the side-effects generated for each re-use value chains (battery, metal and techno-polymer) as well as shared mobility services (B2C). The methodology for the identification of drawbacks and side effects consisted in the following steps:

1) first identification of drawbacks and side effects by a restricted group of partners, that combined their multi-disciplinary knowledge to identify drawbacks. In particular, the activity was led by the partner Avicenne that, by operating as a consulting company in the global market of batteries, could provide its wide business and marketing intelligence knowledge. CNR contributed in this phase by proposing and introducing a model to exhaustively identify and represent interlinked variables. Such a model consisted in two main instruments:

- Tables for the systematic identification of pros and cons of each business scenario for all involved actors
- Map of interlinked variables determining drawbacks and interrelations. Variables in the maps can be identified considering the pros and cons that emerged in the previous tables.

A workshop has been then conducted with all consortium partners in the frame of a project general assembly. During the workshop, three groups were created, each one on a specific re-use value chain. in order to analytically analyse specific drawbacks for each type of products.

The major identified side effects of the project can be summarized in a loss of business for:
- OEMs, due to less cars sold;
- Battery pack suppliers and all the battery supply chain (battery re-use decrease the need of new batteries);
- Metal parts suppliers and metal works (remanufactured metal parts will compete new parts);
- Techno-polymeric raw material suppliers (recycled techno-polymers will compete with virgin raw material).

On the other hand, circular economy in the EV car sharing services will bring major positive impacts:
- Environmental: less CO_2 consumption thanks to EV but also thanks to less battery production and metal part manufacturing from raw materials;
- Global cost decrease at all the level of the value-chain: 2nd life battery, remanufacturing metal parts and recycled techno-polymer will be cheaper; EV made with those recycled and remanufactured products will be cheaper;
- Creation of new business: battery pack dismantling, testing and remanufacturing, metal part remanufacturing, techno-polymer recycling, additional business for car dismantler, new logistics business thanks to the ICT Platform and the Smart Mobile Modules that will be realized in the project.

This Task will provide inputs for the development of economic models that can be used for the assessment of socio-economic impacts of new circular business models in T2.4: “Socio-economic simulation of new services and business models”.

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Review of the Deliverable

D 2.3 - Risk management and identification of side-effects

Reviewer Name	Brenda Nansubuga
Reviewer Organization	Linköping University
Deliverable lead beneficiary	Avicenne
Due date of the deliverable	2019-11-30
Received date of the deliverable by the lead beneficiary	2019-12-05
Submission date of the review	2019-12-05
Overall Assessment of the deliverable	◯ The required level of quality is met, and the deliverable put forward additional insights which can be beneficial for the progress of the project. ◯The required level of quality is met perfectly and no major improvement is needed. I suggested some minor improvements. X The required level of quality is met but there are major improvements to be made before submission of the deliverable. ◯ In order to meet the required level of quality of the deliverable, I have major concerns that may delay the submission of the deliverable.

Review assessment

1. Is the information contained in the deliverable technically sound and complete?

◯ Yes X Can be improved

Comments/suggestion/specifications:

2. Is any critical information missing in the content of the deliverable?

X No ◯ Yes

Comments/suggestion/specifications:

3. Does the deliverable compliant with the relevant project objectives, targets and KPIs related to its topic?

◯ Clearly stated and compliant ◯ Clearly stated but compliancy can be improved
X Not clearly stated but compliant ◯ Not clearly stated and compliancy can be improved
◯ Other responses, please state:

Comments/suggestion/specifications:

4. Does the objective of the deliverable is clearly stated and compliant with the relevant project objectives, targets and KPIs related to its topic?

◯ Clearly stated and compliant ◯ Clearly stated but compliancy can be improved
X Not clearly stated but compliant ◯ Not clearly stated and compliancy can be improved
◯ Other responses, please state:

Comments/suggestion/specifications:

5. Does the method of the deliverable is clearly stated and appropriate for the scope and objective of the deliverable?

XClearly stated and appropriate ◯ Clearly stated but can be improved
◯ Not clearly stated but appropriate ◯ Not clearly stated and can be improved
◯ Other responses, please state:

Comments/suggestion/specifications:

6. Does the key messages and results of the deliverable are clearly stated and compliant with the relevant project objectives, targets and KPIs related to its topic?

◯ Clearly stated and compliant ◯ Clearly stated but compliancy can be improved
◯ Not clearly stated but compliant X Not clearly stated and compliancy can be improved

◯ Other responses, please state:

Comments/suggestion/specifications:

7. Does the layout of the deliverable is compliant with the project template?

X Compliant ◯ Can be improved

Comments/suggestion/specifications:

The dissemination level of this Deliverable is supposed to be public, therefore the template for public Deliverables should be used.

8. Does the language style of the deliverable meet the required quality level?

◯ Yes X Can be improved

Comments/suggestion/specifications:

Only minor explanations and clarifications are requested to better specify some concepts and ideas.

9. Can the deliverable benefit from additional stakeholder expectations (consortium or external stakeholder expectations such e.g. consumers or other value chain stakeholders)?

◯ The deliverable is completely aligned with both consortium and external expectations
X The relevance of additional expectations can be added to the deliverable

Comments/suggestion/specifications:

10. Does the illustrations, drawing and tables of the deliverable clear and comprehensive?

◯ Yes X Can be improved

Comments/suggestion/specifications:

11. Does the abbreviations, references and/or formulas of the deliverable clear and comprehensive?

X Yes ◯ Can be improved

Comments/suggestion/specifications:

CarE-Service

This project has received funding from the European Horizon 2020 research and innovation programme under the grant agreement No 776851

Review of the Deliverable

D 2.3 - Risk management and identification of side-effects

Reviewer Name	Alessandra Melchioni
Reviewer Organization	E-VAI / FNM Group
Deliverable lead beneficiary	AVICENNE
Due date of the deliverable	30.11.2019
Received date of the deliverable by the lead beneficiary	26.11.2019
Submission date of the review	29.11.2019
Overall Assessment of the deliverable	**X** The required level of quality is met, and the deliverable put forward additional insights which can be beneficial for the progress of the project. ◯The required level of quality is met perfectly and no major improvement is needed. I suggested some minor improvements. ◯ The required level of quality is met but there are major improvements to be made before submission of the deliverable. ◯ In order to meet the required level of quality of the deliverable, I have major concerns that may delay the submission of the deliverable.

Review assessment E-VAI

12. Is the information contained in the deliverable technically sound and complete?

X Yes ◯ Can be improved

Comments/suggestion/specifications:

13. Is any critical information missing in the content of the deliverable?

X No ◯ Yes

Comments/suggestion/specifications:

14. Does the deliverable compliant with the relevant project objectives, targets and KPIs related to its topic?

X Clearly stated and compliant ◯ Clearly stated but compliancy can be improved
◯ Not clearly stated but compliant ◯ Not clearly stated and compliancy can be improved
◯ Other responses, please state:

Comments/suggestion/specifications:

15. Does the objective of the deliverable is clearly stated and compliant with the relevant project objectives, targets and KPIs related to its topic?

X Clearly stated and compliant ◯ Clearly stated but compliancy can be improved
◯ Not clearly stated but compliant ◯ Not clearly stated and compliancy can be improved
◯ Other responses, please state:

Comments/suggestion/specifications:

16. Does the method of the deliverable is clearly stated and appropriate for the scope and objective of the deliverable?

X Clearly stated and appropriate ◯ Clearly stated but can be improved
◯ Not clearly stated but appropriate ◯ Not clearly stated and can be improved
◯ Other responses, please state:

Comments/suggestion/specifications:

17. Does the key messages and results of the deliverable are clearly stated and compliant with the relevant project objectives, targets and KPIs related to its topic?

X Clearly stated and compliant ◯ Clearly stated but compliancy can be improved
◯ Not clearly stated but compliant ◯ Not clearly stated and compliancy can be improved

◯ Other responses, please state:

Comments/suggestion/specifications:

18. Does the layout of the deliverable is compliant with the project template?

X Compliant ◯ Can be improved

Comments/suggestion/specifications:

The dissemination level of this Deliverable is supposed to be public, therefore the template for public Deliverables should be used.

19. Does the language style of the deliverable meet the required quality level?

X Yes ◯ Can be improved

Comments/suggestion/specifications:

Only minor explanations and clarifications are requested to better specify some concepts and ideas.

20. Can the deliverable benefit from additional stakeholder expectations (consortium or external stakeholder expectations such e.g. consumers or other value chain stakeholders)?

X The deliverable is completely aligned with both consortium and external expectations
◯ The relevance of additional expectations can be added to the deliverable

Comments/suggestion/specifications:

21. Does the illustrations, drawing and tables of the deliverable clear and comprehensive?

X Yes ◯ Can be improved

Comments/suggestion/specifications:

22. Does the abbreviations, references and/or formulas of the deliverable clear and comprehensive?

X Yes ◯ Can be improved

Comments/suggestion/specifications: