INDICATORS AND METHODS FOR MEASURING TRANSITION TO CLIMATE NEUTRAL CIRCULARITY

Task 5: Case-study group H1

Report for: DG RTD, Directorate B – Healthy Planet, Unit B1: Circular Economy & Biobased Systems

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1. INTRODUCTION

The transition to a circular economy (CE) needs to occur on multiple levels, from households and individual consumers to national and cross-border ecosystems. Measuring and monitoring the development of this transition is an ambitious task and is ideally supported by indicators relevant to all steps in that process.

This case-study is one of 19 developed for a research project into "*Indicators and methods for measuring transition to climate neutral circularity, its benefits, challenges and trade-offs*". It provides a detailed summary of the development and testing programme conducted for Group 1 of the 'Households' sub-policy area during Task 5 of the project. The main purpose of this case-study is:

1. Provide an overview of the testing and monitoring method adopted for each indicator.
2. Outline the key results and performance of each indicator.
3. Highlight any challenges or lessons learnt from the identification, planning, delivery and analysis of the relevant methodology for each indicator.

The aim of Task 5 is to take the learnings of all other Tasks thus far and develop and test the new indicators identified in Tasks 3 and 4 as having potential to enable a deeper understanding of the 3 facets of circularity for the five key approaches. This case-study is a direct output of Task 5.

This case-study focuses on the following 6 indicators outlined in Table 1.

Table 1. Overview of case-study Group 1

URN		Indicator name	Methodology	Level of implementation				
				European Union (EU)	National	City / Region	Companies	Household
H1	**1**	Use of private vehicles, as a percentage of kilometres travelled per person	Citizen's survey			x		x
H3	**2**	Share of household income spent on service models rather than related ownership of goods	Citizen's survey			x		x
H4	**3**	Level and perception of peer-to-peer use and sharing across a range of products/ materials	Citizen's survey			x		x
H5	**4**	Items of clothing repaired by households per year	Citizen's survey			x		x
H7	**5**	Household spending on maintenance and repair, across priority product and material streams	Citizen's survey			x		x
H10	**6**	Unused household goods, across priority products and material streams	Citizen's survey			x		x

2. INDICATOR 1: USE OF PRIVATE VEHICLES, AS A PERCENTAGE OF KILOMETRES TRAVELLED PER PERSON

This indicator aims to measure the use of private vehicles, as a proportion of the total distance travelled per person. In order to gain a deeper understanding of the travel activities of citizens, the indicator also aims to identify the popularity, in terms of use, of other modes of transport at a regional/city level.

A private vehicle refers to any motorised vehicle which is used primarily for the purposes of the person who owns it or of a person otherwise having the right to use it (Law Insider, 2024), including but not limited to private cars and vans, rental cars and transport vehicles. This excludes buses, trams or other means of commercial transportation for hire.

If cities/regions where private vehicles account for a large proportion of travel can be identified, it allows for effort to be directed into changing this. Furthermore, observations can be made to identify potential factors that cause this, especially when comparing with cities/regions where private vehicle use accounts for a small proportion of travel. This could include assessing public transport infrastructure or circular urban design options.

The benefits of monitoring this indicator include:

- Helps to gain a better and proportional understanding of private vehicle use.
- Helps to gain a better understanding of regional differences associated with private vehicle use.
- Allows for future changes in behaviour to be observed and analysed.
- Focuses on strategies that are higher up in the waste hierarchy (e.g. reducing emissions from private vehicle use, preventing private vehicle ownership, etc.).

2.1 KEY METHODOLOGY

2.1.1 Testing method

The system boundary for this indicator is outlined as all private vehicle journeys for both commuting and personal/leisure travel, whether this be as the sole operator of the vehicle or as a passenger.

A citizen's survey was used to measure this indicator. This methodology was selected with an aim of quantifying the behaviours of citizens across the different regions/cities, allowing for analysis of the current values associated with the indicator, as well as allowing progress to be mapped over time with further consistent and systematic surveys. To ensure statistically reliable and useful outputs, the results from the survey were weighted to account for regional/city population sizes to accurately represent the Member State as a whole. The geographical boundary for the testing of this metric was Germany, with a level of granularity to identify different trends and behaviours across different regions/cities within the Member State. Germany was selected for the testing of this indicator due to its extensive and reliable public transport network, as well as the large role the automobile industry plays and the high rate of private vehicle ownership in the country[1].

2.1.2 Data collection method

In order to test this indicator, the following data inputs were requested from respondents for 2023:

- Distance travelled per week across all modes of transport (private vehicle, bus, tram, train, car share scheme, bicycle, foot, plane, taxi, other).
- Proportion of distance travelled per week using a private vehicle.

[1] Federal Ministry of Education and Research, Mobility. (Research in Germany, n.d.) https://www.research-in-germany.org/en/plan-your-stay/living-in-germany/mobility.html#:~:text=Although%20Germany%20is%20considered%20a,most%20efficient%20mode%20of%20transport. Accessed: April 2024.

- Proportion of distance travelled per week using other modes of transport.

The data informing this analysis, and the conclusions drawn from it, were gathered in a nationally representative survey of citizens in Germany, conducted by YouGov Plc for the sole purpose of this project. The total sample size was 2,273 adults, and the survey was undertaken between 28th February - 1st March 2024. The survey was carried out online. The figures have been weighted in accordance with the national demographic breakdown and are therefore representative of all German adults (aged 18+).

To maximise efficiencies across all indicators using a citizen's survey, one nationally representative survey was sent out across Germany, which covered the following indicators. Table 1 below lists the indicators which were included in this overall survey.

Table 1. Indicators included within the 'Vehicles, Electronics & ICT' citizen survey.

URN	Indicator name
H1	Use of private vehicles, as a percentage of kilometres travelled per person, at regional/city level.
EICT1	Percentage of citizens who, having required household electrical items and communications equipment, have chosen alternatives to buying new (sharing or leasing schemes, refuse, reuse, repair).
BV1	Car-sharing frequency rates.

Table 2 shows the breakdown of this at a city/regional level.

Table 2. Breakdown of responses per region/city.

Name of region/city	Percentage of sample (%)
Bremen, Hamburg, Niedersachsen, Schleswig-Holstein	16
Nordrhein-Westfalen	22
Hessen, Rheinland-Pfalz, Saarland	14
Baden-Württemberg	13
Bayern	16
Berlin	4
Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt	8
Sachsen, Thüringen	8
Total	**100**

Table 3 shows a breakdown of the respondents by monthly household income.

Table 3. Breakdown of responses per household income bracket.

Monthly household income (€)	Percentage of sample (%)
Less than 500	3
500 – 1,000	6
1,000 – 1,500	9
1,500 – 2,000	9
2,000 – 2,500	10
2,500 – 3,000	8
3,000 – 3,500	7
3,500 – 4,000	7
4,000 – 4,500	6
4,500 – 5,000	5
5,000 – 10,000	9
10,000 and above	3
Prefer not to say	17

Please refer to Appendix 8.1 to view the survey script. Please note, the survey was translated into German before dissemination by YouGov.

2.1.3 Calculations

No calculations were needed to investigate this indicator. Instead, the percentage of journeys undertaken in a private vehicle was asked directly within the citizen's survey.

2.1.4 Timeline

The project timeline is show in Table 4.

Table 4. Gantt chart for H1

WC	18-Dec	25-Dec	01-Jan	08-Jan	15-Jan	22-Jan	29-Jan	05-Feb	12-Feb	19-Feb	26-Feb	04-Mar	11-Mar	18-Mar	25-Mar
Task 1 - Define private vehicles to be included															
Task 2 - Develop online survey															
Task 3 - Disseminate online survey															
Task 4 - Explore backup datasets (if necessary)															
Task 5 - Create Excel model															
Task 6 - Survey analysis & calculations															
Task 7 - Analysis of themes															
Task 8 - Case study write up															
Review period															
Key deliverables				Online survey									Initial draft case study		Draft case study

Legend

Task progress | Christmas holiday | Review period | Key deliverable

2.1.5 Data gaps and mitigation

A data gap regarding the level of results of the citizens survey was identified during the testing process. Whilst the indicator was originally planned to monitor the level of private vehicle use at a household level, the survey was instead authored to gain results at a citizen level. Whilst this deviated from the original plan, it is assumed that the accuracy of the data provided is much higher than if respondents were asked about their household travel activities. This is due to the likelihood of estimations being required by some respondents when providing details of those they share a household with.

Table 5. Overview of identified data gaps, limitations and mitigation efforts.

	Description of data gap	Mitigation efforts	Level of confidence
1	Citizen's survey data results are not at a household level.	• Results instead used citizen level data, which is assumed to have a higher degree of accuracy than household data should it be collected.	High

2.1.6 Quality review of analysis

To ensure robust and high-quality analysis of the data, the following QA procedure was conducted:

- Prior to work beginning, the Project Director reviewed the proposed research methodology and ensure that the data collection plan is fit for purpose. Only once the research team had addressed any comments from the review process did they proceed to the data collection phase.
- In relation to the survey development and dissemination, Project Manager reviewed the line of questioning for this indicator to ensure that it was clear, followable and able to generate reliable and robust results. In addition to this, respondents were also required to answer each question before being able to move on to ensure data validation of the survey.
- Once the survey has closed and the results had been analysed, the Quality Assurance Manager conducted a thorough internal quality assurance process on the Excel data set which pulled together the data from the survey and subsequent calculations. Any incoming data and assumptions were clearly logged, presenting survey data, user inputs, calculations, assumptions and results.

2.2 KEY ANALYSIS RESULTS

2.2.1 Analysis

On average across all the regions included in the survey, when asked how many kilometres citizens travelled per week in 2023, 9% said they travelled 0 - 5km, 10% 6 - 10km, 13% 11 - 20km, 18% 21 - 50km, 34% 50+ km, and 15% either did not know or could not recall. The most common distance for all regions except Berlin was 50+km.

Figure 1. Average distance travelled per week (km) across all modes of transport, broken down per region/city (2023).

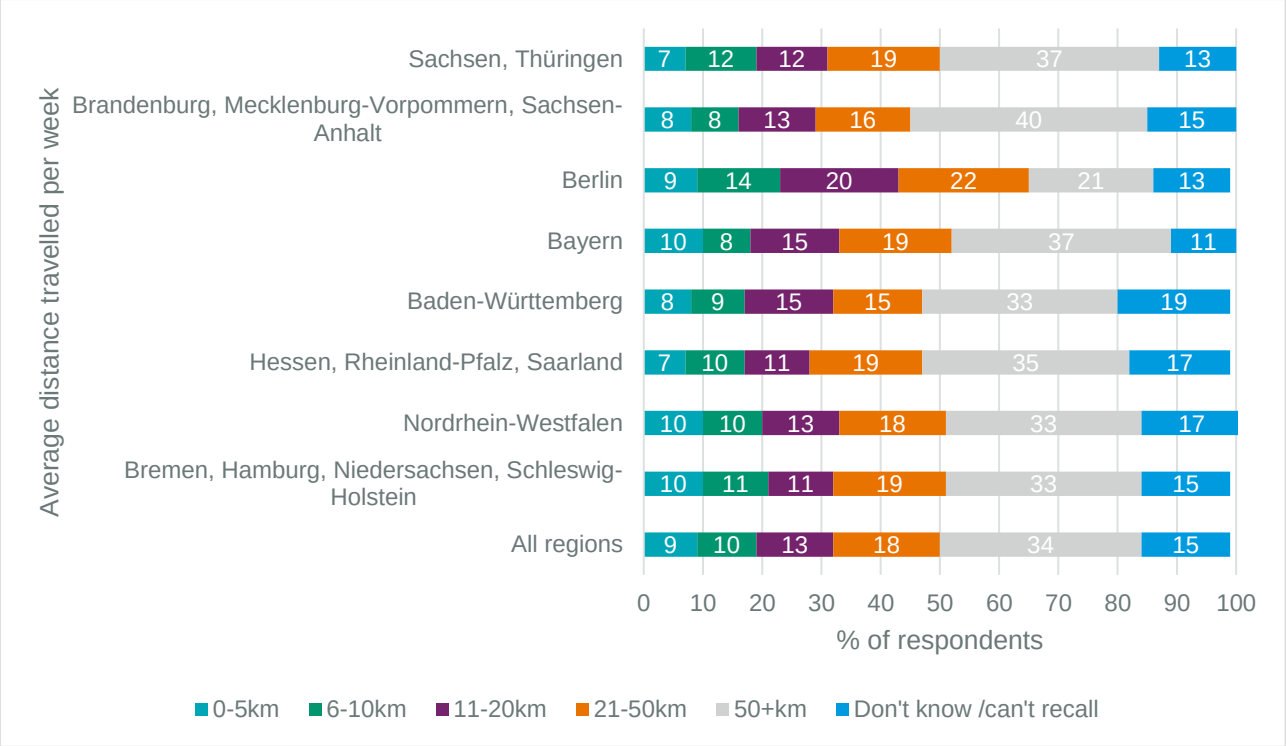
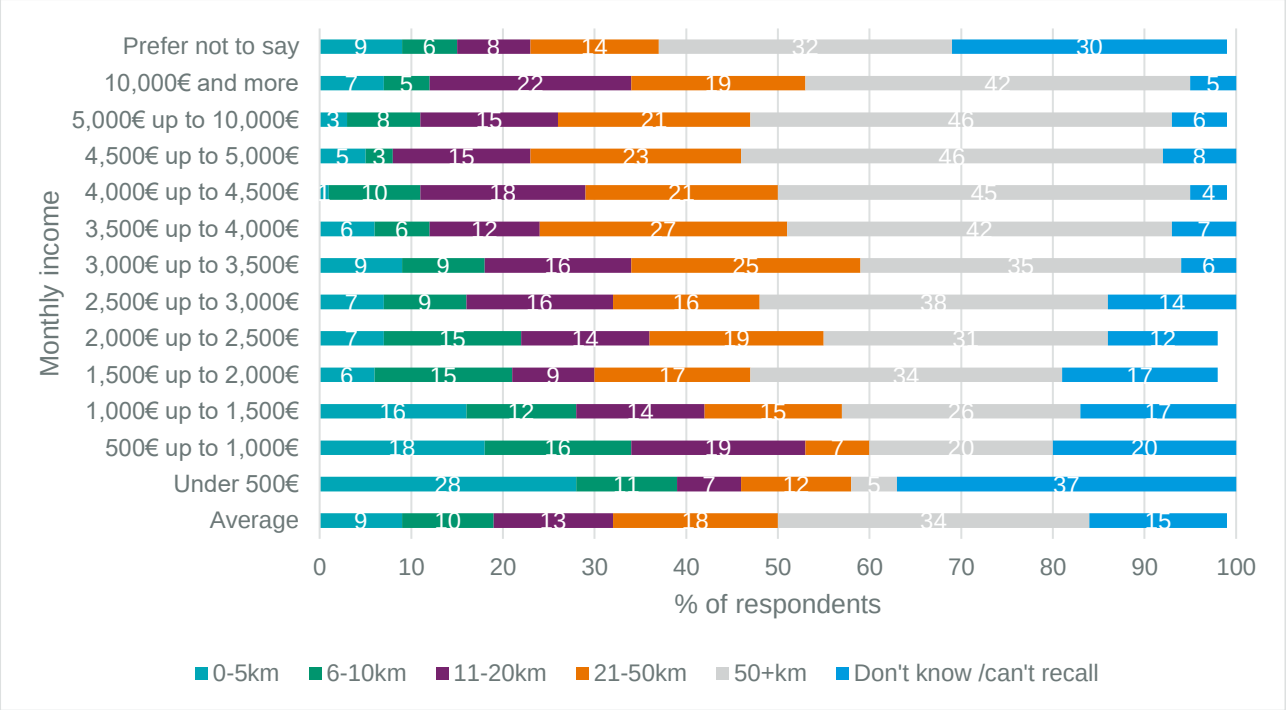


Figure 2 shows the average distance travelled per week in relation to household income across the whole of Germany. Those with a household income of less than €500 a month were most likely to travel the shortest distances, with 28% travelling between 0 - 5km per week. Whilst those with higher household incomes were more likely to travel further distances, with 46% of those earning between €4,500 - €5,000 and €5,000 - €10,000 a month travelling over 50km per week. The results in this figure suggest a correlation between economic income and mobility, whereby the households with higher monthly incomes are more mobile.

Figure 2. Average distance travelled per week (km) across all modes of transport, in relation to household income (2023).



As Figure 3 below displays, across the whole of Germany, 45% of respondents said travelling in private vehicles accounted for between 81 - 100% of the distance they travelled. However, whilst this was the most commonly selected answer across seven of the eight sampled regions/cities, Berlin was the anomaly with only 15% of respondents selecting this. Across Berlin, the most common response was 0% of distance travelled was in a private vehicle, with 21% of respondents selecting this answer. This response likely reflects the high levels of urban density seen in Berlin, as well as its extensive and reliable public transport system, suggesting that infrastructure and urban planning can significantly impact and negate the need for private vehicle use.

Figure 3. Proportion of weekly travel undertaken in private vehicle, broken down per region/city (2023).

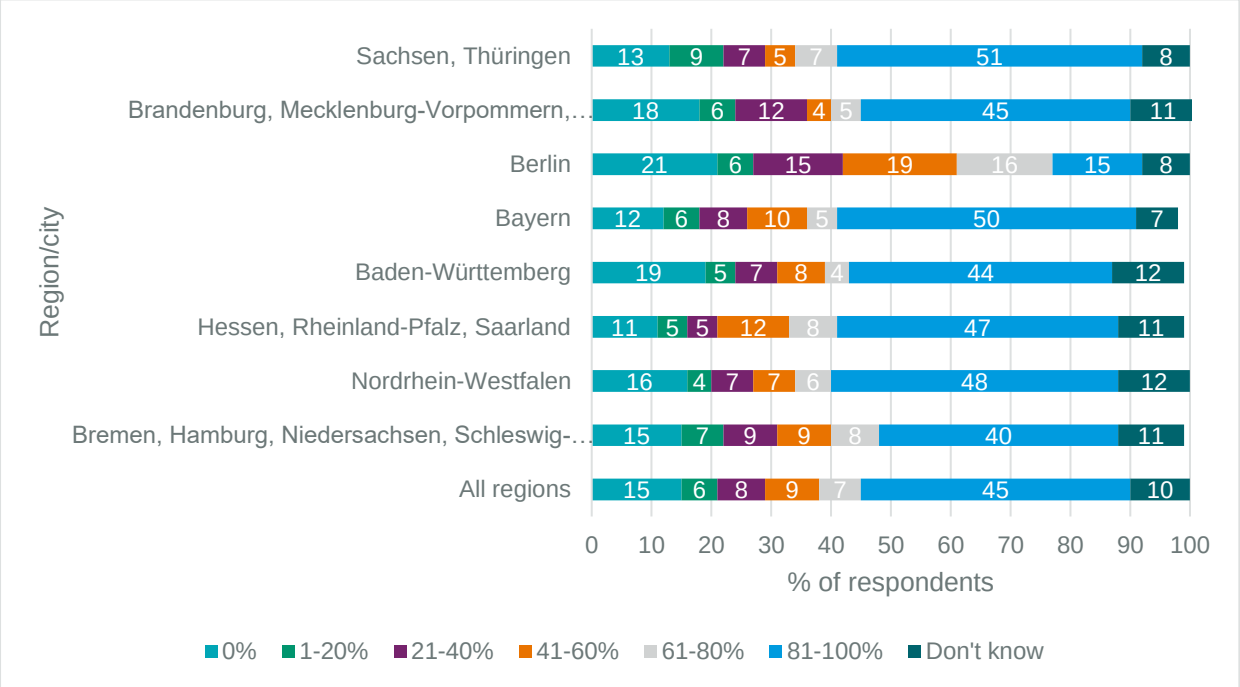
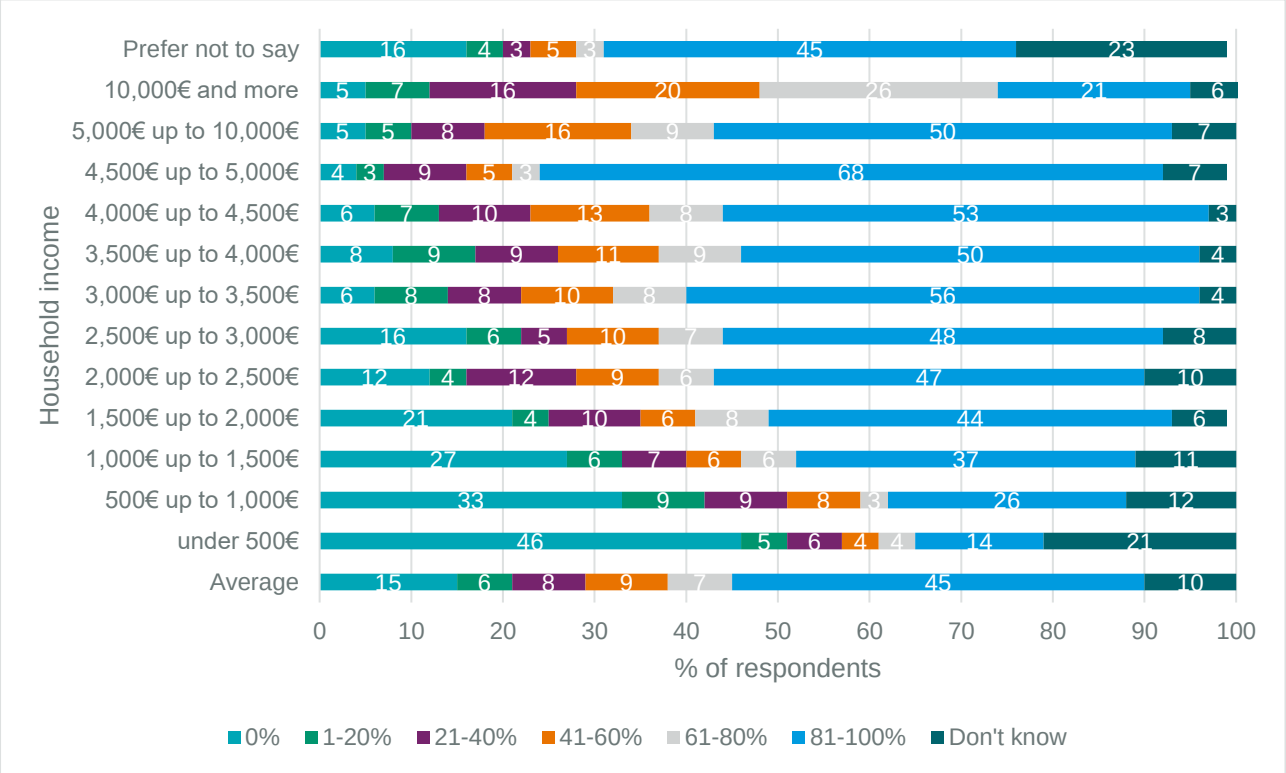


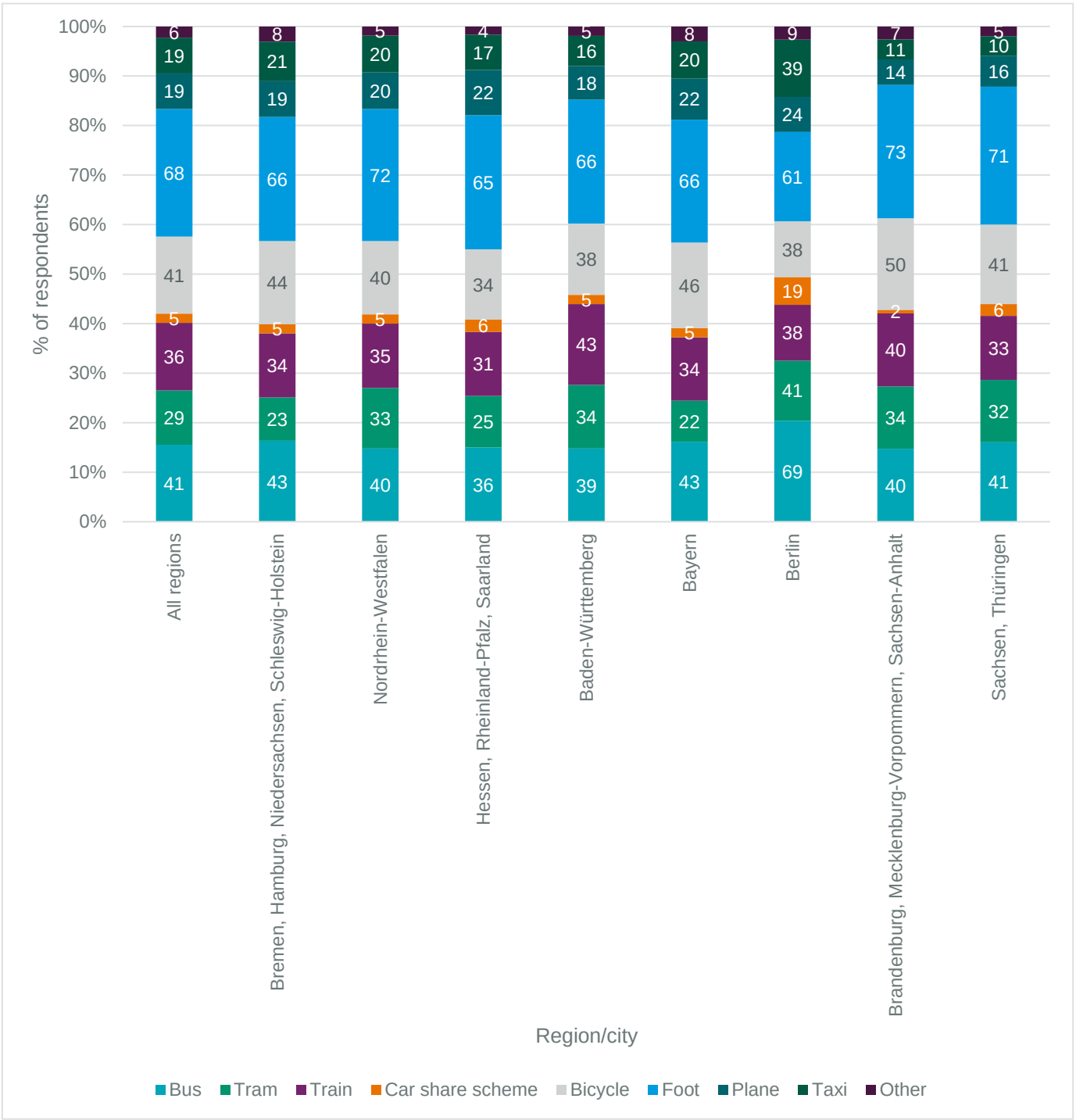
Figure 4 below shows that those coming from households with lower incomes tend to undertake a smaller proportion of their travel in a private vehicle, with 46% of respondents earning under €500 a month not using a private vehicle for any travel. On the other hand, the proportion of respondents using a private vehicle for 81 - 100% of their travel generally increased as household income increased, peaking at 68% for those with a household income between €4,000 – 4,500 per month. This figure dropped significantly to 21% for those with a monthly household income of €10,000 and more. It may be suggested that this drop is a result of a lifestyle choice, whereby those with the highest household income are able to make transport choices more freely, based on preference rather than cost or availability.

Figure 4. Proportion of weekly travel undertaken in private vehicle in relation to household income.



As seen in Figure 5, travelling by foot was the most commonly used alternative across Germany as a whole, with 68% of respondents stating they had used this mode of transport in 2023. However, Berlin was once again the exception to the trend by being the only region/city that didn't have the largest proportion of respondents choosing this mode of transport. Instead, 69% of respondents from Berlin stated that they had used buses, compared with 61% that said they had travelled by foot. Similarly, 19% of respondents form Berlin had used a car share scheme in 2023, whilst only 6% of respondents from the Sachsen, Thüringen and Hessen, Rheinland-Pfalz, Saarland regions had used a similar scheme – the next highest-ranking regions.

Figure 5. Alternative modes of transport used, broken down by region/city (2023).



2.2.2 Limitations

The following limitations have been identified through the testing programme:

- Due to time constraints, regional data was only able to be collected and analysed within one Member State (i.e. Germany). This meant that results could be compared only from the specific regions within Germany, rather than specific regions within two Member States.
- After an initial review of the proposed questions for the citizens survey, it was recommended by YouGov (the survey disseminator) to offer a range of answers to respondents (i.e. options of 0 - 5km, 6-10km, etc.), rather than allowing them free reign and offering a blank text box. Due to the

experience that YouGov have in carrying out this type of survey, this recommendation was followed. Whilst this likely reduced the amount of estimations from respondents, it also likely meant that some responses received were less accurate than they could have been otherwise.

- As the results in Table 2 show, an even split of responses across the sampled regions/cities was unable to be guaranteed. This meant there was a higher proportion of responses based in in some regions (e.g. 4% of respondents were from Berlin compared to 22% in Nordrhein-Westfalen). In turn, this had reduced the robustness of the results received and resulting comparisons made. In future, it is recommended that the European Commission (EC) employs a process that can guarantee an even split of respondents across the sampled regions.
- The use of self-reported data may have introduced recall bias, and potentially social desirability bias. The respondents may not have accurately remembered how much they used private vehicles, or they may have reported what they think is socially acceptable (rather than their actual practices).
- The survey fails to capture the reasoning behind the use of different modes of transport (e.g. cost, accessibility, sustainability), meaning although trends can be spotted and assumptions can be made, it is unable comprehensively understand what factors are influencing the behaviour of respondents.
- The indicator fails to fully account for the variability in factors such as the availability of public transport, which can have a significant impact on transport behaviours.

2.2.3 Performance

During Task 4 of this study, the original indicator, titled “Use of private vehicle in city” was given a score of 12 in the RACER evaluation process. Following Task 5, the indicator once again awarded a score of 12, due to performing higher than initially expected for the criterion ‘Ease’, whilst also performing lower than expected for the criterion ‘Credibility’. Whilst the higher ‘Ease’ score was due to the relative simplicity of developing and disseminating the citizen’s survey, the credibility of this data may come into question due to the indicator not currently being commonly measured by citizens, and therefore likely involving a small element of estimation.

Table 6. RACER evaluation.

Stage of project	RACER criterion					Score
	Relevance	Acceptability	Credibility	Ease	Robustness	
Task 4 (original RACER assessment)	3	2	3	2	2	12
After Task 5 (following testing)	3	2	2	3	2	12

To ensure consistency in applying RACER, the assessment matrix shown in Appendix 8.2 was applied to support the decision making process.

2.2.4 Challenges

The lack of an official definition for ‘private vehicles’ was identified as the first challenge for the team. Whilst this was not a significant challenge due to the presence of definitions from other sources and the relative lack of ambiguity of the term; should the EC take this indicator further in future, it would be useful to develop a definition of this term to ensure consistent and targeted reporting of the indicator.

Another challenge faced by the team was the task of disseminating the citizen’s survey and in turn receiving reliable and trustworthy results from a large enough sample in a relatively small period of time. In order to overcome this challenge, a third-party organisation was commissioned to disseminate the

survey, with the team still having full control over the questions being asked. Whilst this did overcome the challenge the team was facing; it also came at an extra cost which should not be overlooked when considering future data collection associated with this indicator.

2.2.5 Lessons learned

Lessons learnt were recorded throughout the process of creating and testing this indicator, which may be applied to inform future assessments of indicators including:

- For indicators which are based on data from citizen surveys, a judgement needs to be made at the early stages of testing as to what level of data granularity is required. There is a direct trade-off between the level of granularity asked for and the burden on the respondent to answer the questions. Asking for actual numbers within an open-ended question format is a more burdensome approach and could lead to missing data, however it would result in more granular data. In comparison, using numerical ranges within a closed-ended question format would provide less granular data, but would alternatively be easier/quicker for the respondent to complete, which would likely result in higher response rates. Considering this, it is recommended to disseminate citizen surveys via a platform who can guarantee reaching the pre-determined response rate.

2.3 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that this indicator is considered for further development, with minor work required to facilitate its progress.

Reducing the use of private vehicles is an essential step for the EC to achieve a truly CE across its Member States. Whilst there tends to be an increasing focus placed on ensuring vehicles are designed and disposed of in a circular fashion (such as through the proposed regulation on circularity requirements for vehicle design and management of end-of-life vehicles), this indicator would look at the manner in which they are currently used, and learnings could be taken on how to minimise their use in future.

In order to access the data required to measure this indicator, a citizen's survey was essential. However, as key data inputs are not currently commonly recorded amongst citizens (such as average weekly distance travelled and the proportion of this undertaken using different modes of transport), it is recommended that citizens participating in surveys going forward are given more time to complete the survey in order for more accurate measurements to be made, especially if providing data for their whole household. Whilst YouGov was used in the testing of this indicator, it may be more cost efficient to integrate the questions into the regularly circulated EU-wide consumer surveys that the EC currently conduct.

Further, the use of GPS or mobile tracking may also be considered for the monitoring of this metric in future. This method would provide accurate, real-time travel data of participants, reducing inaccuracies associated with self-reported data.

The indicator would also benefit from the development of a clear, EU-wide definition of the term 'private vehicle'. This will help to ensure accurate and consistent reporting in future.

In order to support the implementation of this indicator, it is recommended that a new target is established to monitor the use of private vehicles. This target would also be in line with The European Green Deal[2] target of achieving a 90% reduction in transport-related greenhouse gas emissions by 2050.

In setting this target, it is also recommended that benchmarks for urban and rural areas, or even specific regions/cities are developed. It is likely that urban areas with have a higher population density, better

[2] European Commission, The European Green Deal. (Official website of the European Union, 2024). https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en#:~:text=The%20European%20Commission%20has%20adopted,Delivering%20the%20European%20Green%20Deal. Accessed April 2024.

public transport, and more travel options, all of which potentially lead to lower private vehicle usage. Conversely, rural areas offer suffer from poor public transport connections and greater distances between destinations, leading to a higher reliance on private vehicles. Therefore, without adjusting for these differences, comparisons of data from different regions may not be possible, with higher private vehicle use in rural areas being interpreted as preference as opposed to necessity due to a lack of alternatives modes of transport available.

To support the improvements in the performance of this indicator, it is recommended that legislation incentivising the use of public transport and other more environmentally modes of transport is implemented across Member States. This would build on existing work including 'The Sustainable and Smart Mobility Strategy (European Commission, 2024) and the 'European Urban Mobility Framework' (European Commission, 2021). On a similar note, guidance should be developed and provided to local and national authorities detailing how to make positive changes to discourage the use of private vehicles for more environmentally friendly alternatives, included in this may be guidance on how to implement congestion charges, low-traffic neighbourhoods, or suggested infrastructure improvements such as increased bus and cycle lanes.

Member States and regional authorities may look to Estonia's capital of Tallinn for inspiration, where fare-free public transport (FFPT) was introduced for residents in 2013. After just three months, it was found that the modal share of public transport had increased by 3%, with car use decreasing by 5%. Further analysis found that the modal share of public transport increased by 23% in low income, out of education and unemployed socio-economic groups.

Should this indicator be implemented, it is recommended that results are collected on an annual basis so the impacts of the aforementioned recommendations can be assessed and altered on a yearly basis where necessary.

Following the testing of this indicator, it was found that its original name was fit for purpose and that no variation was needed.

The implementation of this indicator would directly relate to the following macro level indicator within the new EU monitoring framework:

- **Consumption footprint:** i.e. the environmental impacts of EU and Member States consumption by combining data on consumption intensity and environmental impacts of representative products, with the indicator covering mobility as an area of consumption. Minimising private vehicle use will reduce the EU and Member State consumption footprint if private vehicle ownership is also reduced.

Table 7. Summary of recommendations for H1.

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Legislation	Incentives encouraging the use of public transport and other more eco-friendly forms of transport.	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** National governments. • **Consulted:** National governments, public transport providers, citizens. • **Informed:** All stakeholders within EU transport industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
Development of guidance	Develop guidance on how cities/regions can improve their infrastructure and encourage alternatives to private vehicle use (e.g. making walkable cities, increasing bus and bicycle infrastructure).	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** National governments. • **Consulted:** National governments, citizens. • **Informed:** All stakeholders within EU transport industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
Data collection	Surveys should be integrated into existing EC conducted EU-wide surveys.	Short (0.5 – 1.5 years)	• **Responsible:** EC. • **Accountable:** EC • **Consulted:** National governments, citizens. • **Informed:** Citizens.	• **Ease:** The data collection process would be eased should this recommendation be implemented.
Development of benchmarks	Benchmarks should be developed to assess private vehicle use and access to alternative modes of transport across urban/rural areas (or specific regions/cities).	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** EC, National governments. • **Consulted:** National governments, local authorities, public transport providers, citizens. • **Informed:** National governments, local authorities, citizens.	• **Robustness:** The target would encourage the year-on-year monitoring of this indicator, providing more accurate results.

3. INDICATOR 2: SHARE OF HOUSEHOLD INCOME SPENT ON SERVICE MODELS RATHER THAN RELATED OWNERSHIP OF GOODS

This indicator aims to measure the average share of household income spent on service models, at a regional/city level.

A service model, sometimes referred to as product-as-a-service (PaaS) in this context refers to an access-based business model whereby consumers pay to use a good rather than purchasing it outright, through methods such as renting, leasing, or borrowing. It is a key aspect of the CE as it works to reduce the quantity of goods being produced, as well as encouraging consumers to rethink consumption habit[3].

Service models also improve choice and accessibility for consumers, who are able to afford premium products for a fraction of the regular cost. Further, as-a-service models can offer suppliers predictable, steady revenue streams, as well as giving manufacturers and suppliers the opportunity to properly maintain and repair products, keeping them operating at a higher level for longer. When products do eventually reach the end of their life, it is easier for manufacturers and suppliers to responsibly dispose of the items and retain as much value as possible through strategies such as reuse, recycling, and refurbishing.

The benefits to monitoring this indicator include:

- Will help to gain a better understanding of the current adoption of service models.
- Will help to measure the circular behaviours of households within different regions/cities.
- Will provide a deeper understanding of spending habits than using expenditure alone.

3.1 KEY METHODOLOGY

3.1.1 Testing method

Citizens surveys were used to measure this indicator. This methodology was selected with an aim of quantifying the spending habits of citizens across different regions/cities, allowing for analysis of the current values associated with the indicator, as well as allowing progress to be mapped over time with further consistent and systematic surveys. To ensure statistically reliable and useful outputs, the results from the survey were weighted to account for regional/city population sizes to accurately represent the Member State as a whole.

3.1.2 Data collection method

The following data requirements were identified in order to test this indicator:

- Monthly household income in 2023.
- Whether your household used a service model in 2023.
- Total household spend on service models in 2023.

The data informing this analysis, and the conclusions drawn from it, were gathered in a nationally representative survey of citizens in Germany, conducted by YouGov Plc for the sole purpose of this project. The total sample size was 2,273 adults, and the survey was undertaken between 28th February - 1st March 2024. The survey was carried out online. The figures have been weighted in accordance with the national demographic breakdown and are therefore representative of all German adults (aged 18+). Table 8 shows the breakdown of this at a city/regional level.

[3] World Economic Forum, What is an access-based business model and how can it tackle waste and protect resources? (World Economic Forum, April 2022). https://www.weforum.org/agenda/2022/04/access-based-business-model-tackle-waste/. Accessed 17th March 2024.

Table 8. Breakdown of responses per region/city.

Name of region/city	Percentage of sample (%)
Bremen, Hamburg, Niedersachsen, Schleswig-Holstein	16
Nordrhein-Westfalen	22
Hessen, Rheinland-Pfalz, Saarland	14
Baden-Württemberg	13
Bayern	16
Berlin	4
Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt	8
Sachsen, Thüringen	8
Total	**100**

Table 9 shows a breakdown of the respondents by monthly household income.

Table 9. Breakdown of responses per household income.

Monthly household income (€)	Percentage of sample (%)
Less than 500	3
500 – 1,000	6
1,000 – 1,500	9
1,500 – 2,000	9
2,000 – 2,500	10
2,500 – 3,000	8
3,000 – 3,500	7
3,500 – 4,000	7
4,000 – 4,500	6
4,500 – 5,000	5
5,000 – 10,000	9
10,000 and above	3
Prefer not to say	17

Appendix 8.3 contains the survey script for H3.

3.1.3 Calculations

After consolidating the raw survey data on a Microsoft Excel document, the team carried out the following calculations:

$$Total\ household\ income = (Midpoint\ of\ monthly\ household\ income) \times 100$$

$$The\ share\ of\ household\ income\ spent\ on\ service\ models\ each\ year = \left(\frac{Midpoint\ of\ mode\ household\ income\ spent\ on\ service\ models}{Total\ household\ income}\right) \times 100$$

The raw survey data and subsequent analysis can be viewed in Appendix 8.4.

3.1.4 Timeline

The project timeline is show in Table 10.

Table 10. Gantt chart for H3

WC	18-Dec	25-Dec	01-Jan	08-Jan	15-Jan	22-Jan	29-Jan	05-Feb	12-Feb	19-Feb	26-Feb	04-Mar	11-Mar	18-Mar	25-Mar
Task 1 - Agree on service models to be used															
Task 2 - Develop online survey															
Task 3 - Disseminate online survey															
Task 4 - Explore backup datasets (if necessary)															
Task 5 - Create Excel model															
Task 6 - Survey analysis & calculations															
Task 7 - Analysis of themes															
Task 8 - Case study write up															
Review period															
Key deliverables				Online survey									Initial draft case study		Draft case study

Legend

Task progress | Christmas holiday | Review period | Key deliverable

3.1.5 Data gaps and mitigation

Prior to data collection, it was decided that there were some data inputs which were not feasible to accurately collect in the relatively short period of time available. It was felt that respondents to the citizen's survey would not be able to accurately provide figures relating to their household's overall annual spend on goods and services, specifically purchases of goods that were also available for purchase through service models. Therefore, it was decided that household income would instead be collected for the nature of this testing programme and it is recommended that this approach is continued should the indicator progress further.

Table 11 provides an overview of the identified data gaps for this testing programme.

Table 11. Overview of identified data gaps, limitations and mitigation efforts.

	Description of data gap	Mitigation efforts	Level of confidence
1	Lack of accurate data regarding annual household spend on goods and services.	Annual household income has instead been used for the testing period.	Medium

3.1.6 Quality review of analysis

To ensure robust and high-quality analysis of the data, the following QA procedure was conducted:

- Prior to work beginning, the Project Director reviewed the proposed research methodology and ensure that the data collection plan was fit for purpose. Only once the research team had addressed any comments from the review process did they proceed to the data collection phase.
- In relation to the survey development and dissemination, Project Manager reviewed the line of questioning for this indicator to ensure that it was clear, followable and able to generate reliable and robust results. In addition to this, respondents were also required to answer each question before being able to move on to ensure data validation of the survey.
- Once the survey has closed and the results had been analysed, the Quality Assurance Manager conducted a thorough internal quality assurance process on the Microsoft Excel data set which pulled together the data from the survey and subsequent calculations. Any incoming data and assumptions were clearly logged, presenting survey data, user inputs, calculations, assumptions and results.

3.2 KEY ANALYSIS RESULTS

3.2.1 Analysis

On average across all regions surveyed, when asked whether their household used a service model in 2023, 19% responded with ‘yes’, whilst 72% responded with ‘no’. A further 8% either did not know or could not recall. Respondents in Berlin were most likely to have used a service-model in 2023, with 44% of respondents doing so, compared with only 21% in Bremen, Hamburg, Niedersachsen, Schleswig-Holstein – the region where respondents were next most likely to have used a service model.

Figure 6. Use of service-models in 2023, broken down by region/cities.

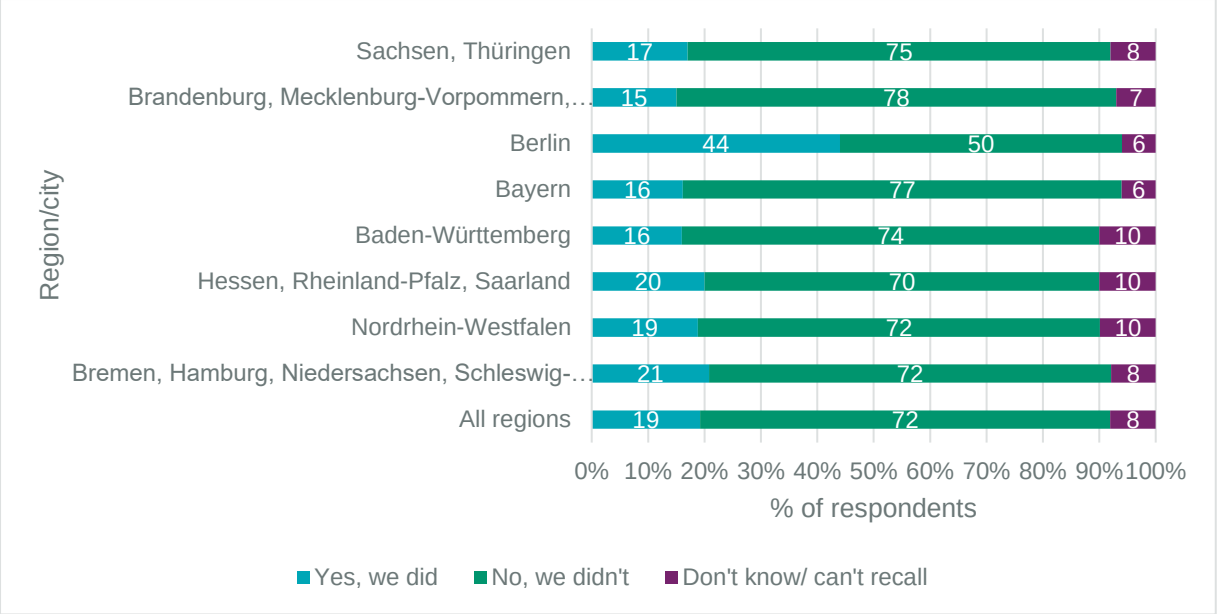
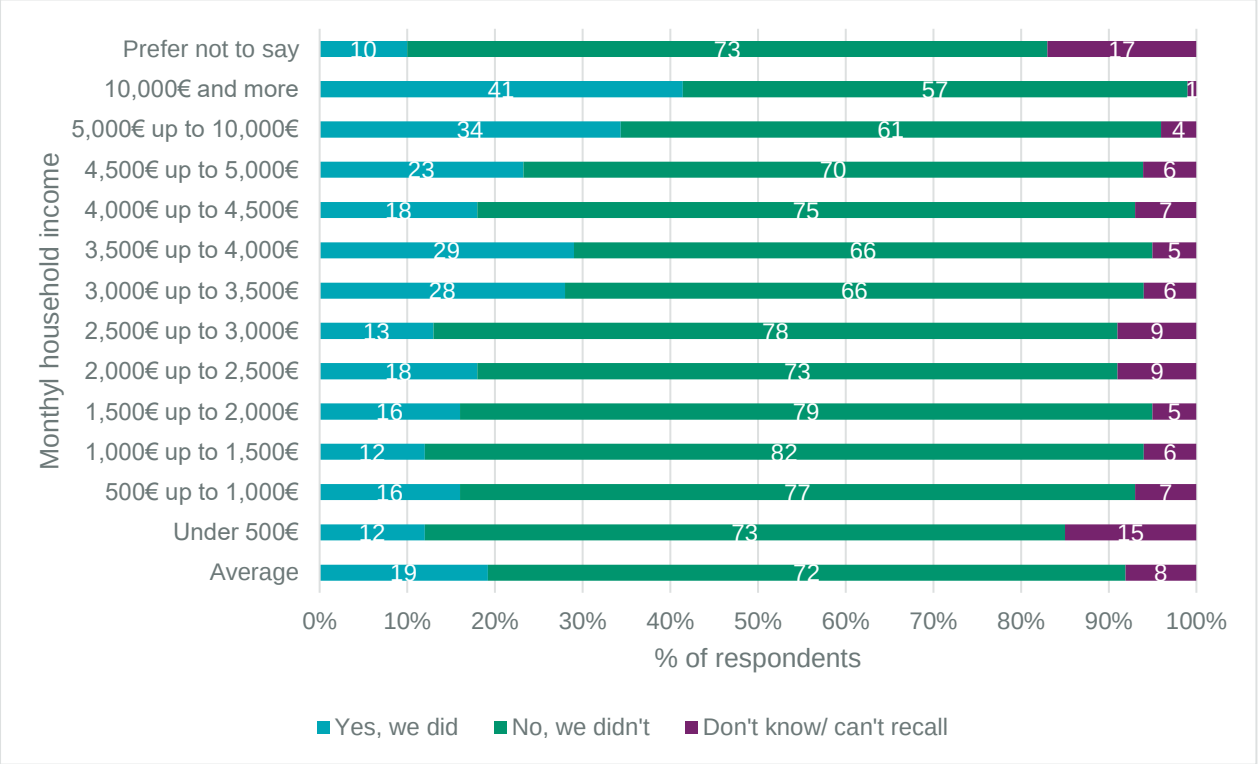


Figure 7 shows the percentage of households that used service models in 2023 in relation to their household income. The data indicates that household with a higher income are more likely to have used a service in 2023. This was highlighted by 41% of the top earning households (more than €10,000 a month) having used one of these models in 2023, compared with only 12% of those households earning less than €500 a month.

Figure 7. Use of service-models in 2023 in relation to household income.



As seen in Figure 8, for seven of the regions either €51-100 or €101-200 was the most common response for household spend on service models in 2023. Only the Sachsen, Thüringen region differed from this, with a mode response of €1-50, whilst Bayern had an equal proportion of respondents that spent between €51-100 and more than €500 (19%).

Figure 8. Household spend on service models in 2023, broken down by region/cities.

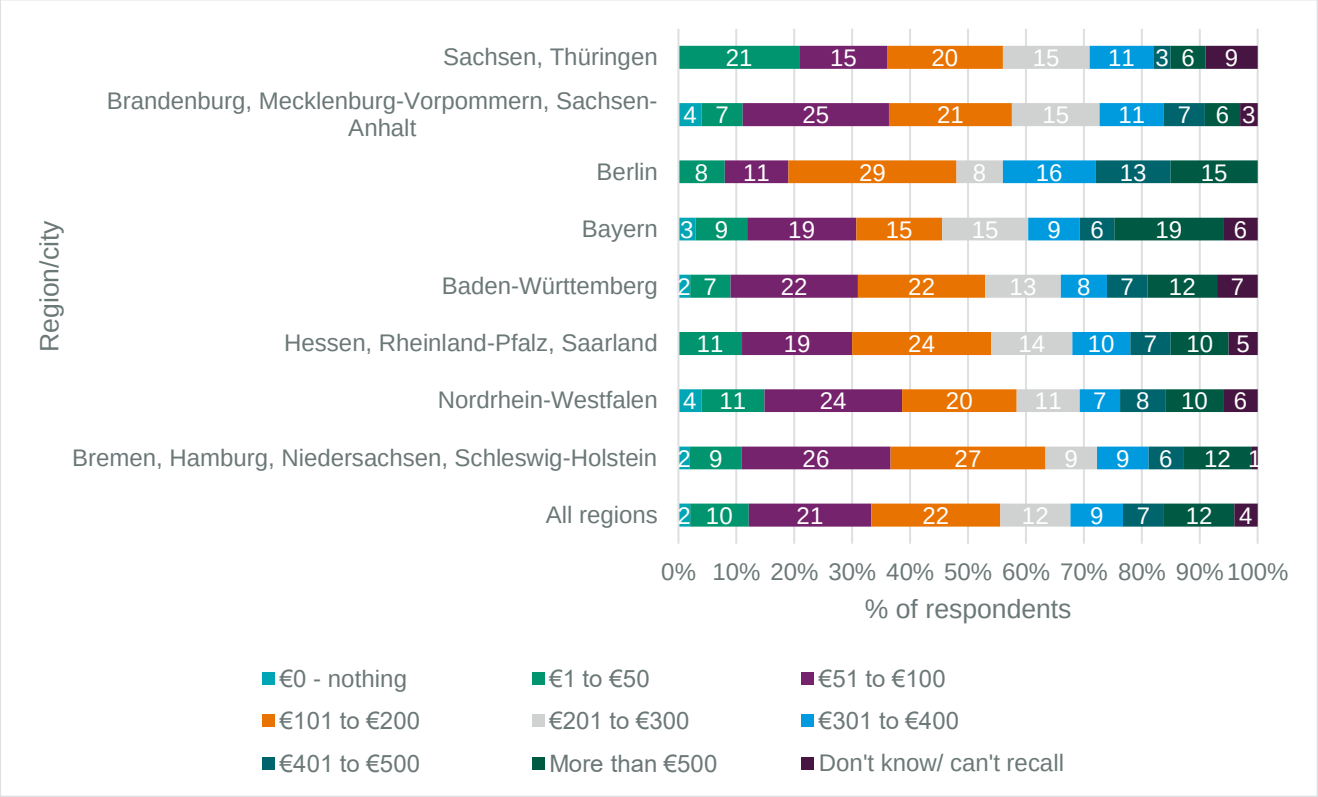
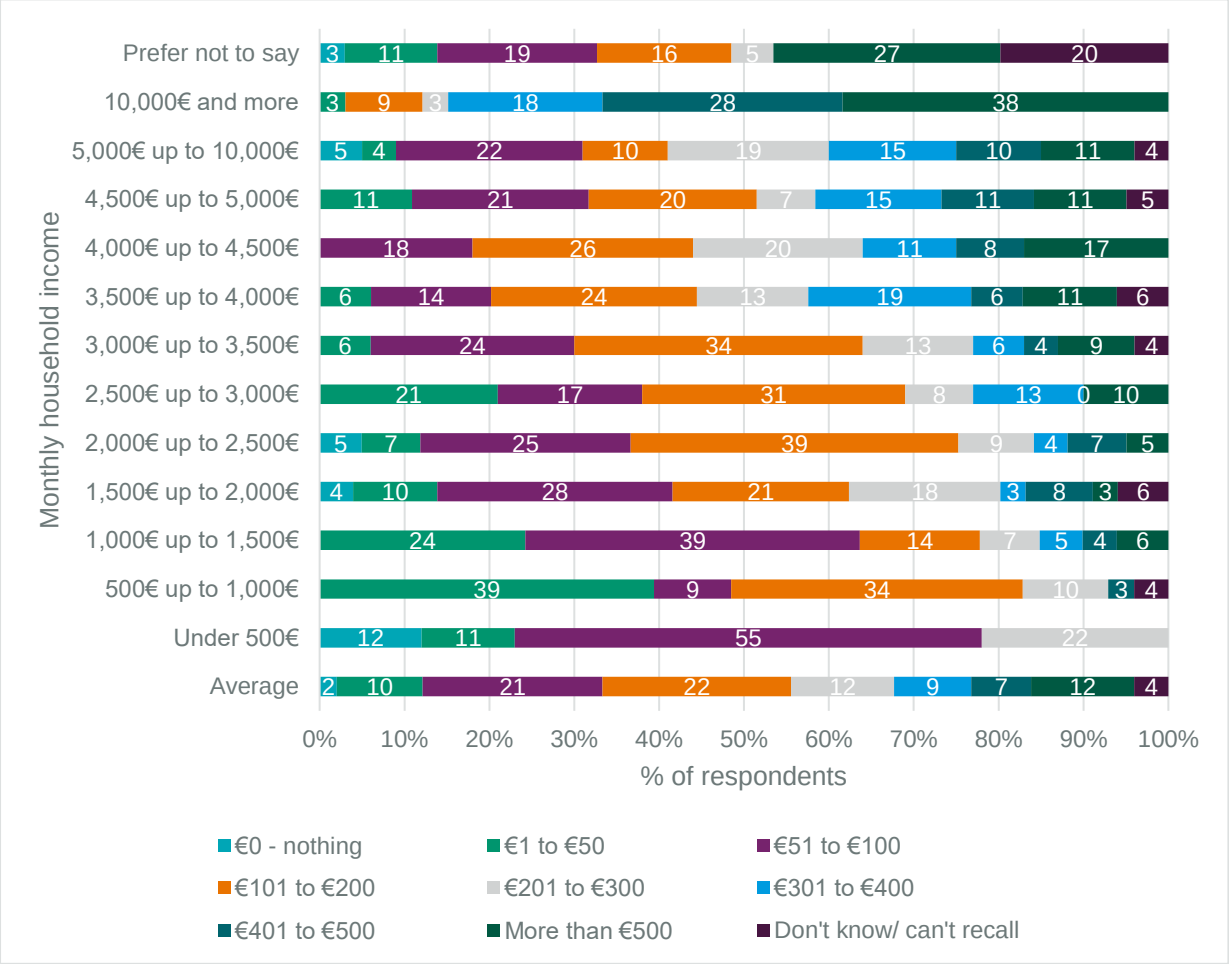


Figure 9 shows a similar picture, with 10 of the 12 income brackets most frequently spending between €51-200. Only those with a household income of €500-1000 were less likely to spend less than this, with the mode response for this income bracket being €1-50. Those households earning between €5000-10,000 a month were most likely to have spent €201-300 on service models in 2023, and the highest earners (those with a household income of more than €10,000 a month) were most likely to have spent more than €500 on these models in 2023.

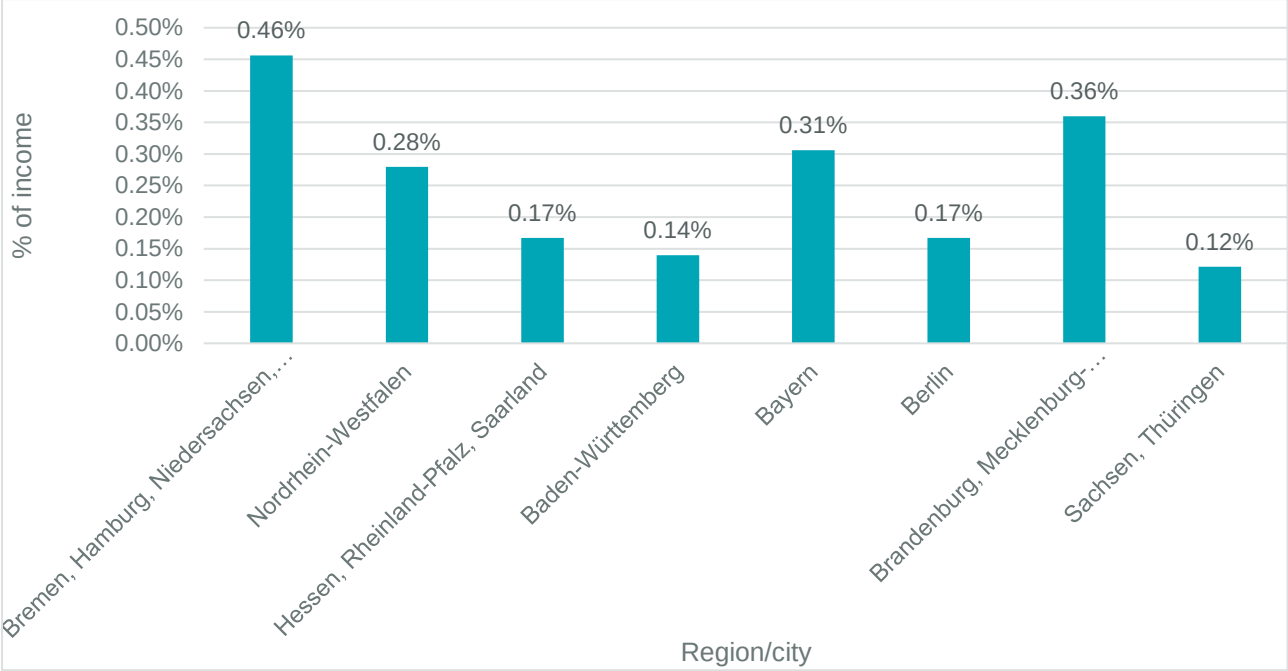
Figure 9. Household spend on service-models in 2023, in relation to household income.



By taking the mode response for each household income category and applying it to the calculation stated in Section 3.1.3, the mode proportion of household income spent on service models in 2023 for each region/city sampled was quantified. The results, as seen in Figure 10, show that the Bremen, Hamburg, Niedersachsen, Schleswig-Holstein region spent the largest proportion of household income on service models (0.46%), whilst the Sachsen, Thüringen only spent 0.12% of household income on service models, the lowest of all regions/cities.

One of the main takeaways from Figure 10 is the small proportion of household income that is currently spent on service models within Germany. Whilst this figure does vary between regions, the differences are negligible when looking at the figures on a larger scale due to the small proportions involved. The generally low proportion of income spent on service models even in regions with higher usage rates suggests that while there is interest, it has not yet become a significant part of consumer behaviour. This underscores the need for continued education and development of service offerings to integrate them more fully into everyday life.

Figure 10. The share of household income spent on service-models each year, per region/city (using calculations outlined in Section 3.1.3



To view the calculations that were used to create the graphs on display, please refer to Appendix 8.4.

3.2.2 Limitations

The following limitations have been identified through the testing programme:

- Due to time constraints, only regional data within one Member State (i.e. Germany) was collected. This meant that only results from the specific regions within Germany were compared, rather than specific regions within two Member States.
- After an initial review of the proposed questions for the citizens survey, it was recommended by YouGov (the survey disseminator) to offer numerical ranges to respondents (i.e. monthly household income under €500, between €500 – €1,000, etc.) rather than asking them to indicate the true value in a free text box. Due to the experience that YouGov have in carrying surveys, this recommendation was followed. Whilst this reduced the amount of guesswork from respondents and allowed them to be grouped easier, it also likely meant that some responses received were less accurate than they could have been otherwise.
- Due to the use of numerical ranges within the survey question, mid-points were used to conduct further analysis. Although this was deemed a sensible approach for this testing programme, using mid-points assumes that responses are uniformly distributed within each range, which may not be the case. Depending on the actual distribution of data within each range, using midpoints could lead to overestimation or underestimation of the true average.
- As discussed in **Data gaps and mitigation**, it was decided that instead of asking citizens for data relating to their expenditure on household goods, household income would alternatively be used in the calculations to test this indicator. Although this meant that the testing of the indicator is not as accurate as originally anticipated and the level of uncertainty in the results was increased, it was not deemed feasible to attain expenditure data within the timeframe available for both respondents and the testing team.
- The use of self-reported data may have introduced recall bias, and potentially social desirability bias. The respondents may not have accurately remembered how much they spent on service models, or they may have reported what they think is socially acceptable (rather than their actual practices). This is particularly relevant when asking about spending habits or income.

- While analysis on income is included in this testing programme, other factors such as education level and technological access might also have significantly influenced the uptake of service models.
- The success of service models heavily relies on the availability and accessibility of technology. In regions with limited digital infrastructure or where technological literacy is low, the reach and effectiveness of these service models are likely to be significantly constrained. This could complicate efforts to uniformly apply and compare the indicator across different regions and Member States. When developing targets or benchmarks related to service models, it is crucial to account for these technological limitations.
- The survey failed to differentiate between the use of service-models as an alternative to ownership and their use alongside direct ownership. Therefore, it cannot be ascertained whether there is a real decrease in goods purchasing or if service models are supplementing ownership. To mitigate against this going forward, future surveys should include specific questions in order to distinguish between the use of service models as a substitute or ownership and their use as a supplement to ownership.
- The success of service-models is heavily reliant on availability and access of technology. The reach and effectiveness of service models is likely to be constrained in regions with limited digital infrastructure or where technological literacy is low, complicating efforts to uniformly apply and compare the indicator across regions and Member States.

3.2.3 Performance

During Task 4 of this study, the original indicator was given a score of 10 in the RACER evaluation process (named “Percentage of household income spent on services rather than goods”), scoring particularly low on the ‘Robustness’ criterion due to the lack of an available existing dataset to be used in the testing process.

Following Task 5, the indicator was awarded a score of 11, due to performing better for the ‘Robustness’ criterion. This was due to the development of a consistent methodology for data collection via the use of the citizen’s survey, and the relative robustness of the resulting dataset that was collected.

Table 12. RACER evaluation.

Stage of project	RACER criterion					Score
	Relevance	Acceptability	Credibility	Ease	Robustness	
Task 4 (original RACER assessment)	3	2	2	2	1	10
After Task 5 (following testing)	3	2	2	2	2	11

To ensure consistency in applying RACER, the assessment matrix shown in Appendix 8.2 was applied to support the decision making process.

3.3 CHALLENGES AND LESSONS LEARNED

3.3.1 Challenges

One challenge faced by the team was the task of disseminating the citizen’s survey and in turn receiving reliable and trustworthy results from a large enough sample in a relatively small period of time. In order to overcome this challenge, it was decided that although the team would still have full control over the questions being asked, a third-party organisation would be commissioned to disseminate the survey. Whilst this helped to outcome the challenge the team was facing; it also came at an extra cost which should not be overlooked when considering future data collection associated with this indicator. The

potential cost and complexity of data collection via surveys across EU Member States poses a potential challenge for applying the indicator in future. The EC conducts regular EU-wide consumer surveys so might be appropriate to integrate this topic into these regular surveys or consider adopting separate surveys related to sustainability and the CE.

3.3.2 Lessons learned

Lessons learnt were recorded throughout the process of creating and testing this indicator, which may be applied to inform future assessments of indicators:

- For indicators which are based on data from citizen surveys, a judgement needs to be made at the early stages of testing as to what level of data granularity is required. There is a direct trade-off between the level of granularity asked for and the burden on the respondent to answer the questions. Asking for actual numbers within an open-ended question format is a more burdensome approach and could lead to missing data, however it would result in more granular data. In comparison, using numerical ranges within a closed-ended question format would provide less granular data, but would alternatively be easier/quicker for the respondent to complete, which would likely result in higher response rates. Considering this, it is recommended to disseminate citizen surveys via a platform who can guarantee reaching the pre-determined response rate (such as YouGov).

3.4 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that this indicator is considered for further development, with minor work required to facilitate its progress.

Increasing the use of service models is a key step for the EC's to achieve its goal of a 'truly circular' economy, as highlighted in the Circular Economy Action Plan (CEAP) (European Commission, 2020) where incentivising product-as-a-service models has been highlighted as a key component designing sustainable products. Service models allow for goods to be used by multiple users from different households, reducing the demand for the overall number of goods being produced. These models also allow for manufacturers and suppliers to maintain goods, helping to ensure they stay in operation for as long as possible and maximising the product lifespan.

Whilst the technology sector is currently one of the leading forces in a product-as-a-service offerings, with revenue in the European platform-as-a-service market projected to reach US$35.22 billion in 2024[4], other industries are also likely to see growth in the coming years. Therefore, it is essential to develop indicators to measure the uptake of these service models and the success of future policy updates that aim to incentive their use.

To support the continual improvement in the performance of this indicator, tax incentives should be considered to both encourage consumers to use service offerings when available, as well as encouraging retailers and manufacturers to offer service models. This would build on the EC's CEAP (European Commission, 2020) which stated the Commission's intention to incentivise 'product-as-a-service or other models where producers maintain ownership of the product or the responsibility for its performance throughout its lifecycle'.

It is also recommended that the EC conduct undertake some Research and Development (R&D) studies to quantify the environmental impacts of service-models, both positive and negative. It should not simply be assumed that all product-as-a-service models are more environmentally friendly than traditional ownership models, and therefore R&D should be used to identify products and service models that would lead to environmental benefits were their use to be incentivised. Until this research has been undertaken, it is not deemed necessary to define targets to support the implementation of this indicator.

[4] Statista, Platform as a Service - Europe. (Statista, September 2023). https://www.statista.com/outlook/tmo/public-cloud/platform-as-a-service/europe#revenue. Accessed 18th March 2024.

Further, it is not recommended that targets are defined until benchmarks have been developed to account for varying access to technology and technological literacy across different regions and Member States. Without these, it will likely be difficult to apply and compare the indicator across the EU.

In order to access the data required to measure this indicator, a citizen's survey was essential. Whilst the use of a third party to disseminate the survey allowed the data to be easily accessed and from a reliable source, as a key data input (annual household spend on service models) is not currently commonly recorded amongst citizens, it is recommended that sufficient amount of time is provided for respondents to complete the survey in an accurate manner. This will also ensure the robustness of results. In addition to this, as the EC conducts regular EU-wide consumer surveys, it may be appropriate to integrate this topic into these regular surveys or consider adopting separate surveys related to sustainability and the CE.

Due to the granularity of the data required for this indicator, it is likely that the collection of this data on the scale required for implementation across Member States would be too difficult to achieve. For example, households would need to provide details on the individual service models used each year and the cost of purchasing the product instead. Instead, it is recommended that the indicator should measure annual household spend on service models as a proportion of overall annual household spend. To achieve more granular results, the indicator should also measure household spend on different service model offerings (e.g. vehicles as a service, clothing as a service, etc.). These can be broken down by the priority products outlined in the CEAP (European Commission, 2020). Going forward, it is therefore recommended that the indicator name is changed to: "Share of household spend on service models in relation to overall household spend".

It is recommended that this indicator is measured on an annual basis in order to monitor the year-on-year impacts of the aforementioned recommendations.

Whilst there is not any direct crossover with this indicator and those within the new EU monitoring framework for CE, quantifying the share of household income spend on service models would indirectly support improvements across the following macro level indicator.

- **Material footprint:** i.e. a quantification of the demand for material extractions triggered by consumption and investment by households, governments and businesses across the EU. Encouraging the use of service models would support the reduction of material footprints as goods are being shared between consumers, minimising the number of goods that are needed on the market to meet demand.
- **Total waste generation per capita:** i.e. the total waste generated in a country (including major mineral wastes), divided by the average population of the country. Encouraging the use of service models may reduce the number of goods placed on the market, thereby reducing waste generation when these goods reach end of life. Further, products are more likely to be well maintained and repaired within this business model as manufacturers maintain ownership. This would also reduce waste generation.
- **Generation of municipal waste per capita:** i.e. the waste collected by or on behalf of municipal authorities and disposed of through the waste management system. Encouraging the use of service models may reduce the number of goods placed on the market, thereby reducing municipal waste generation when these goods reach end of life.
- **Consumption footprint:** i.e. the environmental impacts of EU and Member States consumption by combining data on consumption intensity and environmental impacts of representative products, with the indicator covering mobility as an area of consumption. Encouraging the use of service models may reduce consumption footprint as fewer overall goods will be purchased.

Table 13. Summary of recommendations for H3

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Legislation	Tax incentives to encourage the use of service-models.	Medium (1.5 – 5 years)	• **Responsible:** EC • **Accountable:** National Governments. • **Consulted:** National Governments, service-model providers, citizens. • **Informed:** All stakeholders within the EU service-model industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
R&D	R&D to quantify the potential environmental impacts of service-models.	Short (0.5 – 1.5 years)	• **Responsible:** EC • **Accountable:** National Governments. • **Consulted:** Manufacturers, service-providers, households/citizens. • **Informed:** Households/citizens, service providers.	• **Relevance:** Would ensure that the indicator is working to prioritise low environmental impact services.
Policy	Explore the appropriateness of including this indicator within the regular EU-wide consumer surveys disseminated by the EC.	Short (0.5 – 1.5 years)	• **Responsible:** EC • **Accountable:** EC • **Consulted:** EC • **Informed:** Households/citizens	• **Ease:** The data collection process would be eased should this recommendation be implemented. • **Robustness:** The target would encourage the year-on-year monitoring of this indicator, providing more accurate results.

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Implementation	If this indicator is implemented in the future, it is recommended to measure the annual household spend on service models as a proportion of overall annual household spend. The indicator should also measure household spend on different service model offerings. As a result, indicator name should be changed to: “Share of household spend on service models in relation to overall household spend”.	Medium (1.5 – 5 years)	• **Responsible:** EC • **Accountable:** EC • **Consulted:** NA • **Informed:** Households/citizens	• **Robustness:** Would increase granularity of the data collected and provide more of a scale in the results.
Data collection	Due to the complexity of some of the data inputs required from survey participants, it is recommended that sufficient time is allowed for respondents to provide accurate results.	Short (0.5 – 1.5 years)	• **Responsible:** EC • **Accountable:** EC • **Consulted:** Households/citizens • **Informed:** Households/citizens	• **Ease:** The data collection process would be eased should this recommendation be implemented. • **Robustness:** The quality of data would likely be improved should this be implemented.

4. INDICATOR 3: LEVEL AND PERCEPTION OF PEER-TO-PEER USE AND SHARING ACROSS A RANGE OF PRODUCTS/ MATERIALS

This indicator aims to measure the level of peer-to-peer use and sharing models, as well as household perceptions of these models, at a regional/city level.

Peer-to-peer use and sharing model refers to the collaboration or sharing of a product with other people or households rather than a public body or business. They work by allowing individuals and businesses to share, trade, or rent products, decreasing the need for ownership and promoting resource efficiency[5]. It is a vital aspect of the CE as it seeks to rethink current consumption habits, as well as reduce the quantity of goods being produced, in turn reducing waste and extending the lifespan of products.

The benefits to monitoring this indicator include:

- Will help to gain a better understanding of the current use of peer-to-peer use and sharing models.
- Will help to gain a better understanding of what product categories are most commonly used via peer-to-peer use and sharing models.
- Will help to measure and monitor the circular behaviours and purchases of households within different regions/cities.
- Will help to gain a better understanding of the barriers preventing further uptake of peer-to-peer use and sharing models.

4.1 KEY METHODOLOGY

4.1.1 Testing method

Citizens surveys were used to measure this indicator. This methodology was selected with an aim of quantifying the behaviours and opinions of households across different regions/cities, allowing for analysis of the current values associated with the indicator, as well as allowing progress to be mapped over time with further consistent and systematic surveys. To ensure statistically reliable and useful outputs, the results from the survey were weighted to account for regional/city population sizes to accurately represent the Member State as a whole.

4.1.2 Data collection method

In order to test this indicator, the following data inputs were requested from households for 2023:

- Whether households used a peer-to-peer use and sharing model.
- The type of peer-to-peer use and sharing model(s) households used (if applicable).
- The number of times households used a peer-to-peer use and sharing model.
- Household opinions on peer-to-peer use and sharing models.
- Reasoning for using/not using a peer-to-peer use and sharing model.

The data informing this analysis, and the conclusions drawn from it, were gathered in a nationally representative survey of citizens in Germany, conducted by YouGov Plc for the sole purpose of this project. The total sample size was 2,266 adults, and the survey was undertaken between 28th February - 1st March 2024. The survey was carried out online. The figures have been weighted in accordance

[5]FasterCapital, Circular economy: Creating a Circular Economy through P2P Practices. (FasterCapital, 2024).<https://fastercapital.com/content/Circular-economy--Creating-a-Circular-Economy-through-P2P-Practices.html#:~:text=In%20conclusion%2C%20P2P%20marketplaces%20have,products%2C%20and%20optimize%20resource%20consumption.>. Accessed: March 2024.

with the national demographic breakdown and are therefore representative of all German adults (aged 18+). Table 14 shows the breakdown of this at a city/regional level.

Table 14. Breakdown of responses per region/city.

Name of region/city	Percentage of sample (%)
Bremen, Hamburg, Niedersachsen, Schleswig-Holstein	16
Nordrhein-Westfalen	22
Hessen, Rheinland-Pfalz, Saarland	14
Baden-Württemberg	13
Bayern	16
Berlin	4
Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt	8
Sachsen, Thüringen	8
Total	**100**

Table 15 shows a breakdown of the respondents by monthly household income.

Table 15. Breakdown of responses per household income.

Monthly household income (€)	Percentage of sample (%)
Less than 500	3
500 – 1,000	6
1,000 – 1,500	9
1,500 – 2,000	9
2,000 – 2,500	10
2,500 – 3,000	8
3,000 – 3,500	7
3,500 – 4,000	7
4,000 – 4,500	6
4,500 – 5,000	5
5,000 – 10,000	9
10,000 and above	3
Prefer not to say	17

Appendix 8.3 contains the survey script for this indicator.

4.1.3 Calculations

Calculations were not needed to investigate this indicator due to the use of the citizen's survey.

4.1.4 Timeline

The project timeline is shown in Table 16.

Table 16. Gantt chart for H4

WC	18-Dec	25-Dec	01-Jan	08-Jan	15-Jan	22-Jan	29-Jan	05-Feb	12-Feb	19-Feb	26-Feb	04-Mar	11-Mar	18-Mar	25-Mar
Task 1 - Agree on key priority and service streams to be used															
Task 2 - Develop online survey															
Task 3 - Disseminate online survey															
Task 4 - Explore backup datasets (if necessary)															
Task 5 - Create Excel model															
Task 6 - Survey analysis & calculations															
Task 7 - Analysis of themes															
Task 8 - Case study write up															
Review period														Ricardo	
Key deliverables				Online survey									Initial draft case study		Draft case study

Legend

Task progress | Christmas holiday | Review period | Key deliverable

4.1.5 Data gaps and mitigation

During the course of testing this indicator, no data gaps were identified.

4.1.6 Quality review of analysis

To ensure robust and high-quality analysis of the data, the following QA procedure was conducted:

- Prior to work beginning, the Project Director reviewed the proposed research methodology and ensure that the data collection plan was fit for purpose. Only once the research team had addressed any comments from the review process did they proceed to the data collection phase.
- In relation to the survey development and dissemination, Project Manager reviewed the line of questioning for this indicator to ensure that it was clear, followable and able to generate reliable and robust results. In addition to this, respondents were also required to answer each question before being able to move on to ensure data validation of the survey.
- Once the survey has closed and the results had been analysed, the Quality Assurance Manager conducted a thorough internal quality assurance process on the Microsoft Excel data set which pulled together the data from the survey and subsequent calculations. Any incoming data and assumptions were clearly logged, presenting survey data, user inputs, calculations, assumptions and results.

4.2 KEY ANALYSIS RESULTS

4.2.1 Analysis

Figure 11 shows the use of peer-to-peer use and sharing models across a range of categories, whilst being broken down to a region/city level.

On average across all regions/cities included in the survey, 70% of respondents said their household did not use a peer-to-peer use and sharing model in 2023, with this being most common in the Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt region (79%). Conversely, only 52% of responding Berlin households stated that they didn't use a peer-to-peer use and sharing model in 2023, the lowest of all surveyed regions/cities. Of those households that had used a peer-to-peer use and sharing model in 2023, 'Vehicles' were the most commonly used product category, with 12% of respondents from all regions having used a model involving vehicles. This figure peaked in Berlin with 21%, whilst the Hessen, Rheinland-Pfalz, Saarland region was the only region/city whose mode response was not 'Vehicles', with the 'Food' product area instead scoring the highest (12%).

Figure 11. Use of peer-to-peer use and sharing models, broken down by region/city.

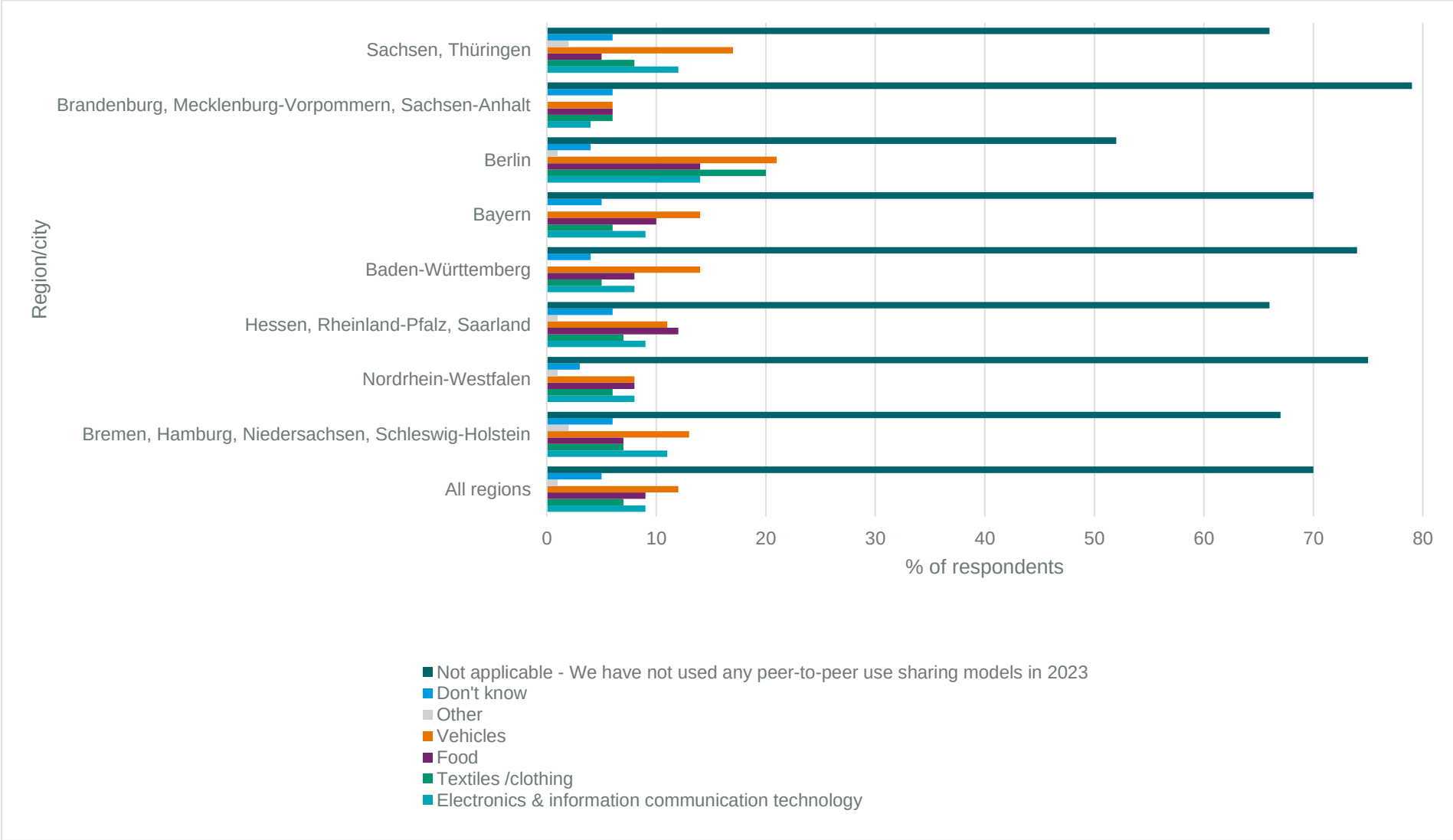


Figure 12 shows the use of peer-to-peer use and sharing models across a range of categories, whilst being broken down to a region/city level.

As was seen across the regions/cities surveyed, ‘Vehicles’ was the most used peer-to-peer use and sharing model product category, with all income groups earning more than €1,500 a month having this as their mode answer (for those who has used a peer-to-peer use and sharing model in 2023). For all income groups earning less than €1,500 a month, ‘Food’ was the most commonly selected answer for those that had used this model in 2023. This may indicate that lower income households are using peer-to-peer use and sharing models out necessity to attain essential goods such as food, as opposed to using these models out of choice or to attain luxury and non-essential items.

Figure 12. Use of peer-to-peer use and sharing models, in relation to household income.

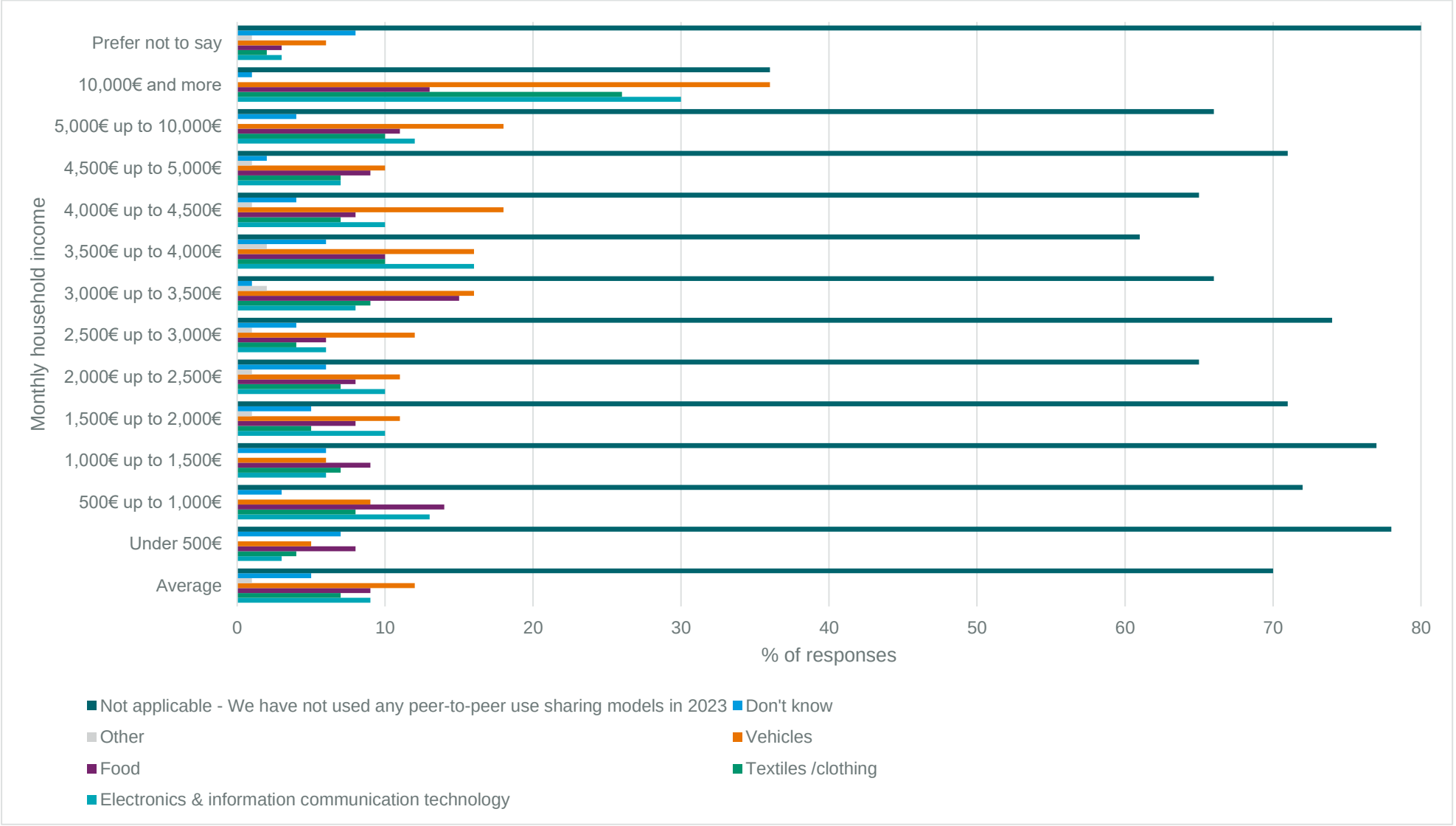


Figure 13 displays the number of times households across different regions/cities used peer-to-peer use and sharing models in 2023. The figure shows that across Germany as a whole, most households that used a peer-to-peer use and sharing model in 2023 did so between 3-5 times, with 36% having selected this response. Sachsen, Thüringen was the only region where this was not the most common answer, with 33% of households only using a peer-to-peer use and sharing model 1-2 times.

As most households used sharing models between 3 – 5 times in 2023, this suggests a casual or trial usage rather than a deep integration of service models into their lifestyle.

Figure 13. Household use of peer-to-peer use and sharing models in 2023, broken down by region/city.

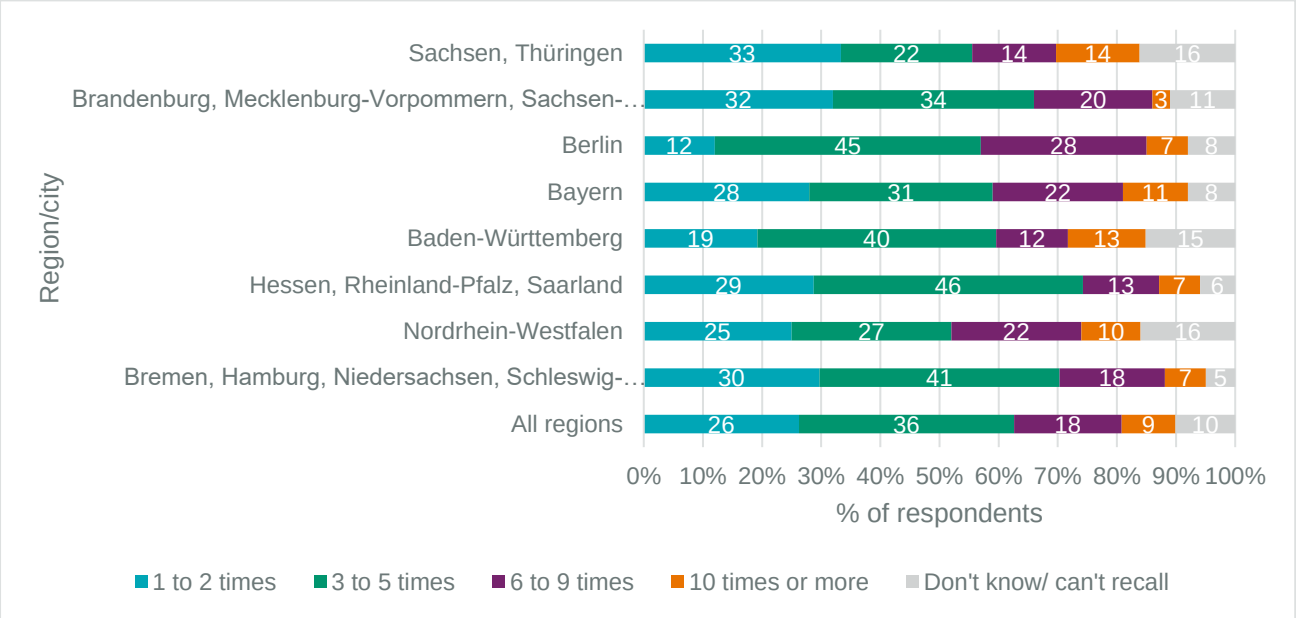


Figure 14 displays the number of times households with different monthly incomes used peer-to-peer use and sharing models in 2023. As seen in Figure 14 below, the most common response for 10 of the 14 income groups was that their household use a peer-to-peer use and sharing system between 3-5 times. The most commonly selected answer for those earning between €1,000-2,000 was that their household used this model type 1-2 times in 2023, whereas those households with the highest income (€10,000 and above) were most likely to have used a peer-to-peer use and sharing model 10 times or above, likely due to having high levels of disposable income and therefore being more likely to make more purchases in general.

Figure 14. Household use of peer-to-peer use and sharing models in 2023, in relation to household income.

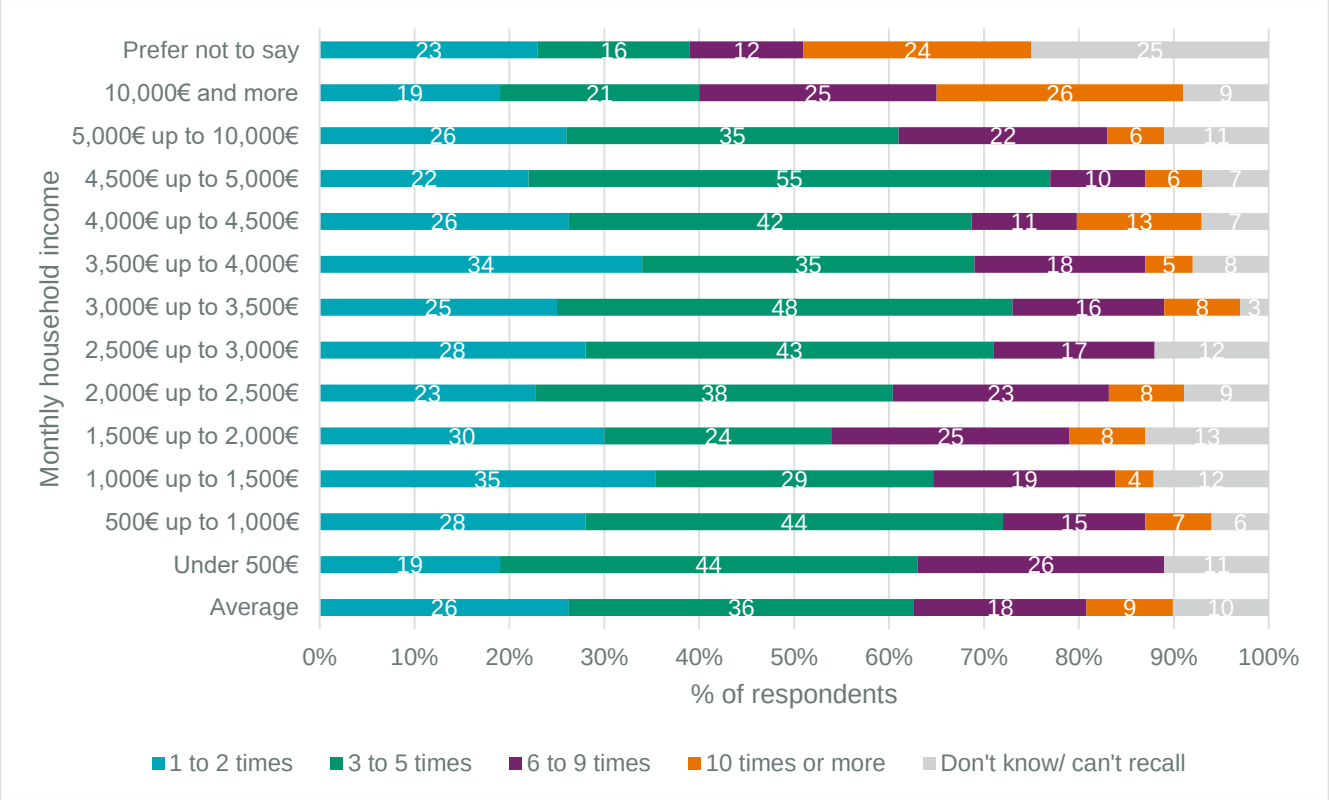


Figure 15 displays the change in opinion of peer-to-peer use and sharing models by respondents that used one in 2023. At least 50% of respondents across all region/cities had a more positive view of peer-to-peer use and sharing schemes after having used one in 2023. This figure peaked in the Berlin and Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt regions/cities at 65%, whilst averaging 57% across all regions/cities. The significant change in perception towards peer-to-peer models after use, especially in Berlin, indicates that direct experience can positively influence attitudes.

Whilst still achieving an overall positive response, the mode answer for the Bayern (39%) and Sachsen, Thüringen (42%) region was that there was ‘No difference’ in their opinion after having used a peer-to-peer use and sharing system. This was also the mode response for the Nordrhein-Westfalen region (33%), although it received the same proportion of responses as the ‘A little more positive’ option.

Figure 15. Change in opinion of peer-to-peer use and sharing models after having used one, per region/city.

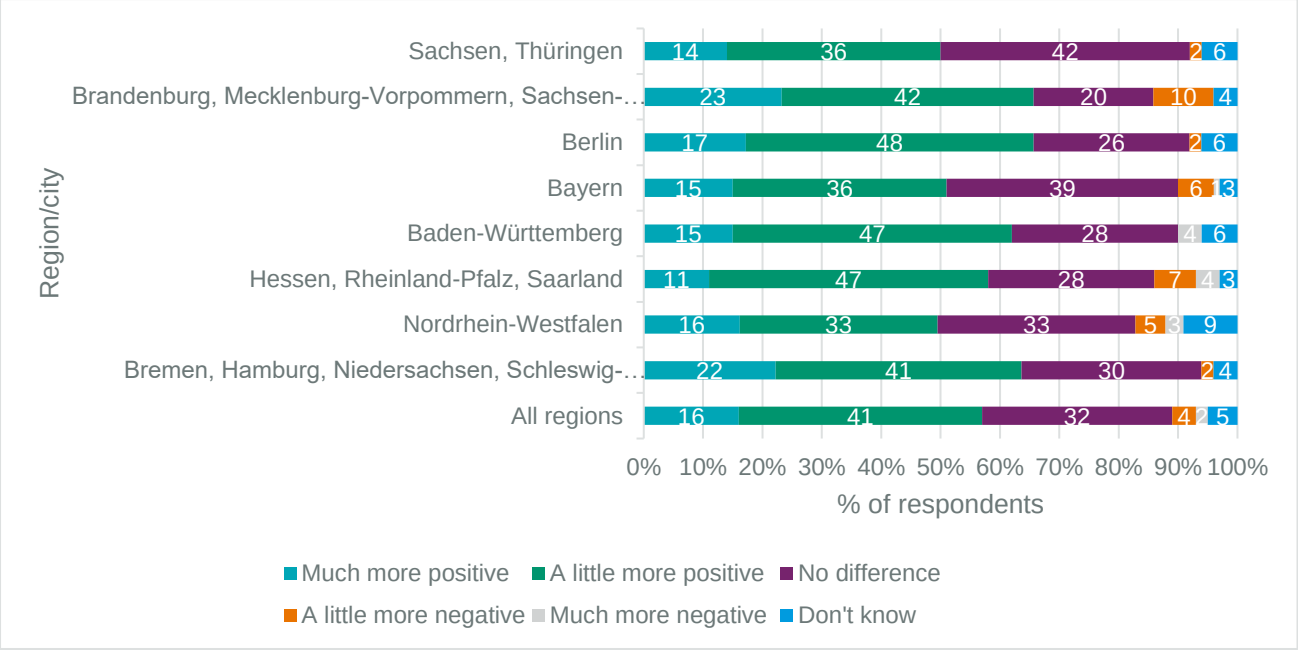


Figure 16 displays the change in opinion of peer-to-peer use and sharing models by respondents that used one in 2023, broken into monthly income thresholds. There was also a largely positive response across the majority of income categories, with all but four of these groups having their mode response as ‘A little more positive’. Those earning between €1,000-2,500, instead most commonly selected ‘No difference’, which was also the mode response for those respondents that preferred not to supply their household income details. Those coming from a household with a monthly income of less than €500 a month had the most positive change in opinion of peer-to-peer use and sharing models, with 49% of these respondents selecting ‘A little more positive’ and 31% opting for ‘Much more positive’.

Figure 16. Change in opinion of peer-to-peer use and sharing models after having used one, in relation to household income.

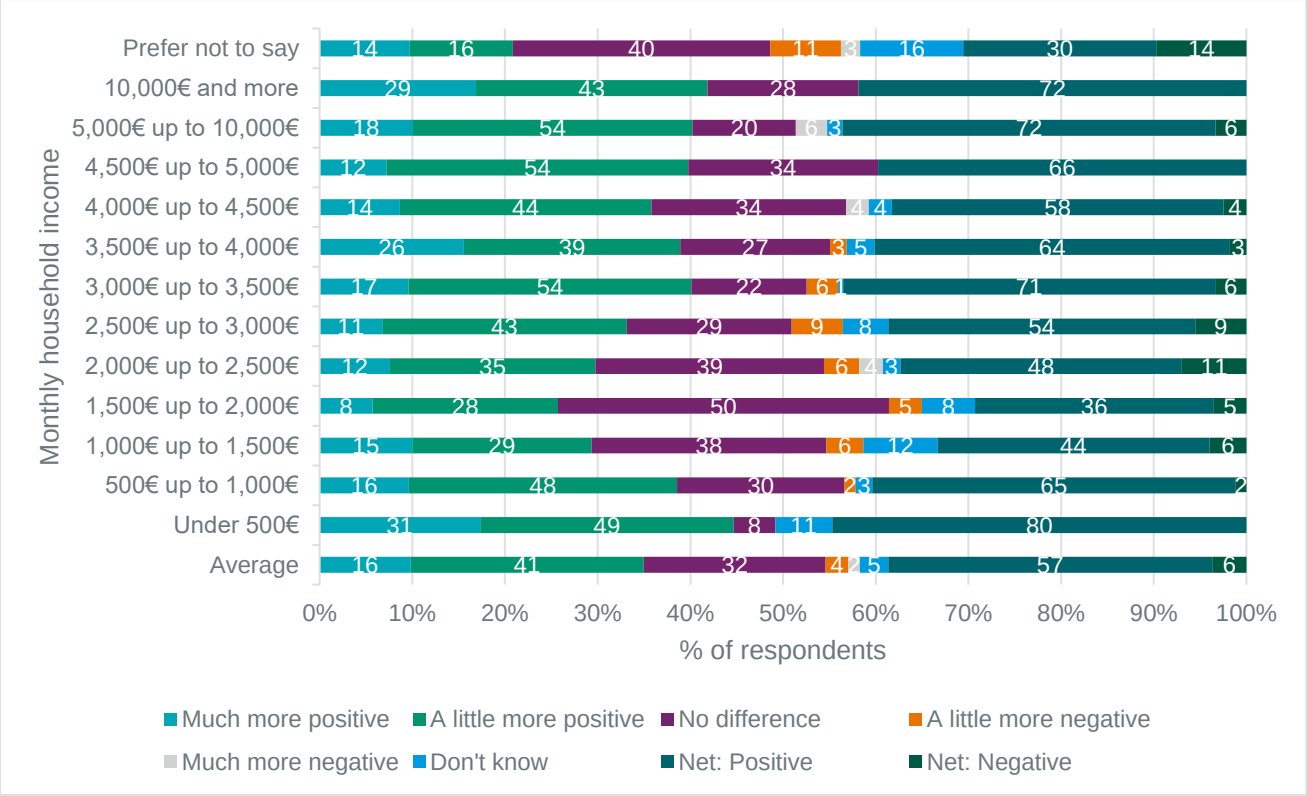


Figure 17 presents the reasons for using a peer-to-peer use and sharing model, with results displayed for each region/city surveyed. The results in Figure 17 show a relatively even spread of responses across the options available (excluding 'don't know' or 'other'). 'They are sustainable options' was the mode response for four regions (Bremen, Hamburg, Niedersachsen, Schleswig-Holstein; Baden-Württemberg; Berlin; and Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt) and averaged 35% across all regions. 'I like the flexibility of not owning the product' also was the mode response for four regions (Nordrhein-Westfalen; Hessen, Rheinland-Pfalz, Saarland; Bayern; and Sachsen, Thüringen), however this response averaged 37% across all regions.

Figure 17. Reasons for using peer-to-peer use and sharing model in 2023, broken down by region/city.

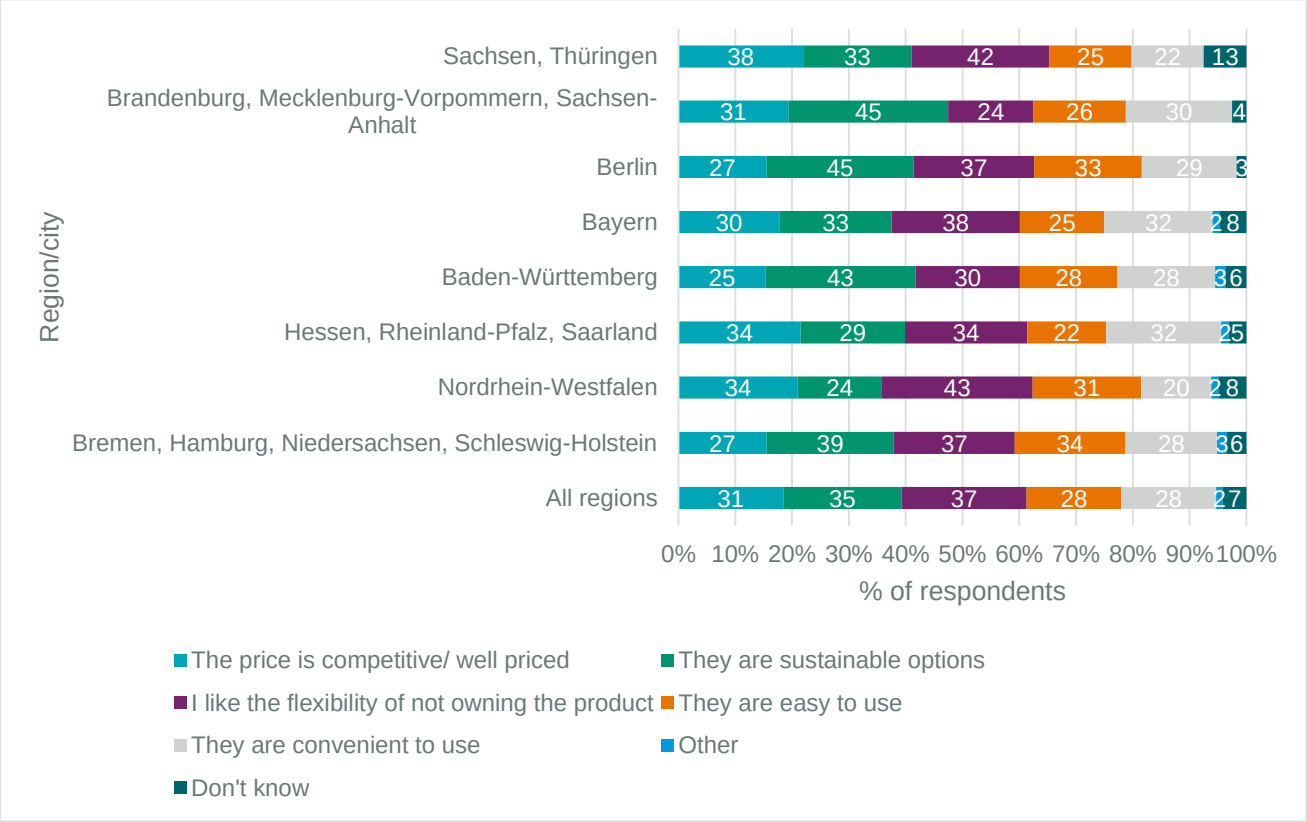


Figure 18 presents the reasons for using a peer-to-peer use and sharing model, with results displayed for each monthly household income category. Similarly, Figure 18 shows that 'I like the flexibility of not owning the product' was the most common response for eight of the income brackets, achieving a peak response of 68% for those with a household income of between €500-1000 a month. 'They are easy to use' was the most common response for households earning between €2,500-3,500 and above €10,000 a month, whilst 'They are sustainable options' was the mode response for the €2,500-3,000 and €3,500-4,000 income brackets. Finally, those households earning between €2,000-2,500 were most likely to have selected 'The price is competitive/well priced' as their response, a characteristic that was shared by those respondents that preferred not to provide their household income.

Figure 18. Reasons for using peer-to-peer use and sharing model in 2023, in relation to household income.

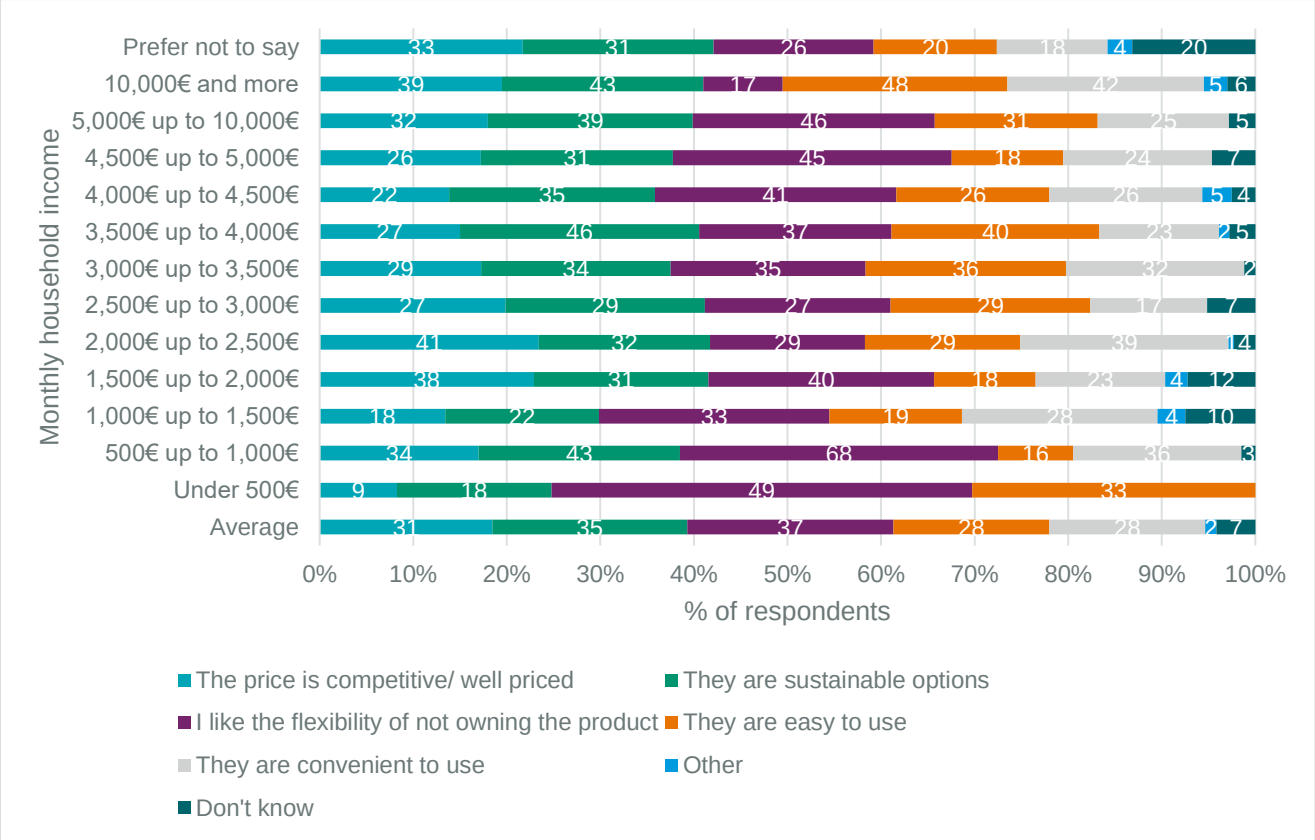


Figure 19 presents the reasons for not using a peer-to-peer use and sharing model, with results broken down by region/city. Figure 19 shows that the most common reason for households not using a peer-to-peer use and sharing model in 2023 was because they 'Did not have any need for this'. This response was selected by 46% of households across all regions/cities, which suggests a potential lack of awareness about the benefits or applicability of these models.

Conversely, the least common response was that 'These services have a poor reputation', with only 1% of respondents across all regions choosing this response, and 0% of respondents from the Berlin and Brandenburg, Mecklenburg-Vorpommern, Sachsen-Anhalt regions/cities believing this to be the case.

Figure 19. Reasons for not using peer-to-peer use and sharing models in 2023, broken down by region/city.

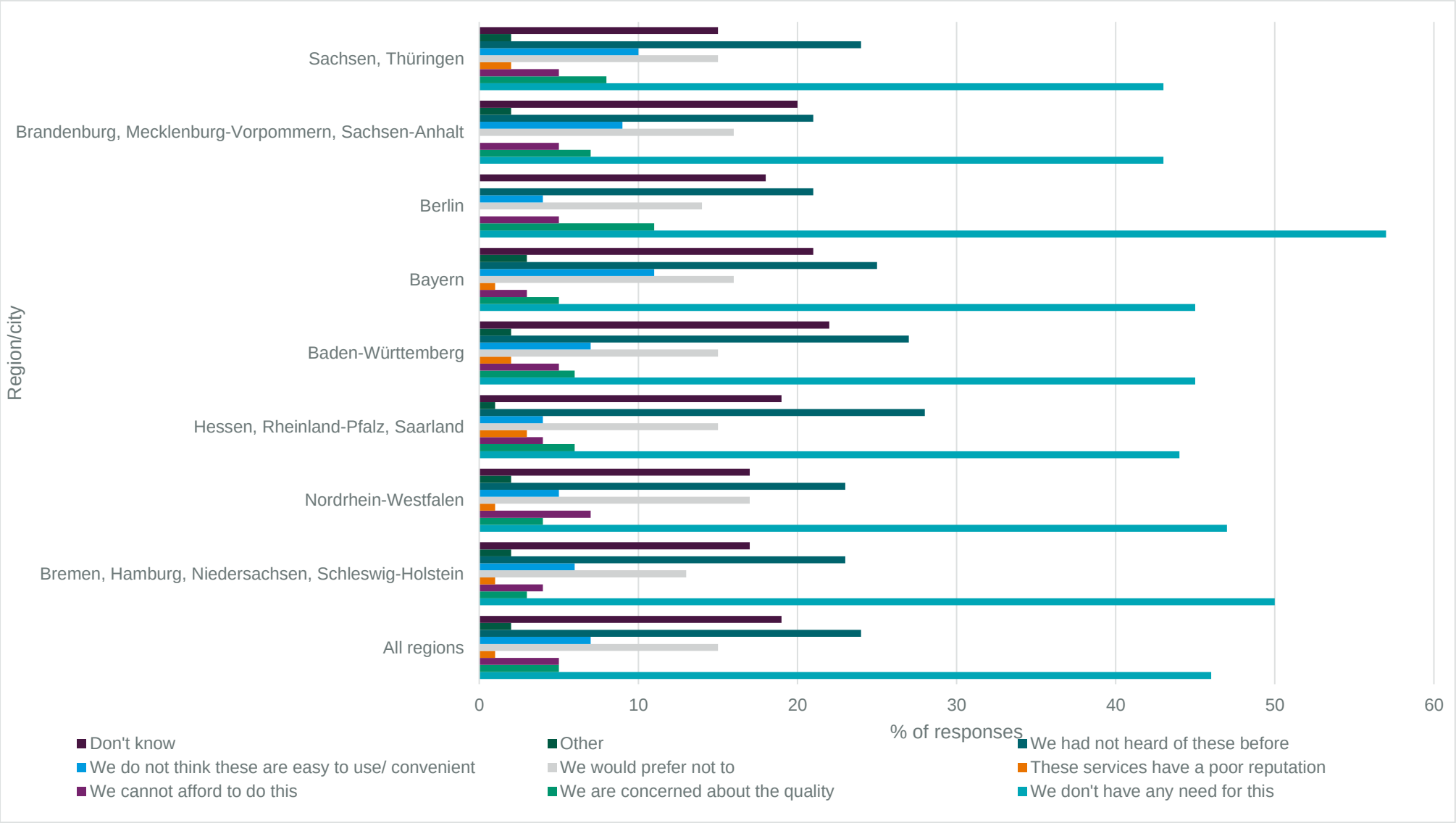
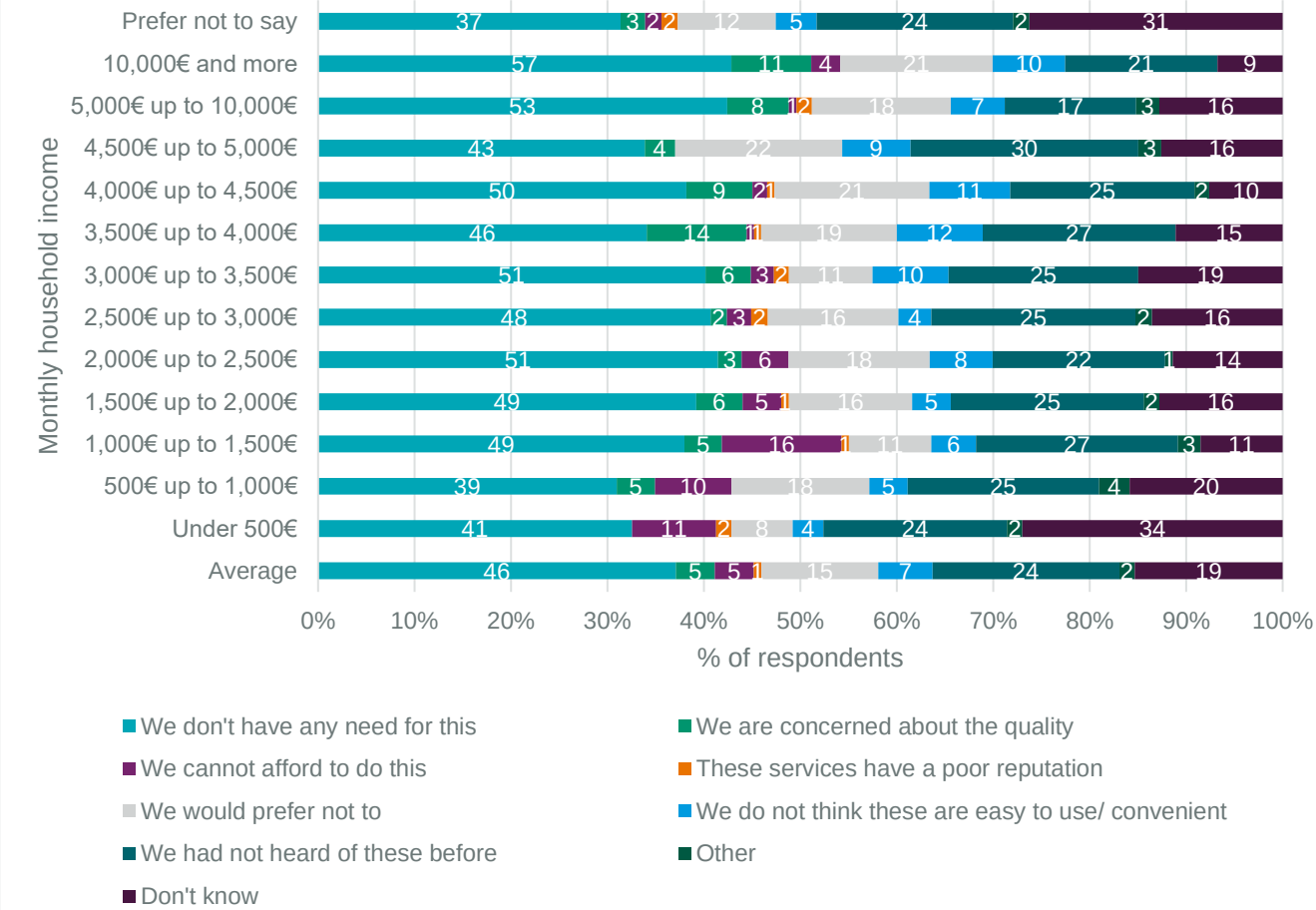


Figure 20 shows the reasons for not using a peer-to-peer use and sharing model, with results broken down into monthly household income brackets. Similarly, households across all income groups also chose that they 'Did not have any need for this' as their most selected answer. The second most selected response was 'We had not heard of these before', an option selected by 24% of respondents across all household income ranges. This shows that a lack of need and knowledge of peer-to-peer use and sharing models' existence were the key driving factors in their limited uptake.

Figure 20. Reasons for not using peer-to-peer use and sharing models in 2023, in relation to household income.



Appendix 8.5 contains the analysis for this indicator.

4.2.2 Limitations

The following limitations have been identified through the testing programme:

- Due to time constraints restraints, only regional data within one Member State (i.e. Germany) was collected. This meant that only results from the specific regions within Germany were compared, rather than specific regions within two Member States.
- After an initial review of the proposed questions for the citizens survey, it was recommended by YouGov (the survey disseminator) to offer numerical ranges to respondents (i.e. used peer-too-peer use and sharing models 1 to 2 times, 3 to 5 times, etc.) rather than asking them to indicate the true value in a free text box. Due to the experience that YouGov have in carrying out surveys, this recommendation was followed. Whilst this reduced the amount of guesswork from respondents and allowed them to be grouped easier, it also likely meant that some responses received were less accurate than they could have been otherwise.
- The use of self-reported data may have introduced recall bias, and potentially social desirability bias. The respondents may not have accurately remembered how much they used peer-to-peer use and sharing

models, or they may have reported what they think is socially acceptable (rather than their actual practices). This is particularly relevant when asking about spending habits or income.

- The survey results indicate a significant lack of awareness about peer-to-peer models. In future, it might be beneficial to include questions that gauge the level of understanding about these models before assessing usage. This could help in distinguishing between non-use due to preference and non-use due to lack of knowledge.
- While analysis on income is included within this testing programme, other factors such as education level and technological access might also significantly influence the use of peer-to-peer sharing practices.
- The success of service models heavily relies on the availability and accessibility of technology. In regions with limited digital infrastructure or where technological literacy is low, the reach and effectiveness of these service models are likely to be significantly constrained. This could complicate efforts to uniformly apply and compare the indicator across different regions and Member States. When developing targets or benchmarks related to service models, it is crucial to account for these technological limitations.

4.2.3 Performance

As Table 17 shows, during Task 4 of this study, the original indicator was given a score of 10 in the RACER evaluation process (named “Peer to peer use and sharing”). The original indicator scored low on the ‘Ease’ and ‘Robustness’ criteria due to the predicted difficulty in collecting the data required to test the indicator, as well as the predicted lack of robustness resulting from the collection of easily misinterpreted qualitative data.

Following Task 5, the indicator was awarded a score of 13, due to performing better across the ‘Ease’ and ‘Robustness’ criteria. The improvement in the ‘Ease’ score was awarded due to the relative simplicity of developing and disseminating the citizen’s survey via YouGov, whilst the higher ‘Robustness’ score was due to the development of the comprehensive methodology used to test this indicator and the large sample size received of 2,266. Whilst improvements were made, the indicator failed to receive top marks in ‘Credibility’ and ‘Robustness’. A lower ‘Credibility’ score was received due to the use of opinion-based data from respondents, with participants possibly interpreting answer options differently. The ‘Robustness’ score was received due to the use of numerical ranges within the survey questions and subsequent results.

Table 17. RACER evaluation.

Stage of project	RACER criterion					Score
	Relevance	Acceptability	Credibility	Ease	Robustness	
Task 4 (original RACER assessment)	3	3	2	1	1	10
After Task 5 (following testing)	3	3	2	3	2	13

To ensure consistency in applying RACER, the assessment matrix shown in Appendix 8.2 was applied to support the decision making process.

4.3 CHALLENGES AND LESSONS LEARNED

4.3.1 Challenges

One challenge faced by the team was the task of disseminating the citizen’s survey and in turn receiving reliable and trustworthy results from a large enough sample in a relatively small period of time. In order to overcome this challenge, it was decided that although the team would still have full control over the questions being asked, a third-party organisation would be commissioned to disseminate the survey. Whilst this helped to overcome the challenge being faced; it also came at an extra cost which should not be overlooked when considering future data collection associated with this indicator. The potential cost and complexity of data collection via surveys across EU Member States poses a potential challenge for applying the indicator in future. The EC conducts regular EU-wide consumer surveys so might be appropriate to integrate this topic into these regular surveys or consider adopting separate surveys related to sustainability and the CE.

4.3.2 Lessons learned

Lessons learnt were recorded throughout the process of creating and testing this indicator, which may be applied to inform future assessments of indicators:

- For indicators which are based on data from citizen surveys, a judgement needs to be made at the early stages of testing as to what level of data granularity is required. There is a direct trade-off between the level of granularity asked for and the burden on the respondent to answer the questions. Asking for actual numbers within an open-ended question format is a more burdensome approach and could lead to missing data, however it would result in more granular data. In comparison, using numerical ranges within a closed-ended question format would provide less granular data, but would alternatively be easier/quicker for the respondent to complete, which would likely result in higher response rates. Considering this, it is recommended to disseminate citizen surveys via a platform who can guarantee reaching the pre-determined response rate (such as YouGov).

4.4 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that this indicator is considered for further development, with minor work required to facilitate its progress.

The main findings from this indicator showed that the majority of households in Germany did not use a peer-to-peer use and sharing model in 2023. However, of those households that did, 'Vehicles' was generally the product category that was most used within these models. Over 50% of households had a more positive view of these models after having used one, with 80% of those with the lowest household income experiencing these positive views. Of those that hadn't use a peer-to-peer use and sharing model in 2023, most opted against it due to a lack of need, whilst 24% of households hadn't heard of these models.

Increasing the uptake of peer-to-peer use and sharing models and gaining a better understanding of household opinions of these models, is a key step for the EC to reach their goal of achieving a true CE. The value of the global sharing economy has been forecasted to rise from below $150 million in 2023 to $600 million in 2027[6], highlighting the scale of the potential environmental and circular benefits that can be achieved through peer-to-peer use and sharing models. This potential emphasises the importance and relevance of developing indicators that measure not only the uptake of peer-to-peer use and sharing models, but also the public opinion on these models.

A citizen's survey was used to collect the data required for this indicator. Through disseminating this survey via a 3rd party (YouGov in this case), the data had good availability, robustness and directness. The methodology also has the potential to be easily replicated on a yearly basis to monitor progression. As the EC conducts regular EU-wide consumer surveys, it may be appropriate to integrate this topic into these regular surveys or consider adopting separate surveys related to sustainability and the CE. Whilst YouGov was successfully used in the testing of this indicator, it may be more cost effective to integrate the questions into the regularly circulated EU-wide consumer surveys that the EC currently conduct.

Due to the large number of respondents that were unaware of peer-to-peer use and sharing models, it is recommended that public facing guidance is developed to educate households on topics such as what a peer-to-peer use and sharing model is, what the benefits are of using this type of model, and examples and availability of these models. Once this guidance has been developed and distributed, the figures regarding awareness of peer-to-peer use and sharing schemes can be revisited on an annual basis to monitor its impact. This increase in consumer knowledge may also help in future data collection processes, with respondents being able to accurately decipher when they have and haven't use a peer-to-peer use and sharing model.

Similarly, it is recommended that legislation should be implemented to incentivise the use of peer-to-peer use and sharing models. This may include tax breaks, subsidies on purchases, or other financial benefits (e.g. reduced parking/congestion charges for shared vehicles). This legislation would build on the EC 'A European

[6] Statista, Value of the sharing economy worldwide in 2023 with a forecast for 2027 and 2031. (Statista, 2023). <https://www.statista.com/statistics/830986/value-of-the-global-sharing-economy/>. Accessed: March 2024.

agenda for the collaborative economy'[7] release, which while detailing benefits of the sharing economy to consumers and entrepreneurs, fails to discuss potential legislative levers to incentivise the increased uptake in peer-to-peer use and sharing models.

It is also recommended that digital infrastructure limitations are addressed via investment in digital infrastructure and literacy, particularly in regions that currently have a low rate of adoption of these technologies. This investment may provide significant enhancement to the reach and effectiveness of peer-to-peer use and sharing models.

Due to the informality of a lot of peer-to-peer use and sharing models currently in operation, and the subjective nature of qualitative data, it has not been deemed necessary to define targets to support the implementation of this indicator.

Following the testing of this indicator, it was found that its original name was fit for purpose and that no variation was needed.

Whilst there is not any direct crossover with this indicator and those within the new EU monitoring framework for CE, quantifying the level and perception of peer-to-peer use and sharing models at a regional/city level would indirectly support improvements across the following macro level indicators:

- **Material footprint:** i.e. a quantification of the demand for material extractions triggered by consumption and investment by households, governments and businesses across the EU. Encouraging the use of peer-to-peer use and sharing models would support the reduction of material footprints as goods are being shared between consumers, minimising the number of goods that are needed on the market to meet demand.
- **Total waste generation per capita:** i.e. the total waste generated in a country (including major mineral wastes), divided by the average population of the country. Encouraging the use of peer-to-peer use and sharing models will reduce the number of goods placed on the market, thereby reducing waste generation when these goods reach end of life.
- **Generation of municipal waste per capita:** i.e. the waste collected by or on behalf of municipal authorities and disposed of through the waste management system. Encouraging the use of peer-to-peer use and sharing models will reduce the number of goods placed on the market, thereby reducing municipal waste generation when these goods reach end of life.
- **Consumption footprint:** i.e. the environmental impacts of EU and Member States consumption by combining data on consumption intensity and environmental impacts of representative products, with the indicator covering mobility as an area of consumption. Encouraging the use of peer-to-peer use and sharing models will reduce our consumption footprint as fewer overall goods will be purchased.

[7] EUR-Lex, COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A European agenda for the collaborative economy. (EUR-Lex, 2016). https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52016DC0356. Accessed: March 2024.

Table 18. Summary of recommendations for H4

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Policy	Explore the appropriateness of including this indicator within the regular EU-wide consumer surveys disseminated by the EC.	Short (0.5 – 1.5 years)	• **Responsible:** EC • **Accountable:** EC • **Consulted:** EC • **Informed:** Households/citizens	• **Ease:** The data collection process would be eased should this recommendation be implemented. • **Robustness:** The target would encourage the year-on-year monitoring of this indicator, providing more accurate results.
Legislation	Incentives encouraging the use of peer-to-peer use and sharing models.	Medium (1.5 – 5 years)	• **Responsible:** EC • **Accountable:** National governments. • **Consulted:** National governments, peer-to-peer use and sharing platforms, citizens. • **Informed:** All stakeholders within EU, the peer-to-peer use and sharing industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
Development of guidance	Develop public facing guidance to educate them on the use of peer-to-peer use and sharing models (e.g., what they are, how they can be accessed, and the benefits of using them).	Medium (1.5 – 5 years)	• **Responsible:** EC • **Accountable:** National governments, peer-to-peer use and sharing platforms. • **Consulted:** National governments, the peer-to-peer use and sharing platforms, citizens. • **Informed:** All stakeholders within EU peer-to-peer use and sharing industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
Investment	Invest in digital infrastructure and literacy across regions with a low adoption rate. This may increase the reach of peer-to-peer use and sharing models.	Medium (1.5 – 5 years)	• **Responsible:** EC • **Accountable:** EC, national governments. • **Consulted:** National governments, citizens. • **Informed:** Citizens.	NA – the recommendation will support the indicator through encouraging performance improvements.

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Data collection	Surveys should be integrated into existing EC conducted EU-wide surveys.	Short (0.5 – 1.5 years)	• **Responsible:** EC. • **Accountable:** EC • **Consulted:** National governments, citizens. • **Informed:** Citizens.	• **Ease:** The data collection process would be eased should this recommendation be implemented.

5. INDICATOR 4: ITEMS OF CLOTHING REPAIRED BY HOUSEHOLDS PER YEAR

This indicator aims to measure the average number of clothing items repaired by households each year, at a regional/city level. This will be broken down by item type, in order to identify which clothing items are more commonly repaired by citizens within certain cities/regions across EU Member States.

Repair refers to the fixing of a specified fault in a product and/or replacing defective components, in order to make the product a fully functional product to be used for its originally intended purpose (The International Resource Panel, 2018). It is an essential aspect of the CE as it works to extend the lifespan of products and materials. Repair acts as a Value Retention Process (VRP) through retaining material value and functionality of a product.

There are many benefits for the EC to monitoring this indicator, such as:

- Moves away from focusing on recycling rates, to more desirable CE strategies which are higher up the waste hierarchy[8].
- Supportive of driving positive social and economic impact in communities.
- Will help to gain a better understanding of the current adoption of self-repair and third repair activities.
- Will help to gain an understanding of what clothing items are most commonly repaired by households.
- Will help to measure and monitor the circularity of households within different regions/cities.

5.1 KEY METHODOLOGY

5.1.1 Testing method

To clearly define the types of clothing to be assessed for this indicator and to allow for replication across the EU, it was decided to use the EU tariff codes (which every product exported from or imported into the EU receives) due to it being easily understandable by citizens and households. Table 19 below lists the different types of clothing found in this classification.

Table 19. EU tariff codes[9]

Product classifications for textiles
Blouses and shirt blouses
Jackets and blazers
Jerseys and pullovers
Overcoats, parkas, anoraks, windcheaters, wind jackets and similar articles
Shirts for men or boys
T-shirts, singlets and vests
Skirts and divided skirts
Sarongs
Trousers, dungarees and shorts
Dresses
Suits and ensembles
Clothing accessories

[8] The “waste hierarchy” ranks waste management options according to what is best for the environment.
[9] EC, Classifying textiles. Classifying textiles | Access2Markets (europa.eu). Accessed 15 February 2024.

Product classifications for textiles
Specialist clothing

Please note that due to the time limitations involved in this research project, the team have decided to reduce the scope to the following key items:

- Jackets and blazers.
- Trousers, dungarees and shorts.
- T-shirts, singlets and vests.
- Footwear. 10

However, when monitoring in full, it is recommended that this indicator is measured across all categories.

5.1.2 Data collection method

The data informing this analysis, and the conclusions drawn from it, were gathered in a nationally representative survey of citizens conducted by YouGov Plc for the sole purpose of this project. The figures were weighted by YouGov in accordance with the national demographic breakdown and are therefore representative of all French adults (aged 18+). The total sample size was 1,019 adults, and the survey was undertaken between 28th February - 1st March 2024. The survey was carried out online.

To maximise efficiencies across all indicators using a citizen's survey, one nationally representative survey was sent out across France, which covered the following indicators. Table 20 below lists the indicators which were included in this overall survey.

Table 20. Indicators includes within the 'Household goods' citizen survey

URN	Indicator name
H5	Items of clothing repaired by households per year
H7	Household spending on maintenance and repair, across priority product and material stream
H8[11]	Comparison of life of household furniture as estimated by manufacturers and the actual duration these items are used by households
H10	Unused household goods, across priority products and material streams

The total sample size was 1,019 adults and Table 21 shows the breakdown of this at a city/regional level. The figures have been weighted in accordance with the national demographic breakdown and are therefore representative of all French adults (aged 18+).

Table 21. Breakdown of responses by region/city

Name of region/city	Percentage of sample (%)
North East	26
North West	19
Paris Region	18
South East	25

[10] Please note, for the nature of this testing programme, 'Footwear' has been added into the original textile classifications for completeness.
[11] Please note, this indicator is presented within the Group 3 case study document for 'Households'.

Name of region/city	Percentage of sample (%)
South West	11
Total	**100**

Table 22 shows a breakdown of the respondents by household income.

Table 22. Breakdown of responses per household income

Household income (€)	Percentage of sample (%)
Less than 15,000	12
15,000 – 19,999	7
20,000 – 29,999	17
30,000 – 39,999	14
40,000 – 49,999	9
50,000 – 59,999	7
60,000 – 69,999	4
70,000 – 79,999	2
80,000 – 89,999	2
90,000 – 99,999	1
100,000 – 124,999	<1
125,000 – 149,999	<1
150,000 – 199,999	<1
200,000 +	<1
I don’t know	7
Prefer not to answer	14
Total	**100**

For the nature of this testing programme, the following data inputs were requested from households for 2023:

- Number of ‘Jackets and blazers' your household repaired.
- Number of ‘Trousers, dungarees and shorts’ your household repaired.
- Number of ‘T-shirts, singlets and vests’ your household repaired.
- Number of ‘Footwear items’ your household repaired.

The following forms of repair were explored through this indicator:

Table 23. In-scope activities relating to repair

In-scope activities	Description
In-house company repairs and maintenance	Services provided by the specific product manufacturer or retailer directly to consumers.
Third party repairs and maintenance	Services provided by external companies to consumers who are not the direct manufacturer and retailer of the product.
Self-repair and maintenance (where possible)	Providing consumers with the necessary knowledge, tools, and equipment to carry out safe and efficient repairs at home.

Alongside this, qualitative data was also requested to provide additional narrative to the indicator results. The qualitative data collected included:

- The average frequency of clothing repairs by households, broken down per region.
- The most common type of clothing repairs by households, broken down per region and clothing type.
- The main barriers to households repairing their clothes, broken down per region.

Please refer to Appendix 8.6 to view the survey script. Please note, the survey was translated into French before dissemination by YouGov.

5.1.3 Calculations

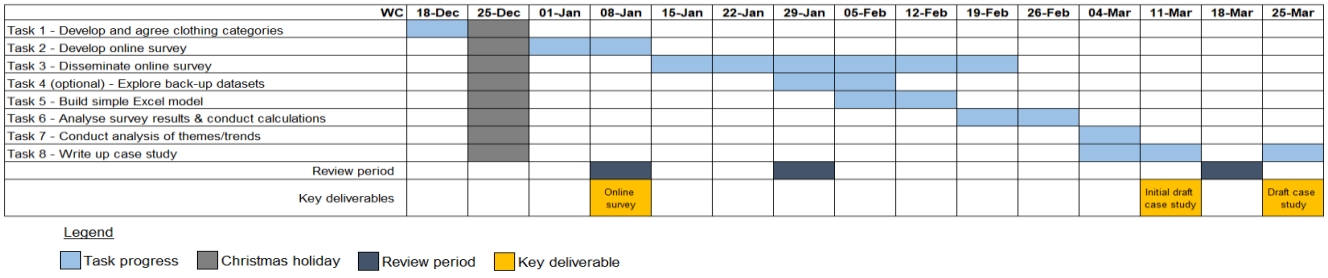
To calculate the indicator, a weighted average based on the proportion of total responses (excluding any responses for 'Don't Know') in each region was determined. These proportions were then applied to the mid-point of the ranges provided within the survey questions to give an estimate of the average number of clothing items repaired.

Please refer to Appendix 8.7 to view the calculations conducted.

5.1.4 Timeline

The project timeline is show in Table 24.

Table 24. Gantt chart for H5



5.1.5 Data gaps and mitigation

During the course of this testing programme, no data gaps were identified.

5.1.6 Quality review of analysis

To ensure robust and high-quality analysis of the data, the following QA procedure were conducted:

- Prior to work beginning, the Project Director reviewed the proposed research methodology and ensure that the data collection plan is fit for purpose. Only once the research team had addressed any comments from the review process did they proceed to the data collection phase.

- In relation to the survey development and dissemination, the Project Manager reviewed the line of questioning for this indicator to ensure that it was clear, followable and able to generate reliable and robust results. In addition to this, respondents were also required to answer each question before being able to move on to ensure data validation of the survey.
- Once the survey has closed and the results had been analysed, the Quality Assurance Manager conducted a thorough internal quality assurance process on the MS Excel data set which pulled together the data from the survey and subsequent calculations. Any incoming data and assumptions were clearly logged, presenting survey data, user inputs, calculations, assumptions and results.

5.2 KEY ANALYSIS RESULTS

Please note that all figures, unless otherwise stated, are from YouGov Plc. Total sample size was 1,019 adults. Fieldwork was undertaken between 28th February - 1st March 2024. The survey was carried out online. The figures have been weighted and are representative of all French adults (aged 18+).

5.2.1 Analysis

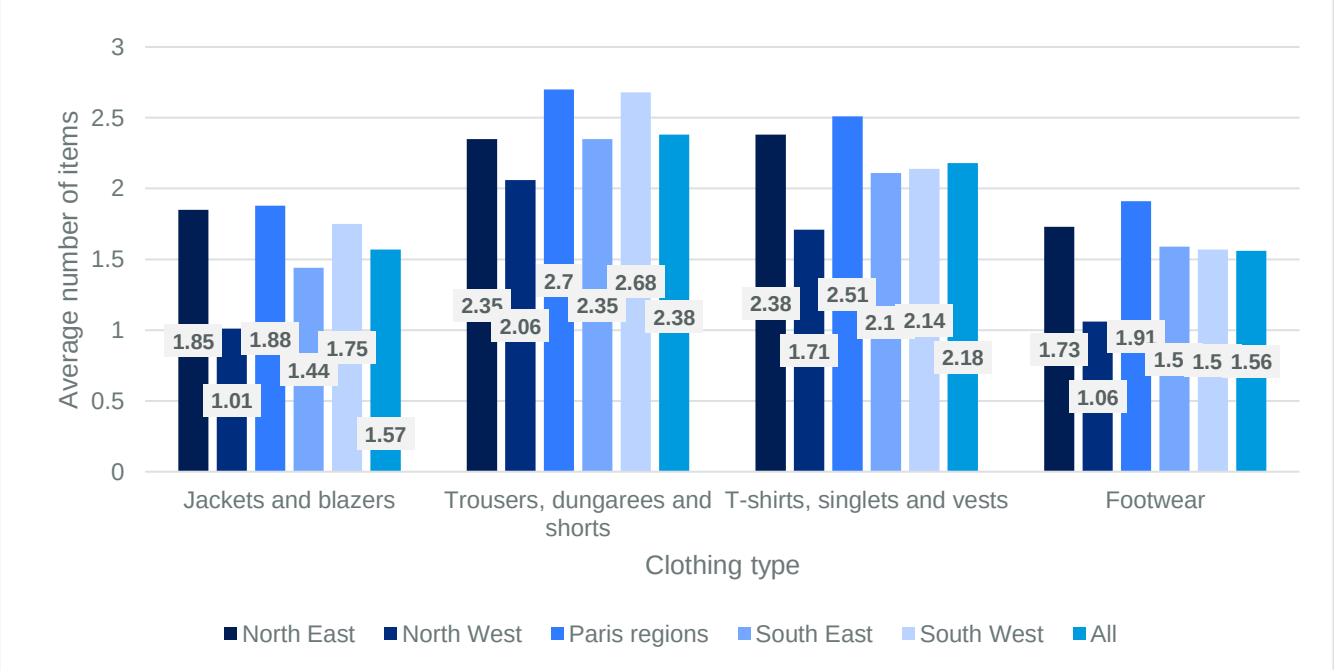
5.2.1.1 Main results

Figure 21 presents the main results for this indicator.

'Trousers, dungarees and shorts' were the most commonly repaired across households in all regions, with households on average repairing an estimated 2.38 items in 2023. 'Footwear' were the least commonly repaired by households in all regions, with households repairing an estimated 1.56 items in 2023.

Across all clothing types explored, households within the Paris region on average repaired the most items in 2023. Households within the North West region repaired the least number of items across all clothing types.

Figure 21. Average number of items repaired by households across the key clothing types, broken down per region (2023).



5.2.1.2 Detailed results

On average across all regions surveyed, when asked how often French households repair their broken clothing, 11% said they 'always do', 28% 'often do', 27% 'sometimes do', 17% 'rarely do', 13% 'never do' and 3% 'Did not know' (see Figure 22). Households within the Paris region were the most likely to always repair their broken clothing, whilst households within the South West region were the most likely to never repair their broken clothes.

Figure 22. Frequency of clothing repairs, broken down by region

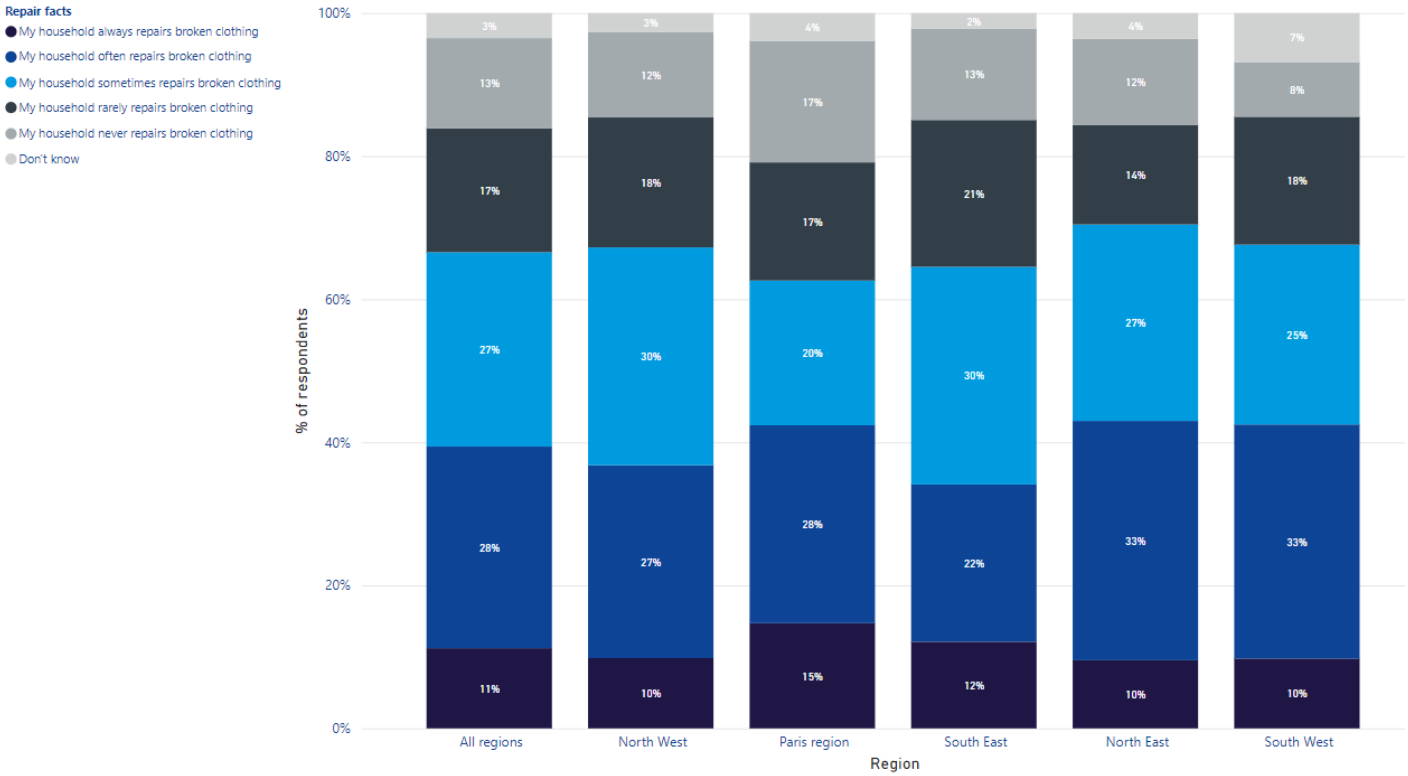
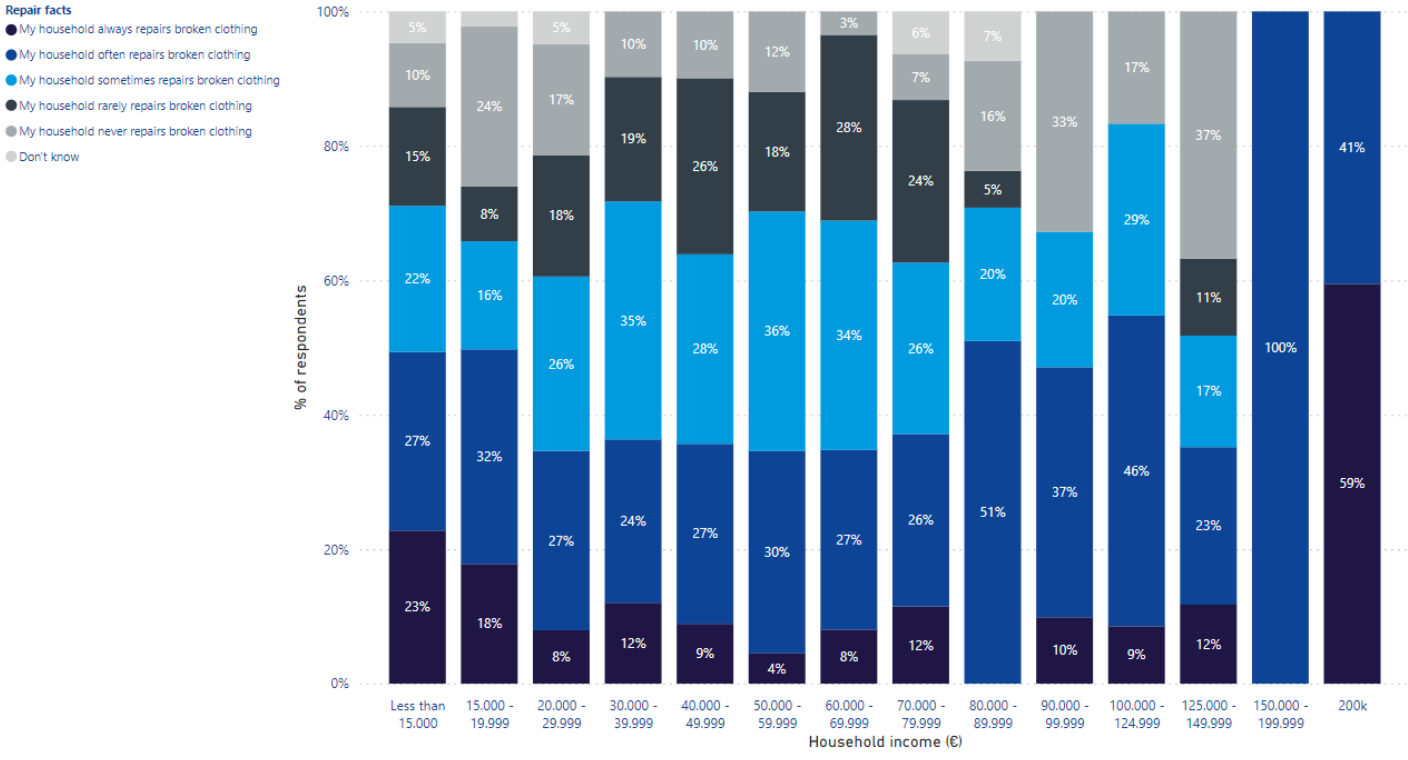


Figure 23 highlights the frequency of clothing repairs in relation to household income across the whole of France. Those households earning less than €15,000 a year were the most likely to repair their clothes, with almost 23% of respondents in that income category selecting 'My household always repairs broken clothing'. Households with a combined income of more than €100,000 were the most likely to never repair their broken clothes, with 19% of respondents within that income group selecting 'My household never repairs its broken clothing'.

Figure 23. Frequency of clothing repairs, broken down by household income



As Figure 24 shows, across all French regions, the main barriers cited for not repairing clothes was a lack of skills (49%), a lack of available equipment (31%) and a lack of understanding of available services (24%).

Figure 24. Barriers to repairing broken clothing, broken down per region

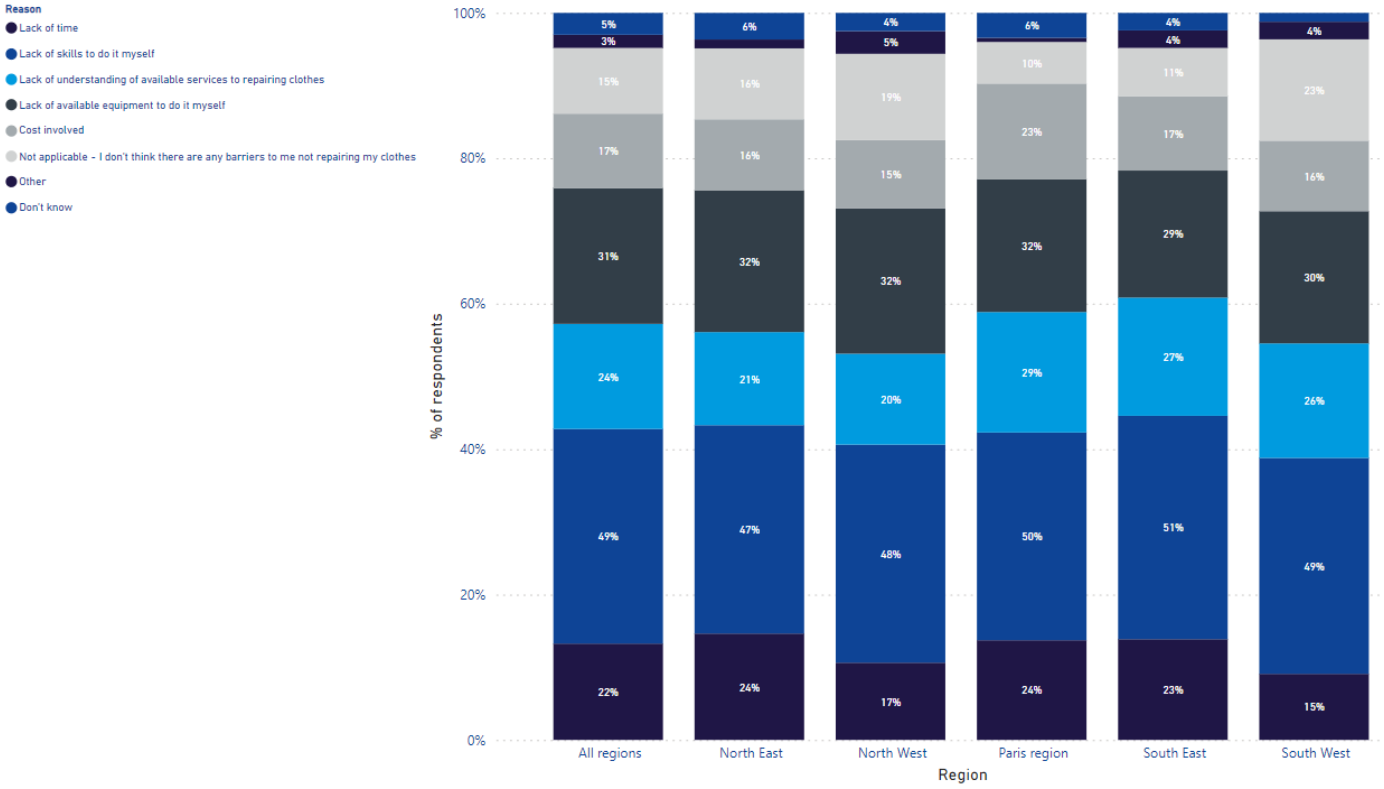


Figure 25 highlights the frequency of repair by French households in 2023 across the key clothing types, broken down by region. Figure 26 presents the same results, alternatively broken down by clothing type.

Across all regions, households most commonly did not repair their ‘Jackets and blazers’ in 2023, with 43% of respondent selecting ‘0’. The North West region repaired the least amount of ‘Jackets and blazers’ in 2023, with 54% of respondents stating they repaired none. This was 20% higher than the total across all regions.

Across all regions, households most typically repaired 1 – 3 items of ‘Trousers, dungarees and shorts’ in 2023, with 51% of respondents selecting this option.

French households most commonly repaired 1 - 3 items of ‘T-shirts, singlets & vests’, with 39% of respondents selecting this option across all sampled regions. Across all regions, 36% of respondents said that they repaired no items within that clothing type in 2023.

Repair activities across all regions for ‘Footwear’ was low, with 44% of households not repairing any shoes in 2023 and 40% repairing between 1 – 3 pairs. Households within the North West were the most likely to not repair any footwear items, with 55% of respondents not repairing any in 2023.

Figure 25. Frequency of repair across the key clothing types, broken down by region (2023)

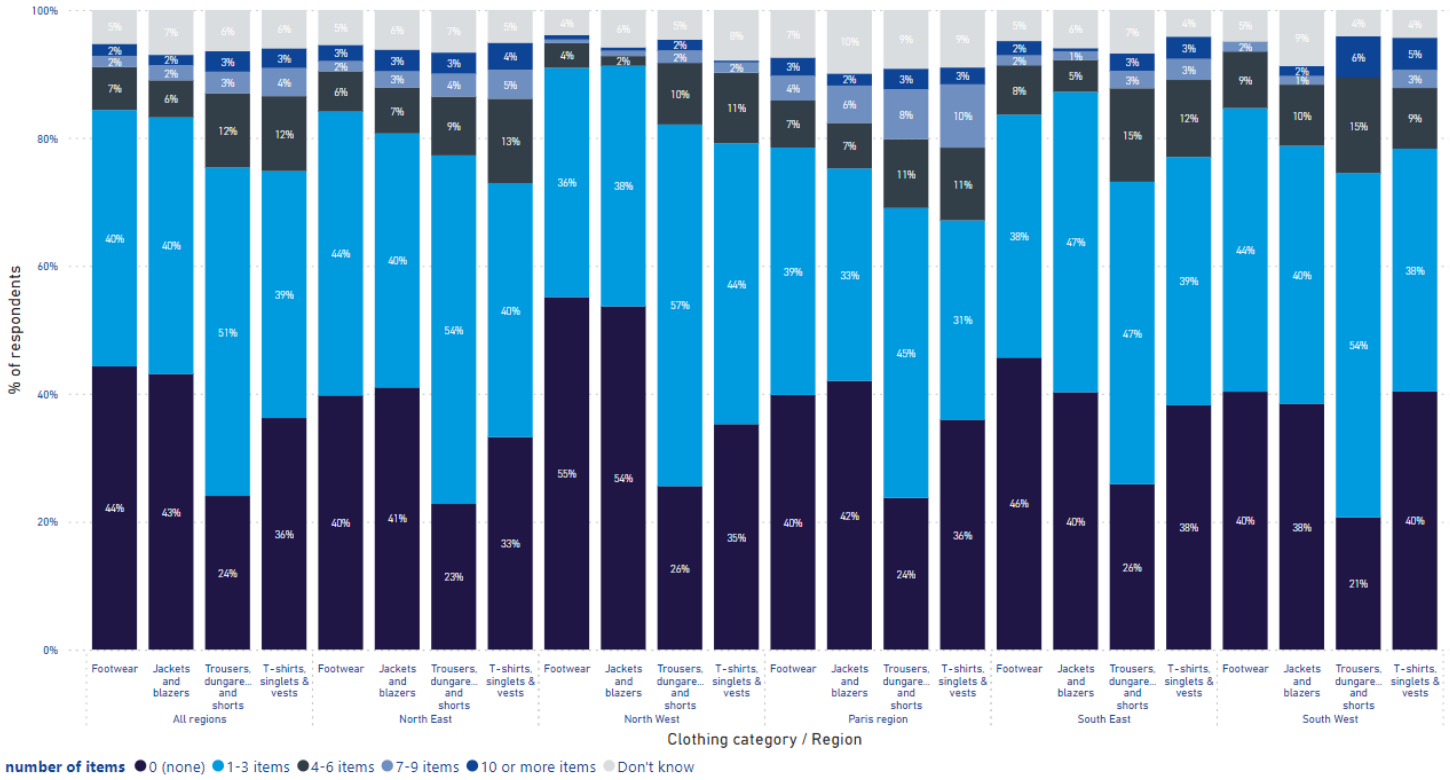


Figure 26. Frequency of repair across the key clothing types, broken down by type (2023)

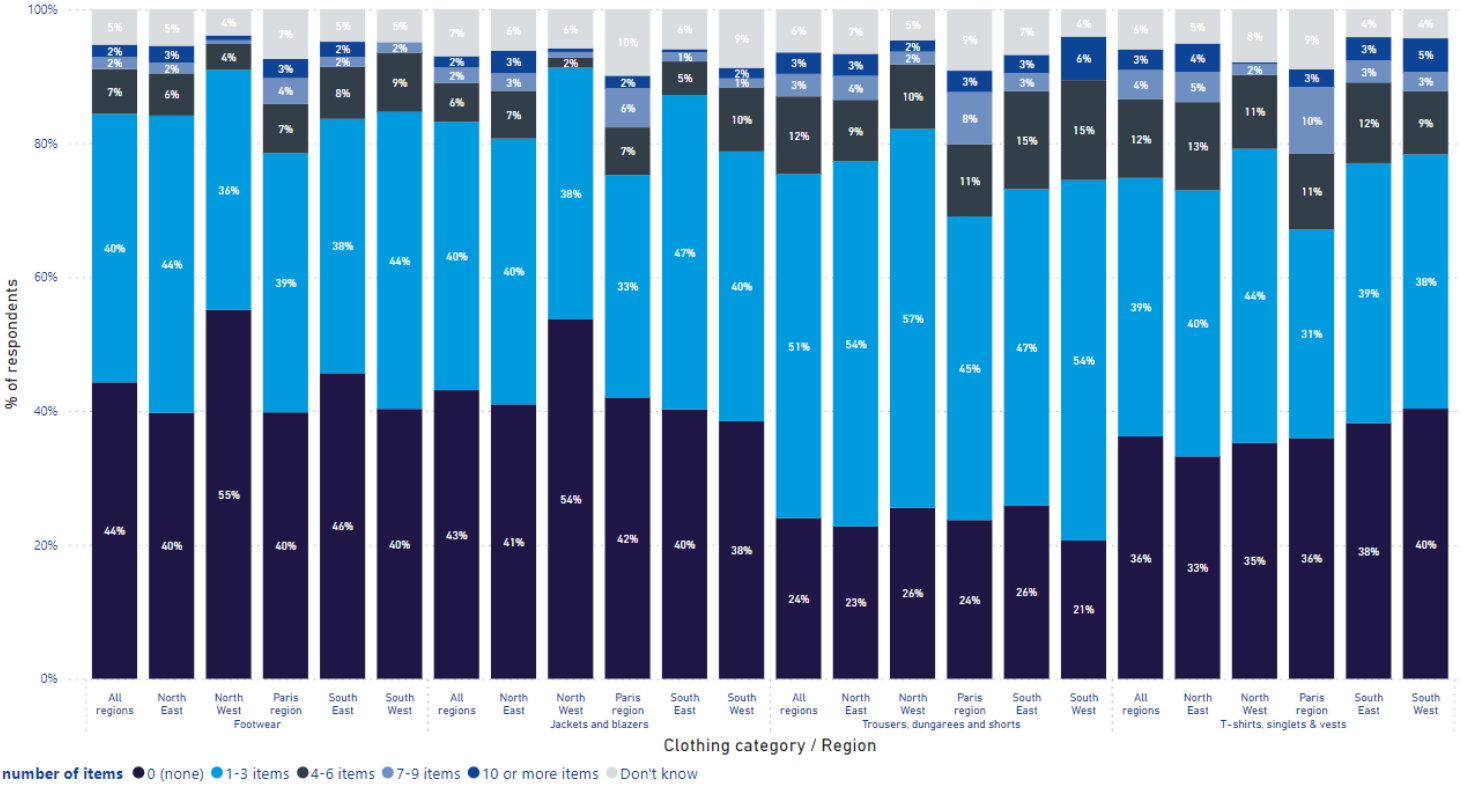


Figure 27 presents the most common types of repair across each of the key clothing types in 2023, broken down by region. Figure 28 presents the same results, alternatively broken down by clothing type.

Across all French regions sampled, the most common types of repair for 'Jackets and blazers' were self-repair (54% of respondents) and 3rd party repair (23% of respondents).

For 'Trousers, dungarees and shorts', 'Self-repair' was the most common type of repair for this clothing type across all individual regions, with an average of 61% of respondents selecting this option. However, in the Paris region, only 46% of respondents using 'self-repair' as the most commonly used option and 31% using 'third party repair'.

Similarly to 'Jackets and blazers' and 'Trousers, dungarees and shorts', 'self-repair' was the most common type of repair for 'T-shirts, singlets and vests' in 2023, with 67% of respondents selecting this option across all regions. Households within the Paris region were less likely to self-repair these clothing items, with only 52% of respondents selecting this option. 'third party repair' was a more commonly used repair type for 'T-shirts, singlets and vests' than the other French regions.

'Footwear' was the only clothing type where 'Self-repair' was not the most common type of repair. 'Third party repair' was most commonly used to repair broken footwear items, with 41% of respondents selecting this option across all regions.

Figure 27. Common types of repairs across the key clothing types, broken down by region (2023)

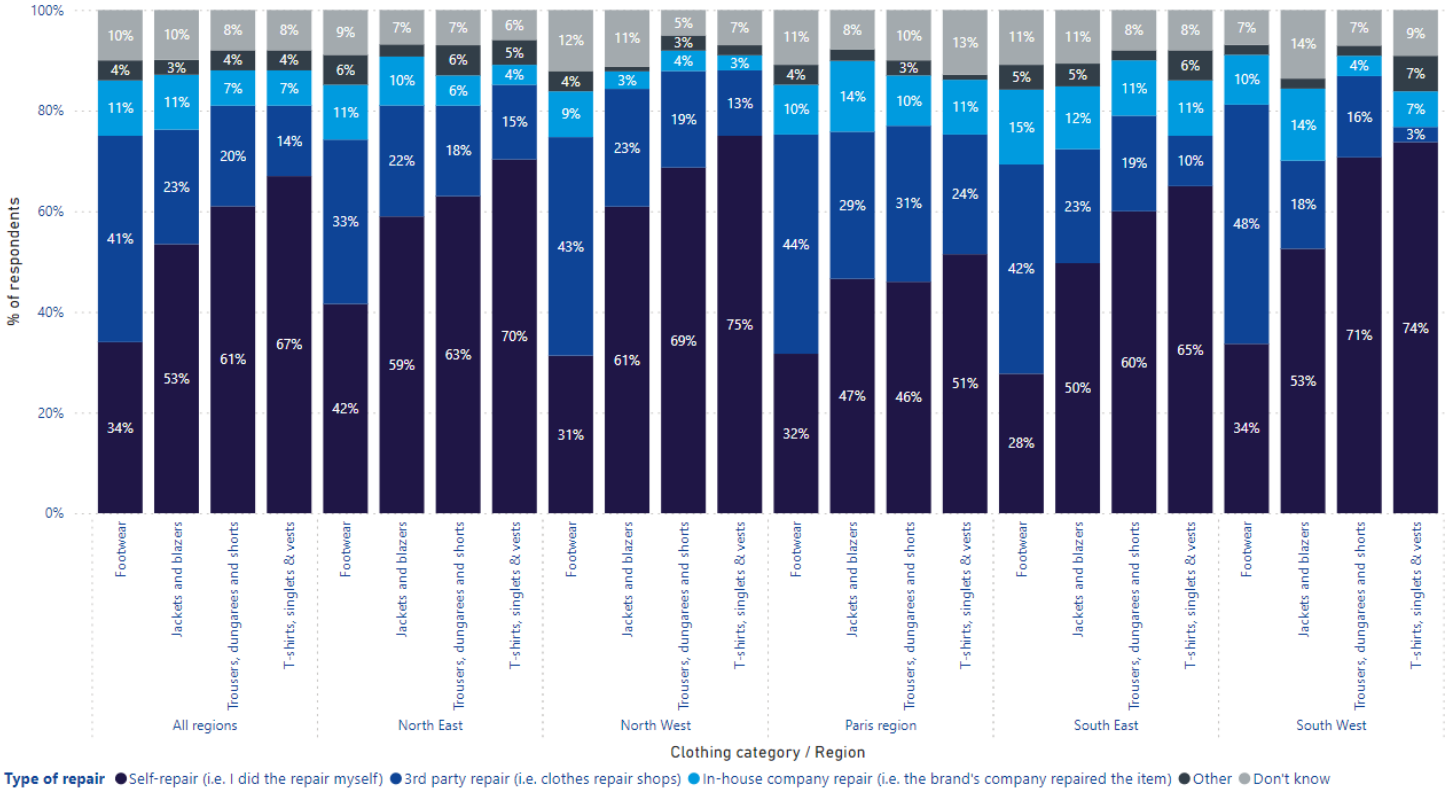
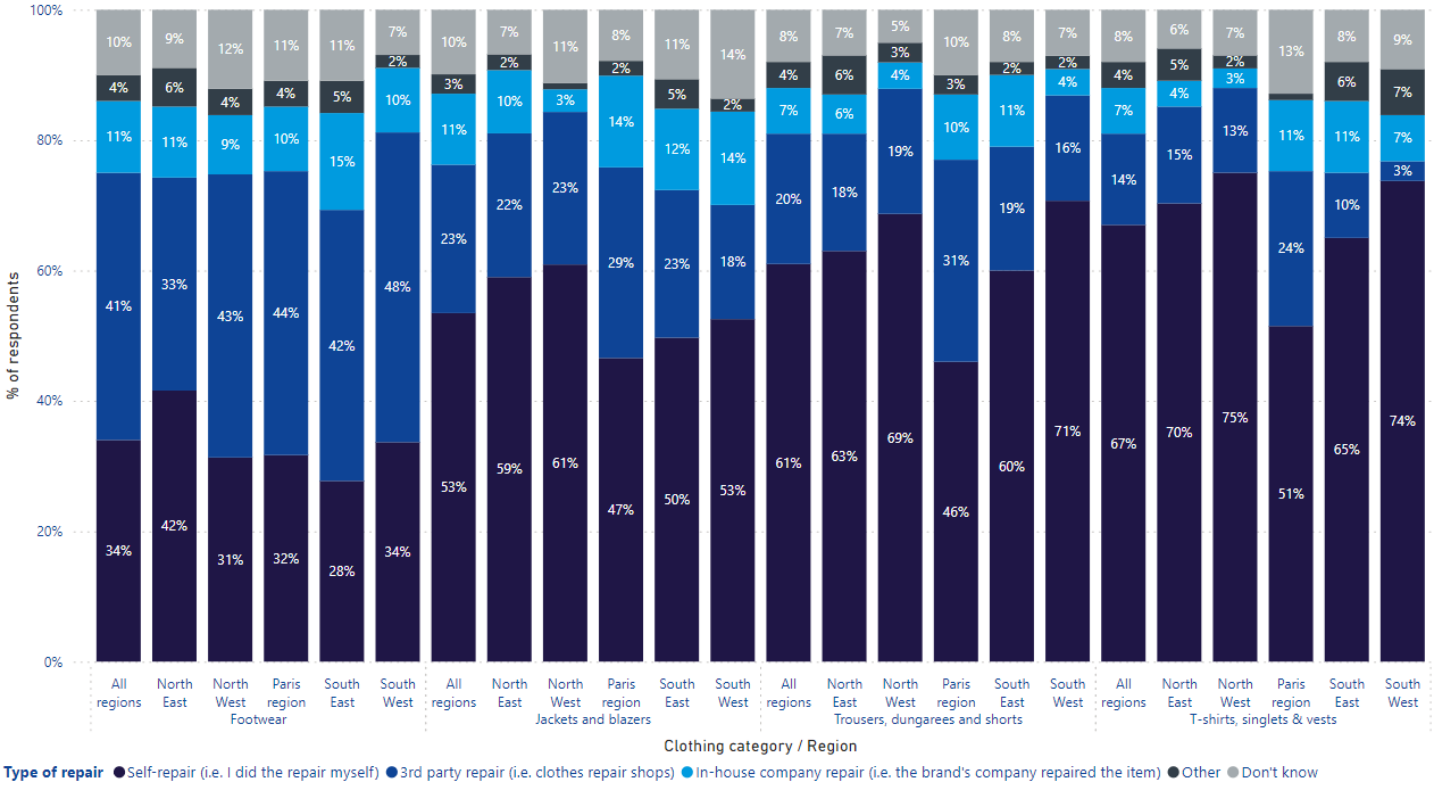


Figure 28. Common types of repairs across the key clothing types, broken down by type (2023)



5.2.2 Limitations

The following limitations have been identified through the testing programme:

- Due to time constraints, only regional data within one EU Member State (i.e. France) was collected and analysed. This meant that only results from the specific regions within France were compared, rather than specific regions within two or more EU Member States. For many of the results there were minor regional differences within France itself. Therefore, it is thought that more valuable and interesting results will be determined if this indicator is rolled-out to all EU Member States.
- Within the survey questions, numerical ranges were used to allow respondents to provide an estimate, which means they not face 'recall difficulty' (i.e. needing to think back and recall each specific action/behaviour from the previous year). However, the downside of this approach is that the survey results did not generate exact values of the number of items an average household repaired last year. The collected data was therefore more difficult to analyse than if an open format was used, and it may have also resulted in bias.
- Due to the use of numerical ranges within the survey question, mid-points were used to conduct further analysis. Although this was deemed a sensible approach for this testing programme, using mid-points assumes that responses are uniformly distributed within each range, which may not be the case. Depending on the actual distribution of data within each range, using midpoints could lead to overestimation or underestimation of the true average. However, due to the fairly small ranges used, it would have had a lesser impact, apart from potential the option for '10 or more items'.
- Although the survey figures were weighted by YouGov in accordance with the national demographic breakdown and are therefore representative of all French adults (aged 18+), not all regions within France were included in the sample. This may have potentially led to some inaccuracies.
- The use of self-reported data for determining the average number of items repaired by households will have introduced recall bias, and potentially social desirability bias. The respondents may not have accurately remembered how many clothing items they repaired, or they may have reported what they think is socially acceptable (rather than their actual practices).
- The survey does not account for the variability in how different types of clothing are used and the frequency with which they might need repairs. For example, work clothing might be subjected to more

wear and tear than occasional wear, and this could impact the repair frequency. This lack of data could impact the accuracy of conclusions about the most frequently repaired items.

- Although a definition of 'repair' was provided in the survey, individual understanding and interpretation of what constitutes a repair can vary. This could lead to inconsistencies in what respondents would consider a repair, potentially impacting the data's reliability.
- While household income is a valuable metric, it may not fully capture the complexities of socio-economic status. Factors such as education level and occupation could potentially influence repair practices but are not explicitly accounted for in the analysis.

5.2.3 Performance

Table 25 below compares the RACER score allocated to the original indicator during Task 4 (named '*Items of clothing repaired per year*') against the final indicator after the Task 5 testing process. During Task 4, the original indicator was allocated a score of 12 against the RACER evaluation process. This was due to the indicator being supportive of the EU Textiles strategy[12], and its focus upon product life extension and strategies further up the waste hierarchy[8]. At this stage the data was thought to be easy to collect via sales information from repair shops and online repair surveys.

Following the Task 5 testing, the indicator was allocated a score of 14, due to performing higher than expected for the criterion 'Ease' and 'Robustness'. This was due to the development and dissemination of a citizen's survey via YouGov, which was a simple process and provided relatively robust results due to a large sample size of 1,019 adults. The indicator also performed higher in the 'Robustness' criterion, due to the survey receiving a large sample size of 1,019 adults. However, it did not receive full marks for this criterion due to the use of numerical ranges within the survey questions and subsequent results.

Table 25. RACER evaluation

Stage of project	RACER criterion					Score
	Relevance	Acceptability	Credibility	Ease	Robustness	
Task 4 (original RACER assessment)	3	3	3	2	1	12
After Task 5 (following testing)	3	3	3	3	2	14

To ensure consistency in applying RACER, the assessment matrix shown in Appendix 8.2 was applied to support the decision making process.

5.3 CHALLENGES AND LESSONS LEARNED

5.3.1 Challenges

One major challenge faced during the monitoring process was the development and selection of clothing type categories. It is essential that the classification is the same across the EU, to ensure consistent data collection and reporting at a national level. Two potential options for classifying the key clothing items were identified, namely:

- EU tariff codes for textiles[13]: See Table 19.
- EEA textile categories: See Table 26.

[12] European Commission, EU strategy for sustainable and circular textiles, (Official website for the European Commission, 2023). https://environment.ec.europa.eu/strategy/textiles-strategy_en. Accessed 15th April 2024.
[13] EC, Classifying textiles. Classifying textiles | Access2Markets (europa.eu). Accessed 15 February 2024.

Table 26. EEA textile categories

Categories
Coats, jackets, trousers, skirts, suits and dresses.
Blouses, shirts, t-shirts, underpants and pyjamas.
Pullovers and cardigans.
Stockings, tights and socks.
Workwear.
Baby clothes, sportswear, scarves and handkerchiefs.
Household textiles.
Shoes.

After assessing the strengths and weaknesses of both classification systems, it was determined that the EU tariff codes were the most appropriate for this testing programme. This was due to the list being consumer friendly, making it easy for citizens and households to distinguish between the categories during the survey. Using the EU tariff codes would also support the whole life cycle tracking of clothing items, from the point at which they are placed on the market, their use (including repair) and their disposal. However, if this indicator is fully implemented in the future, it is recommended that the chosen categories are mapped against existing categories used within Extended Producer Responsibility (EPR) schemes. This will support harmonisation and will provide a fuller picture of the current flow of textiles across individual EU Member States.

Alongside the above, the following challenges were identified during this testing programme:

- Due to the team's previous experience of disseminating surveys, it was agreed that gathering data at a citizen level was a significant challenge for this indicator. As a result, during the very early stages of the testing programme, it was decided to use a third party to disseminate the survey. This meant that a response rate of at least 1,000 would be guaranteed.
- The potential cost of data collection via surveys across individual Member States poses a challenge for applying this indicator in the future. As the EC conducts regular EU-wide consumer surveys, it may be appropriate to integrate this topic into these existing surveys or to consider adopting separate surveys related to sustainability and the CE.

5.3.2 Lessons learned

Lessons learnt were recorded throughout the process of creating and testing this indicator, which may be applied to inform future assessments of indicators:

- For indicators which are based on data from citizen surveys, a judgement needs to be made at the early stages of testing as to what level of data granularity is required. There is a direct trade-off between the level of granularity asked for and the burden on the respondent to answer the questions. Asking for actual numbers within an open-ended question format is a more burdensome approach and could lead to missing data, however it would result in more granular data. In comparison, using numerical ranges within a closed-ended question format would provide less granular data, but would alternatively be easier/quicker for the respondent to complete, which would likely result in higher response rates.
- For indicators which rely upon survey data from citizens or households, going through a third party supplier is the most effective approach to ensure high response rates. YouGov were able to guarantee a response rate of 1,000, which allowed the team to make robust and evidence-led conclusions from the data. As mentioned above, as the EC conducts regular EU-wide consumer surveys, it may be appropriate to alternatively integrate this topic into these existing surveys or to consider adopting separate surveys related to sustainability and the CE.

5.4 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that this indicator is considered for further development, with minor work required to facilitate its progress.

Repair is an essential process for reaching the EC's ultimate goal of 'true circularity', in order to reduce production and consumption rates, and extend product lifespans. Through the Right to Repair[14] and the Ecodesign for Sustainable Products Regulation (ESPR)[15,16], repair is increasingly gaining traction on policymakers and legislator's agendas. However, traditionally repair has been given less attention than recycling (a strategy further down the waste hierarchy[8]), alongside other value retention processes such as reuse, remanufacture and refurbishment. With repair being increasingly passed into national and EU legislation, it is essential to develop indicators to measure the performance and success of these existing and upcoming policy instruments. As a result, this indicator is highly relevant to implement.

In order to access the required data to measure this indicator, a citizen's survey was essential. Through disseminating this survey via a third party, the data had good availability, robustness and directness. The approach has the potential to be easily replicated on a yearly basis, or alternatively across other products deemed of high importance.

In order to support the implementation of this indicator, it is recommended that a new target is established to monitor the repair rate of clothing items. Targets for the repair rate of all priority products should be implemented within the framework of the ESPR. This target would also support developments from the EU 'Right to Repair'.

The main findings from this indicator showed that two thirds of all French households repair their clothing at least sometimes, with almost four in ten doing so often or always. Self-repair was the most common repair method that respondents opted for, with 67% selecting this option for 'T-shirts, singlets and vests' and 61% for 'Trousers, dungarees and shorts'. The main barriers cited for not repairing clothes were a lack of skills, available equipment (i.e. tools and repair kits) and understanding of available services. This highlights the potential for implementing engagement and support interventions, in order to build skills on how to repair broken clothes, what available services there are (i.e. via third parties), and where to hire the necessary equipment. Once these interventions have been carried out, the figures can be revisited via an annual update to monitor its impact and contribution to increasing the items of clothing repaired by households. In order to tackle these barriers, it is also recommended to develop a website which identifies where the nearest repair shop is for households and to provide guidance on how to effectively carry out self-repair activities.

Although the EU tariff codes were deemed the most suitable classification for this testing programme, it is recommended that a harmonised list of clothing/textile items is developed, particularly in the face of some EU Member States passing textile EPR legislation and beginning to set up schemes (such as the Netherlands and Sweden). When/if monitoring in full, it is recommended that the chosen categories align with the existing categories used within existing and new EPR schemes. Harmonisation is essential to ensure that effective and consistent approaches are adopted across individual EU Member States. The widespread alignment of key textile/clothing categories will also provide a fuller picture of the current flow of textiles from when they are placed on the market, in-use by consumers, all the way through to their end-of-life. This will also support the EC's ambition to introduce mandatory and harmonised EPR schemes for textiles in all EU Member States.[17]

In order to support the year-on-year performance improvements of this indicator, tax incentives should be considered which would encourage repair activities across households. For example, clothes and shoe repairs are eligible for financial aid from the government in France, known *as* 'bonus réparation'. If consumers take their clothes or shoes to one of the recognised repairers, they will receive money off the total cost of work

[14] European Commission, Right to repair: Commission introduces new consumer rights for easy and attractive repairs. (Official website of the European Union, 2023). https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1794. Accessed 8th April 2024.

[15] The ESPR will set ecodesign requirements for specific product groups to improve their circularity, energy performance (e.g. within both the manufacturing process of the product and its actual use) and other environmental sustainability aspects.

[16] European Commission, Ecodesign for Sustainable Products Regulation. (Official website of the European Union, 2023). https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products-regulation_en. Accessed 8th April 2024.

[17] European Commission, Circular economy for textiles, 2023. Circular economy for textiles (europa.eu). Accessed 15 February 2024.

conducted. This repair scheme aims to increase repair rates and awareness, whilst helping to upskill approved repairers.

Due to the success of this indicator during the testing phase, it is recommended that the potential of rolling out this indicator to other priority products is assessed (such as electronics and information and communication technology (ICT) or furniture).

Following the testing of this indicator, the initial indicator name is still deemed fit for purpose to take forward during any future development activities.

Quantifying the number of clothing items (or other high-priority products outlined in the CEAP (European Commission, 2020)) repaired by households each year would indirectly support improvements to the new EU monitoring framework for CE across the following macro level indicators within the framework:

- **Material footprint:** i.e. a quantification of the demand for material extractions triggered by consumption and investment by households, governments and businesses across the EU. Encouraging the repair of various household or commercial products would support the EU and individual EU Member States material footprints to decrease as resources are used more efficiently and products kept in the system for longer.
- **Total waste generation per capita:** i.e. the total waste generated in a country (including major mineral wastes), divided by the average population of the country. Encouraging repair activities will ensure that the lifespan of products are extended for as long as practically possible, thereby reducing waste generation.
- **Generation of municipal waste per capita:** i.e. the waste collected by or on behalf of municipal authorities and disposed of through the waste management system. Encouraging repair activities will ensure that the lifespan of products are extended for as long as practically possible, thereby reducing the generation of municipal waste.
- **Consumption footprint:** i.e. the environmental impacts of EU and EU Member States consumption by combining data on consumption intensity and environmental impacts of representative products. Maximising repair opportunities will reduce the EU and EU Member State consumption footprint, as individuals/businesses will be purchasing fewer products/goods.

Table 27. Summary of recommendations for H5

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Policy	Development of a new target to monitor the repair rate of priority products within the CEAP, including textiles. The target should be implemented within the framework of the ESPR, and would also support developments from the EU 'Right to Repair'.	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** EC. • **Consulted:** Repair organisations/centres, relevant industry trade associations, relevant product industries. • **Informed:** All stakeholders.	• **Relevance:** The indicator will relate much more closely to policy objectives if directly supporting a target. • **Robustness:** The target would encourage the year-on-year monitoring of this indicator, providing more accurate results.
Communication	Development of a website to find the closest repair shop and provide guidance on how to self-repair.	Medium (1.5 – 5 years)	• **Responsible:** National Governments. • **Accountable:** EC. • **Consulted:** Repair organisations/centres, recyclers. • **Informed:** Households/citizens.	NA – the recommendation will support the indicator through encouraging performance improvements.
Research & Development (R&D)	Harmonisation of textile/clothing categories across EU and individual EU Member States.	Short (0.5 – 1.5 years)	• **Responsible:** EC. • **Accountable:** National Governments. • **Consulted:** National trade associations, Extended Producer Responsibility Schemes. • **Informed:** All stakeholders within the EU textile industry.	• **Ease:** The ease of data reporting will be improved, alongside data analysis by the EC. • **Credibility:** Will ensure that the indicator results are easy to interpret by a wide array of audiences. • **Robustness:** Harmonisation of textile/clothing categories will allow the data to be compared at a Member State level and aggregated up to an EU level.

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Legislation	Tax incentives to encourage repair activities for citizens.	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** National Governments. • **Consulted:** National Governments, repair organisations/centres, citizens. • **Informed:** All stakeholders within the EU textile industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
Communication	Capacity building and awareness programmes for repair to build skills/knowledge and raise awareness across households.	Short (0.5 – 1.5 years)	• **Responsible:** National Governments. • **Accountable:** Local municipalities. • **Consulted:** Repair organisations/centres, households/citizens. • **Informed:** Households/citizens.	NA – the recommendation will support the indicator through encouraging performance improvements.
R&D	Assess the suitability of rolling this indicator out to other high priority products (such as electronics and ICT and furniture).	Short (0.5 – 1.5 years)	• **Responsible:** EC. • **Accountable:** National Governments. • **Consulted:** Households. • **Informed:** Households.	• **Relevance:** Rolling the indicator out to other high priority products will increase its support of policy objectives. • **Credibility:** Will allow for the results to be compared at a product level in order to identify poor performing product categories that require urgent action.

6. INDICATOR 5: HOUSEHOLD SPENDING ON MAINTENANCE AND REPAIR, ACROSS PRIORITY PRODUCT AND MATERIAL STREAMS

The indicator aims to measure the average yearly household spending on maintenance and repair activities, across the high priority products outlined in the CEAP (European Commission, 2020).

Repair refers to the fixing of a specified fault in a product and/or replacing defective components, in order to make the product a fully functional product to be used for its originally intended purpose (The International Resource Panel, 2018). Maintenance refers to the routine activities and/or corrective or preventive repair undertaken on products to prevent faults and extend the life expectancy.[18] Although repair and maintenance are often used interchangeably, they are in fact employed at different stages within a product's lifecycle. Repairs are carried out after a product experiences a fault, and maintenance is carried out prior to a fault. Maintenance and repair are essential aspects of the CE as it works to extend the lifespan of products and materials. They both act as a VRP[19] through retaining material value and functionality within a product.

There are many benefits to monitoring this indicator for the EC, such as:

- Quantifies the uptake of repair and maintenance services across the high-priority products.
- Moves away from focusing on recycling rates, to more desirable CE strategies which are higher up the waste hierarchy[8].
- Supportive of driving positive social and economic impact in communities.
- Will help to gain an understanding of which high-priority products are more commonly repaired and maintained by households.

6.1 KEY METHODOLOGY

6.1.1 Testing method

This indicator was tested across the following high priority products outlined in the CEAP (European Commission, 2020), due to their potential to be maintained and repaired by households:

- Household electricals items (toasters, power tools, etc.) and communications equipment (smartphones, laptops, printers, etc.).[20]
- Textiles (clothing, bedding, curtains, towels, etc).
- Household vehicles and batteries (personal cars, portable batteries, etc.).[21]

The following high priority products outlined in the CEAP (European Commission, 2020) were deemed out-of-scope, due to not being suitable for maintenance and repair activities by households:

- Construction and buildings.
- Packaging.
- Plastics.
- Food, water and nutrients.

This indicator measured the average yearly household spending on the following repair activities outlined in Table 28.

[18] Fiix, What is the difference between repair and maintenance?. (Fiix Software, n.d.). https://fiixsoftware.com/glossary/repair-and-maintenance/#:~:text=Maintenance%20refers%20to%20routine%20activities,%2C%20repainting%2C%20and%20routine%20inspections. 10th April 2024.

[19] VRP's refer to activities that enable the completion of, and/or potentially extend a product's service life beyond traditional expected service life. These processes include reused, repair, remanufacture, refurbishment, etc. (The International Resource Panel, 2018)

[20] Please note, this category has been renamed from 'Electronics & ICT' in order to be more consumer friendly.

[21] Please note, this category has been renamed from 'Batteries and vehicles' in order to be more consumer friendly.

Table 28. In-scope activities relating to maintenance and repair

In-scope activities	Description
In-house company repairs and maintenance	Services provided by the specific product manufacturer or retailer directly to consumers.
Third party repairs and maintenance	Services provided by external companies to consumers who are not the direct manufacturer and retailer of the product.
Self-repair and maintenance (where possible)	Providing that consumers have the necessary knowledge, tools, and equipment, carrying out safe and efficient repairs at home.

6.1.2 Data collection method

For the nature of this testing programme, the following data inputs will be requested from households for 2023:

- Total combined household income.
- Average spend on the maintenance and repair of 'Household electrical items and communications equipment'.
- Average spend on the maintenance and repair of 'Textiles'.
- Average spend on the maintenance and repair of 'Household vehicles and batteries'.

To maximise efficiencies across all indicators using a citizen's survey, the data informing this analysis, and the conclusions drawn from it, were gathered in a nationally representative survey of citizens conducted by YouGov Plc[22] for the sole purpose of this project. It was undertaken between 28th February - 1st March 2024, sent out across France and carried out online. It covered the indicators in Table 29.

Table 29. Indicators includes within the 'Household goods' citizen survey

URN	Indicator name
H5	Items of clothing repaired by households per year
H7	Household spending on maintenance and repair, across priority product and material streams
H8[23]	Comparison of life of household furniture as estimated by manufacturers and the actual duration these items are used by households
H10	Unused household goods, across priority products and material streams

A sample size of 1,019 adults was received for the 'Household's survey'. The figures have been weighted by YouGov in accordance with the national demographic breakdown and are therefore representative of all French adults (aged 18+).

Table 30 shows the breakdown of this at a city/regional level.

[22] YouGov, Surveys; Serviced.(YouGov, 2024). https://yougov.co.uk/. Accessed 8th April 2024.
[23] Please note, this indicator is presented within the Group 3 case study document for 'Households'.

Table 30. Breakdown of responses per region

Name of region/city	Percentage of sample (%)
North East	26
North West	19
Paris Region	18
South East	25
South West	11
Total	**100**

Table 31 shows a breakdown of the respondents by household income.

Table 31. Breakdown of responses per household income

Household income (€)	Percentage of sample (%)
Less than 15,000	12
15,000 – 19,999	7
20,000 – 29,999	17
30,000 – 39,999	14
40,000 – 49,999	9
50,000 – 59,999	7
60,000 – 69,999	4
70,000 – 79,999	2
80,000 – 89,999	2
90,000 – 99,999	1
100,000 – 124,999	<1
125,000 – 149,999	<1
150,000 – 199,999	<1
200,000 +	<1
I don't know	7
Prefer not to answer	14
Total	**100**

Please refer to Appendix 8.6 to view the survey script. Please note, the survey was translated into French before dissemination by YouGov.

6.1.3 Calculations

Due to gathering the required data through the citizens survey, no further calculations were required.

6.1.4 Timeline

The project timeline is show in Table 32.

Table 32. Gantt chart for H7

WC	18-Dec	25-Dec	01-Jan	08-Jan	15-Jan	22-Jan	29-Jan	05-Feb	12-Feb	19-Feb	26-Feb	04-Mar	11-Mar	18-Mar	25-Mar
Task 1 - Develop list of household products															
Task 2 - Develop online survey															
Task 3 - Disseminate online survey															
Task 4 (optional) - Explore back-up datasets															
Task 5 - Build simple Excel model															
Task 6 - Analyse survey results & conduct calculations															
Task 7 - Conduct analysis of themes/trends															
Task 8 - Write up case study															
Review period															
Key deliverables				Online survey									Initial draft case study		Draft case study

Legend

Task progress | Christmas holiday | Review period | Key deliverable

6.1.5 Data gaps and mitigation

The identified data gaps and mitigation strategies are included in Table 33.

Table 33. Overview of identified data gaps, limitations and mitigation efforts

	Description of data gap	Mitigation efforts	Level of confidence
1	There is insufficient data on how wider socio-economic factors (alongside household income) influence maintenance and repair activities. These variables could significantly impact household decisions and spending on repair. In addition, economic factors (such as cost and the availability of affordable repair services) will likely impact household decisions surrounding repair.	None. It is recommended that additional qualitative questions are included in the survey if implemented in the future.	Low

6.1.6 Quality review of analysis

To ensure robust and high-quality analysis of the data, the following QA procedure was conducted:

- Prior to work beginning, the Project Director reviewed the proposed research methodology and ensure that the data collection plan is fit for purpose. Only once the research team had addressed any comments from the review process did they proceed to the data collection phase.
- In relation to the survey development and dissemination, Project Manager reviewed the line of questioning for this indicator to ensure that it was clear, followable and able to generate reliable and robust results. In addition to this, respondents were also required to answer each question before being able to move on to ensure data validation of the survey.
- Once the survey has closed and the results had been analysed, the Quality Assurance Manager conducted a thorough internal quality assurance process on the MS Excel data set which pulled together the data from the survey and subsequent calculations. Any incoming data and assumptions were clearly logged, presenting survey data, user inputs, calculations, assumptions and results.

6.2 KEY ANALYSIS RESULTS

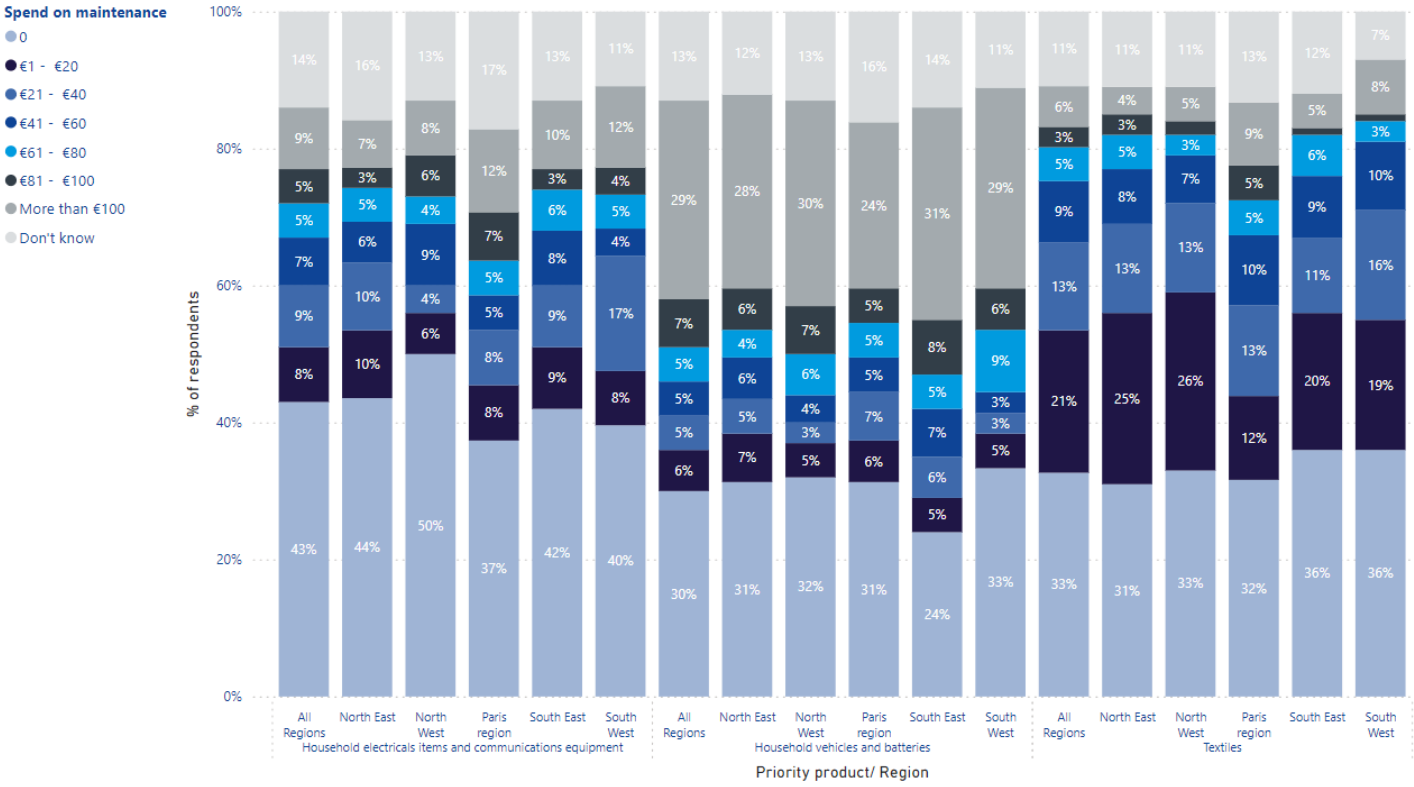
6.2.1 Analysis

For ‘Household electrical items and communications equipment’, across each region surveyed within the national sample, households most commonly spent €0 on maintenance and repair activities (see Figure 29). Across all regions, 43% of respondents selected this option based on their 2023 spending. One anomaly identified was in the South West region, where 17% of respondents said they spent between €21 - €40 on the maintenance and repair of ‘Household electrical items and communications equipment’, in comparison to the average of 9%.

Across each region surveyed within the national sample, households mostly commonly spent either €0 (30% of respondents) or more than €100 (29% of respondents) on maintenance and repair activities for 'Household vehicles and batteries'. No significant regional disparities were identified for 'Household vehicles and batteries'.

Across each region surveyed within the national sample, households most commonly spent €0 on maintenance and repair activities for 'Textiles'. Across all regions, 33% of respondents selected this option based on their 2023 spending. The second most common response was €1 - €20. One anomaly identified was in the Paris region, where only 12% of respondents said they spent between €1 - €20 on the maintenance and repair of textiles, in comparison to the average of 21%.

Figure 29. Household spend on the maintenance and repair of priority products, broken down by region (2023)



Please view Appendix 8.8 for the raw survey data.

6.2.2 Limitations

The following limitations have been identified through the testing programme:

- Due to time constraints, regional data within one EU Member State (i.e. France) was collected and analysed. This meant that results were only compared from the specific regions within France, rather than specific regions within two or more EU Member States. For many of the results there were minor regional differences within France itself. Therefore, it is thought that more valuable and interesting results will be determined if this indicator is rolled-out to all EU Member States.
- Within the survey questions, numerical ranges were used to allow respondents to provide an estimate, which means they do not face 'recall difficulty' (i.e. needing to think back and recall each specific action/behaviour from the previous year). However, the downside of this approach is that the survey results did not generate exact values of the average household spend on maintenance and repair in 2023. The collected data was therefore more difficult to analyse than if an open-format was used, and it may have also resulted in bias.
- Although the survey figures were weighted in accordance with the national demographic breakdown and are therefore representative of all French adults (aged 18+), not all regions within France were included in the sample. This may have potentially led to some inaccuracies.

- The cost of self-repair and maintenance activities may not have been fairly reflected within the results as activities carried out at home often cost nothing (although sometimes the household will incur small costs). As this indicator focuses on value rather than the frequency of repair, this is not captured.
- The use of self-reported data for determining annual spend on maintenance and repair will have introduced recall bias, and potentially social desirability bias. The respondents may not have accurately remembered how much they spend last year, or they may report what they think is socially acceptable (rather than their actual practices).
- There is a lack of data on the age of products at the time of repair and whether they were repaired under warranty. This information could help to understand consumer decision to repair versus the replacement of older items, and the role of warranties in promoting repairs.

6.2.3 Performance

Table 34 compares the RACER score allocated to the original indicator during Task 4 against the final indicator after the Task 5 testing process. During Task 4, the original indicator was allocated a score of 11 against the RACER evaluation process. This was due to the indicator's potential to quantify shifting consumption patterns. However, there were concerns around the difficulty of collecting the data. Following the Task 5 testing, the indicator was allocated a score of 12, due to performing higher than expected for the criterion 'Ease'. This was due to the development and dissemination of a citizen's survey via YouGov, which was a simple process and provided relatively robust results due to a large sample size of 1,019 adults. The indicator performed slightly weaker across the 'Relevance' criterion, receiving a score of 2. Although the indicator is supportive of strategies further up the waste hierarchy[8], it was considered that measuring this indicator at a regional/city level did not result in significant enough learnings to justify the additional effort to gather this granularity of data. Minimal regional disparities were noted during the analysis stage. It was therefore considered that this indicator could alternatively be measured at a national level.

Table 34. RACER evaluation

Stage of project	RACER criterion					Score
	Relevance	Acceptability	Credibility	Ease	Robustness	
Task 4 (original RACER assessment)	3	2	3	1	2	11
After Task 5 (following testing)	2	2	3	3	2	12

To ensure consistency in applying RACER, the assessment matrix shown in Appendix 8.2 was applied to support the decision making process.

6.3 CHALLENGES AND LESSONS LEARNED

6.3.1 Challenges

The following challenges were identified during this testing programme:

- The potential cost of data collection via surveys across individual Member States poses a challenge for applying this indicator in the future. As the EC conducts regular EU-wide consumer surveys, it may be appropriate to integrate this topic into these existing surveys or to consider adopting separate surveys related to sustainability and the CE.
- Diverse regulations across EU Member States could create inconsistencies in repair practices and access to repair services in the future. This diversity might make it challenging to analyse and compare data across the EU, and develop a benchmark for the indicator.

6.3.2 Lessons learned

Lessons learnt were recorded throughout the process of creating and testing this indicator, which may be applied to inform future assessments of indicators:

- For indicators which are based on data from citizen surveys, a judgement needs to be made at the early stages of testing as to what level of data granularity is required. There is a direct trade-off between the level of granularity asked for and the burden on the respondent to answer the questions. Asking for actual numbers within an open-ended question format is a more burdensome approach and could lead to missing data, however it would result in more granular data. In comparison, using numerical ranges within a closed-ended question format would provide less granular data, but would alternatively be easier/quicker for the respondent to complete, which would likely result in higher response rates.
- For indicators which rely upon survey data from citizens or households, going through a third party supplier is the most effective approach to ensure high response rates. YouGov were able to guarantee a response rate of 1,000, which allowed the team to make robust and evidence-led conclusions from the data. As mentioned above, as the EC conducts regular EU-wide consumer surveys, it may be appropriate to alternatively integrate this topic into these existing surveys or to consider adopting separate surveys related to sustainability and the CE.
- Self-repair may not be fairly captured within the results of this indicator (due to the focus on value rather than frequency). If implemented in the future, it is recommended to also gather data relating to the frequency of repair in order to assess the average cost and more accurately monitor self-repair activities.

6.4 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that this indicator is considered for further development, with minor work required to facilitate its progress.

Repair is an essential process for reaching the EC's ultimate goal of 'true circularity', in order to reduce production and consumption rates and extend product lifespans. Through the Right to Repair[24] and the ESPR [25,26], repair is increasingly gaining traction on policymakers and legislator's agendas. However, traditionally repair has been given less attention and resources than recycling (a strategy further down the waste hierarchy[8]), alongside other value retention processes such as reuse, remanufacture and refurbishment. With repair being increasingly included into national and EU legislation, it is essential to develop indicators to measure the performance and success of these existing and upcoming policy instruments. As a result, this indicator was found relevant to implement.

This indicator will encourage households to repair their faulty products more often through either third party repair, in-house brand repair or self-repair opportunities. For third party and in-house repair activities, this will contribute towards the generation of green jobs and new professional skills. In order to access the required data to measure this indicator, a citizen's survey was essential. Through disseminating this survey via a third party, the data had good availability, robustness and directness. The approach has the potential to be easily replicated on a yearly basis.

To support the implementation of this indicator, it is recommended that a new target is established to monitor the repair rate of priority products within the CEAP (European Commission, 2020). The target should be implemented within the framework of the ESPR, and would also support developments from the EU 'Right to Repair'.

The main findings from this indicator showed that French households most commonly spent €0 on maintenance and repair in 2023 across all in-scope products, namely 'Household electrical items and communications equipment', 'Textiles' and 'Household vehicles and batteries'. This suggests that households might be discouraged from having products repaired, potentially due to high costs, difficulty in accessing repair services or design features preventing repair. Despite this indicator being tested at a regional/city level, minor regional disparities were found during the analysis stage. It was considered that measuring this indicator at a regional/city level did not result in significant enough learnings to justify the additional effort to gather this

[24] European Commission, Right to repair: Commission introduces new consumer rights for easy and attractive repairs. (Official website of the European Union, 2023). https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1794. Accessed 8th April 2024.

[25] European Commission, Ecodesign for Sustainable Products Regulation. (Official website of the European Union, 2023). https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products-regulation_en. Accessed 8th April 2024.

[26] The ESPR will set ecodesign requirements for specific product groups to improve their circularity, energy performance and other environmental sustainability aspects. The new requirements will impact all products placed on the EU market, with some exceptions such as food, feed, certain motor vehicles and medical products.

granularity of data. It is recommended that DG-RTD further assess the suitability of implementing this indicator at a national level, which would still provide the ability to assess the performance of upcoming legislation relating to repair, but would make analysis easier.

Although self-repair activities sometimes incur small costs onto households, often they are free which means that these activities are not captured within the results of this indicator (as it focuses on value rather than the frequency of repair). Often people do not have the money for third party repairs (or do not want to spend it that way), meaning they do it for free at home. Considering this, if implemented in the future, it is recommended to also gather data relating to the frequency of repair in order to assess the average cost and more accurately monitor self-repair activities.

In order to support the year-on-year performance improvements of this indicator, tax incentives should be considered which would encourage repair activities across households. For example, clothes and shoe repairs are eligible for financial aid from the government in France, known *as* 'bonus réparation'. If consumers take their clothes or shoes to one of the recognised repairers, they will receive money off the total cost of work conducted. This repair scheme aims to increase repair rates and awareness, whilst helping to upskill approved repairers.

It can be assumed that there are barriers to households not repairing their products due to the low household spending on maintenance and repair in 2023. The main barrier to repair will likely be the incurred cost and lack of skills required. This highlights the potential for implementing capacity building programmes for repair to help build the necessary skills and knowledge. This will also help to raise awareness of the importance of repair, rather than buying new. Once these interventions have been carried out, the figures can be revisited via an annual update to monitor its impact and contribution to increasing householding spending on these fundamental activities. Alongside building the necessary skills and awareness, it is also important to ensure that the actual products are suitable for repair opportunities. It is therefore recommended that the EC provides detailed circular design guidance on the high priority products outlined in the CEAP (European Commission, 2020). This guidance will include 'design for repairability' strategies, such as improving disassembly, offering spare parts and disassembly instructions, and granting third party repairers with repair information and access to spare parts.

Following the testing of this indicator, the initial indicator name is still deemed fit for purpose to take forward during any future development activities.

Quantifying the average household spending on maintenance and repair across priority products would indirectly support improvements of the new EU monitoring framework for CE across the following macro level indicators:

- **Material footprint:** i.e. a quantification of the demand for material extractions triggered by consumption and investment by households, governments and businesses across the EU. Encouraging the repair of various household or commercial products would support the EU and individual EU Member States material footprints to decrease as resources are used more efficiently and products are kept in the system for longer.
- **Total waste generation per capita:** i.e. the total waste generated in a country (including major mineral wastes), divided by the average population of the country. Encouraging repair activities will ensure that the lifespan of products are extended for as long as practically possible, thereby reducing waste generation.
- **Generation of municipal waste per capita:** i.e. the waste collected by or on behalf of municipal authorities and disposed of through the waste management system. Encouraging repair activities will ensure that the lifespan of products are extended for as long as practically possible, thereby reducing the generation of municipal waste.
- **Consumption footprint:** i.e. the environmental impacts of EU and EU Member States consumption by combining data on consumption intensity and environmental impacts of representative products. Maximising repair opportunities will reduce the EU and EU Member State consumption footprint, as individuals/businesses will be purchasing fewer products/goods.

Table 35: Summary of recommendations for H7

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Legislation	Tax incentives for citizens to encourage repair activities.	Medium (1.5 – 5 years)	• **Responsible:** National governments. • **Accountable:** EC. • **Consulted:** National governments, repair organisations/centres, citizens. • **Informed:** All stakeholders within the relevant EU industries.	NA – the recommendation will support the indicator through encouraging performance improvements.
Policy	Capacity building programmes for repair to build skills/knowledge and raise awareness across households.	Short (0.5 – 1.5 years)	• **Responsible:** Local municipalities. • **Accountable:** National governments. • **Consulted:** Repair organisations/centres, households/citizens. • **Informed:** Households/citizens.	NA – the recommendation will support the indicator through encouraging performance improvements.
R&D and legislation	Circular design guidance to ensure the priority products are 'designed for repairability' (i.e. can be easily disassembled, upgraded, cleaned, etc.).	Medium (1.5 – 5 years)	• **Responsible:** National governments. • **Accountable:** EC. • **Consulted:** Repair organisations/centres, recyclers, manufacturers, citizens. • **Informed:** Product manufacturers and industry.	NA – the recommendation will support the indicator through encouraging performance improvements.
Policy	Development of a new target to monitor the repair rate of priority products within the CEAP. The target should be implemented within the framework of the ESPR, and would also support developments from the EU 'Right to Repair'.	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** EC. • **Consulted:** Repair organisations/centres, relevant industry trade associations, relevant product industries. • **Informed:** All stakeholders.	• **Relevance:** The indicator will relate much more closely to policy objectives if directly supporting a target. • **Robustness:** The target would encourage the year-on-year monitoring of this indicator, providing more accurate results
Policy	If this indicator is implemented in the future, also gather data relating to the frequency of repair in order to assess the	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** EC. • **Consulted:** NA.	• **Robustness:** The indicator would more accurately monitor self-repair activities.

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
	average cost and more accurately monitor self-repair activities.		• **Informed:** Households.	

7. INDICATOR 6: UNUSED HOUSEHOLD GOODS, ACROSS PRIORITY PRODUCTS AND MATERIAL STREAMS

This indicator aims to measure the average number of priority products unused each year by households, at a city/regional level.

Unused products are those owned by households which are not currently being used, but are also not disposed of, passed on or donated. Unused products have a negative impact on progress towards shifting to a more CE, as households are storing away a significant number of unused products with no plans to donate or recycle them. This acts as a barrier towards reaching true circularity. For a CE to function, as many products and materials as possible need to be recovered back into the system, in order to retain value and reduce the need for further raw material extraction.

There are several benefits for the EC to monitoring this indicator, such as:

- Will help to gain a better understanding of material flows across the high-priority products. The number of unused products being accumulated within households is currently poorly understood.
- Quantifies the 'lost opportunity' in terms of the value of raw materials that are stored in unused products, materials which could alternatively be shifted to value retention processes (such as material recycling and reuse).
- Will help to gain a better understanding of consumer's behaviour to allow for the implementation of more targeted interventions.
- Will increase consumer/household awareness of hoarding behaviours.
- May encourage the uptake of circular business models (e.g. Product-as-a-Service (PaaS) offerings).

7.1 KEY METHODOLOGY

7.1.1 Testing method

This indicator was tested across the following high priority products outlined in the CEAP (European Commission, 2020) which were deemed to have the potential to be accumulated by households:

- Household electricals (toasters, lamps, power tools, etc.) and communications equipment (i.e. smartphones, laptops, printers, etc.).[27]
- Textiles (clothing, shoes, bedding, curtains, towels, etc.).
- Portable batteries.[28]

The following high priority products outlined in the CEAP (European Commission, 2020) are out-of-scope, as they are not commonly accumulated by households.

- Construction and buildings.
- Packaging.
- Plastics.
- Food, water and nutrients.

For the nature of this testing programme, the following quantitative data inputs were requested from households across each of the in-scope high priority products:

- Whether households currently own any unused items.
- The number of items a household currently owns which are unused.
- The estimated length of time these items have been unused for.

[27] Please note, this category has been renamed from 'Electronics and ICT' to use more consumer-friendly language.

[28] Please note, the scope of 'Batteries and vehicles' has been reduced to cover any portable batteries, and these are the only suitable products within this priority product category which may be unused and storage within households.

Alongside this, qualitative data was also requested to provide additional narrative to the indicator results, namely:

- The reasons why these items are currently unused.

This indicator was tested at a national level across France. A citizen's survey was used to gather the required data inputs.

7.1.2 Data collection method

The data informing this analysis, and the conclusions drawn from it, were gathered in a nationally representative survey of citizens, conducted by YouGov Plc[29] for the sole purpose of this project. The total sample size was 1,019 adults, and the survey was undertaken between 28th February - 1st March 2024. The survey was carried out online, sent out across France. The figures were weighted by YouGov in accordance with the national demographic breakdown and are therefore representative of all French adults (aged 18+).

To maximise efficiencies across indicators using a citizen's survey, one nationally representative survey was used to cover the indicators listed in Table 36 below.

Table 36. Indicators included within the 'Household goods' citizen survey

URN	Indicator name
H5	Items of clothing repaired by households per year
H7	Household spending on maintenance and repair, across priority product and material stream
H8[30]	Comparison of life of household furniture as estimated by manufacturers and the actual duration these items are used by households
H10	Unused household goods, across priority products and material streams

Table 37 below shows the breakdown of the respondents at a city/regional level.

Table 37. Breakdown of responses per region/city

Name of region/city	Percentage of sample (%)
North East	26
North West	19
Paris Region	18
South East	25
South West	11
Total	**100**

Table 38 shows a breakdown of the respondents by household income.

[29] YouGov, Surveys; Serviced.(YouGov, 2024). https://yougov.co.uk/. Accessed 8th April 2024.
[30] Please note, this indicator is presented within the Group 3 case study document for 'Households'.

Table 38. Breakdown of responses per household income

Household income (€)	Percentage of sample (%)
Less than 15,000	12
15,000 – 19,999	7
20,000 – 29,999	17
30,000 – 39,999	14
40,000 – 49,999	9
50,000 – 59,999	7
60,000 – 69,999	4
70,000 – 79,999	2
80,000 – 89,999	2
90,000 – 99,999	1
100,000 – 124,999	<1
125,000 – 149,999	<1
150,000 – 199,999	<1
200,000 +	<1
I don’t know	7
Prefer not to answer	14
Total	**100**

Please refer to Appendix 8.6 to view the survey script. Please note, the survey was translated into French before dissemination by YouGov.

7.1.3 Calculations

Due to gathering the required data through the citizens survey, no further calculations were required.

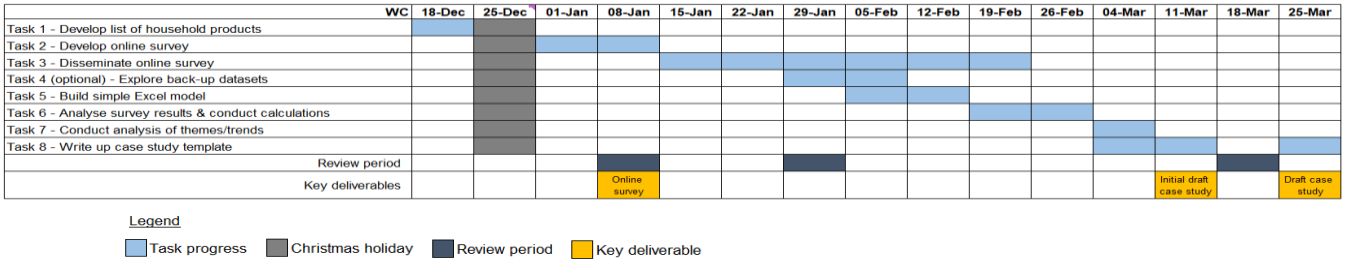
To calculate the indicator, we conducted a weighted average based on the proportion of total responses (excluding any responses for 'Don’t Know') in each region. These proportions were then applied to the mid-point of the ranges provided within the survey questions to give an estimate of the average number of unused high priority products across households.

Please refer to Appendix 8.9 to view the calculations conducted.

7.1.4 Timeline

The project timeline is show in Table 39.

Table 39. Gantt chart for H10



7.1.5 Data gaps and mitigation

During the course of this testing programme, no data gaps were identified due to the use of a third party to conduct the survey, ensuring a sufficient response rate to test this indicator.

7.1.6 Quality review of analysis

To ensure robust and high-quality analysis of the data, the following QA procedure was conducted:

- Prior to work beginning, the Project Director reviewed the proposed research methodology and ensure that the data collection plan is fit for purpose. Only once the research team had addressed any comments from the review process did they proceed to the data collection phase.
- In relation to the survey development and dissemination, Project Manager reviewed the line of questioning for this indicator to ensure that it was clear, followable and able to generate reliable and robust results. In addition to this, respondents were also required to answer each question before being able to move on to ensure data validation of the survey.
- Once the survey has closed and the results had been analysed, the Quality Assurance Manager conducted a thorough internal quality assurance process on the MS Excel data set which pulled together the data from the survey and subsequent calculations. Any incoming data and assumptions were clearly logged, presenting survey data, user inputs, calculations, assumptions and results.

7.2 KEY ANALYSIS RESULTS

7.2.1 Analysis

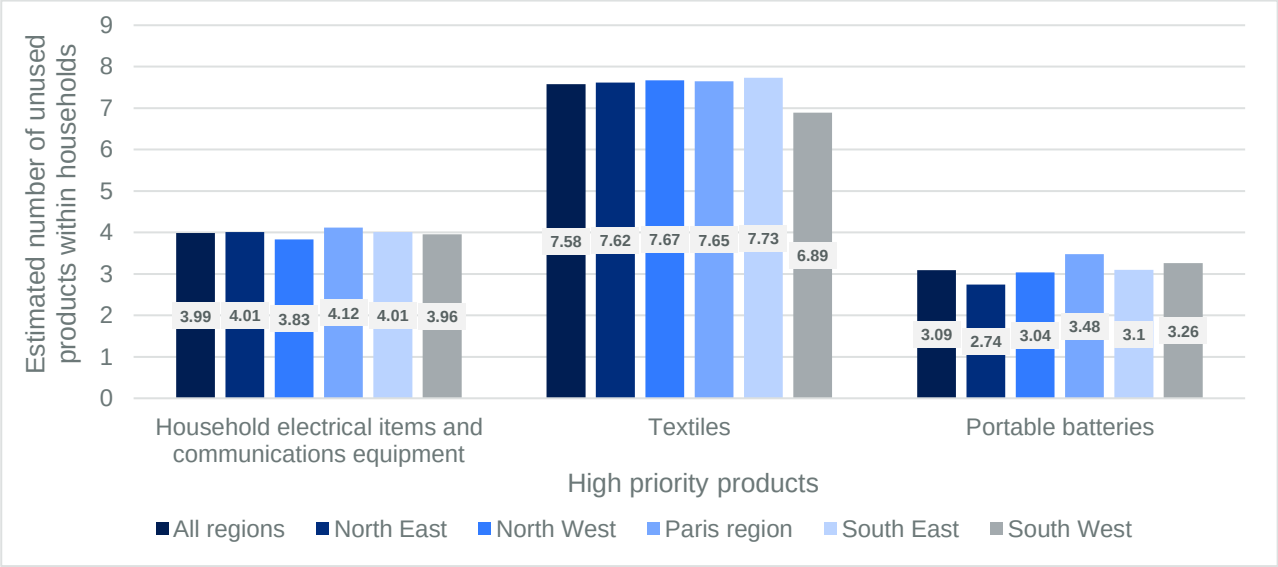
7.2.1.1 Main results

Figure 30 presents the main results for this indicator. On average across all regions, ‘Textiles’ were the most commonly owned unused product, with each French household currently owning an estimated 7.58 items. Households within the South West region were found to own slightly fewer unused textile products at 6.89 items each. The high number of unused textile items suggests a significant impact of fast fashion and consumer lifestyle choices on product accumulation. Therefore, there is an opportunity for interventions aimed at promoting more sustainable consumption patterns in order to encourage the purchase of higher-quality, longer-lasting clothes (such as clothing swaps and donation schemes and Product-as-a-service (PaaS) models).

‘Household electrical items and communications equipment’ was the second most commonly owned unused product within French households. On average across all regions, households currently own an estimated 3.99 items. No regional disparities were identified.

‘Portable batteries’ were found to be the least commonly owned unused product, with each household across France currently owning an estimated 3.09 items. Despite being the least commonly owned product, these are still relatively high figures per household. This could indicate the need for enhanced recycling programmes specifically aimed at ‘Portable batteries’. No regional disparities were identified.

Figure 30. Average estimated number of unused high priority products across households (2024)



7.2.1.2 *Detailed results*

Across all products included in the survey, 'Textiles' was the most commonly unused product by households, with over half (53%) of respondents currently owning unused textile items (see Figure 31 below). It should be noted that respondents could select more than one item per category in response to this question, and therefore the percentages will not add up to 100% for each region. A high proportion of households also reported having unused 'Household electrical items and communication equipment', with 42% of respondents selecting this option. One minor regional disparity was reported across the 'Portable batteries' category. The Paris region reported slightly higher rates of unused 'Portable batteries', with 30% of respondents selecting this option, in comparison to an average of 22%.

Figure 31. Unused high priority products, broken down by region (2024)

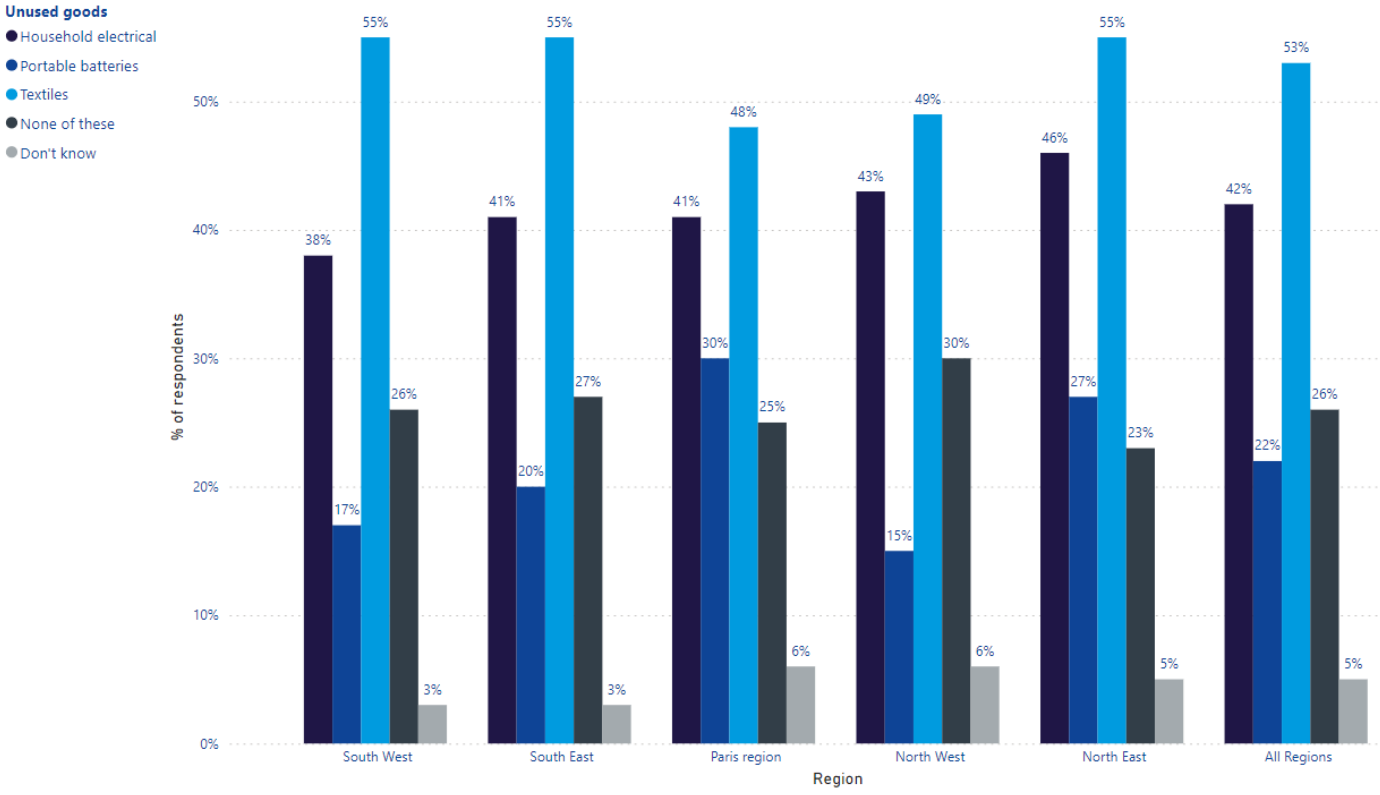


Figure 32 below presents the estimated number of unused items owned by households, broken down by region. For 'Household electrical items and communications equipment', households across each region most commonly owned 1 – 2 unused items.

Similarly for 'Portable batteries', households across each region most commonly owned 1 – 2 unused items, with on average 55% of households selecting this option. The Paris region was the only region where households owned 11+ unused 'Portable batteries' items, with 5% of households selecting this option.

The number of 'Textile' items reported unused was substantially higher than the other in-scope products, with all regions aside from the South West selecting 11+ items as the most common option. The most common answer selected by households in the South West was 3 – 6 items.

Figure 32. Estimated number of unused high priority products across households, broken down by region (2024)

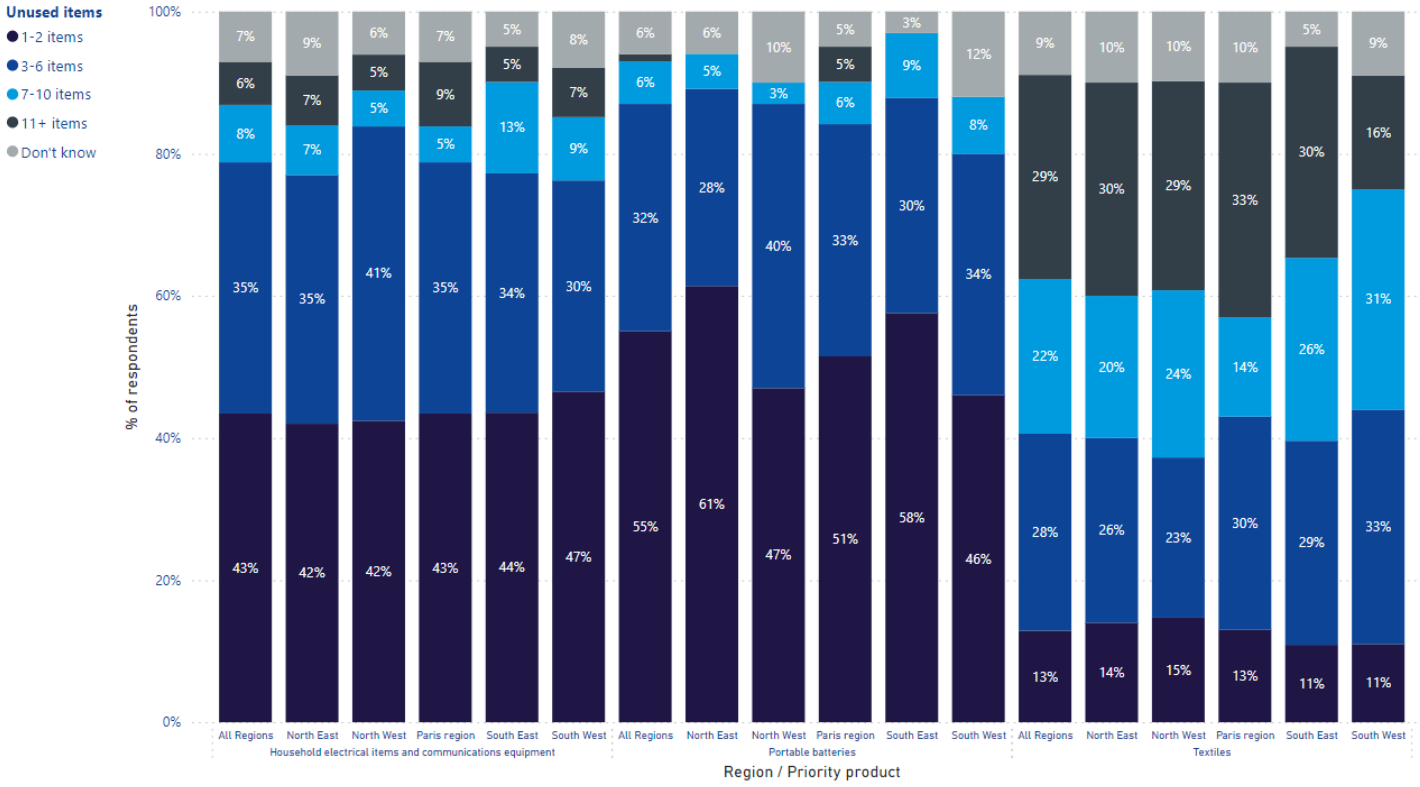
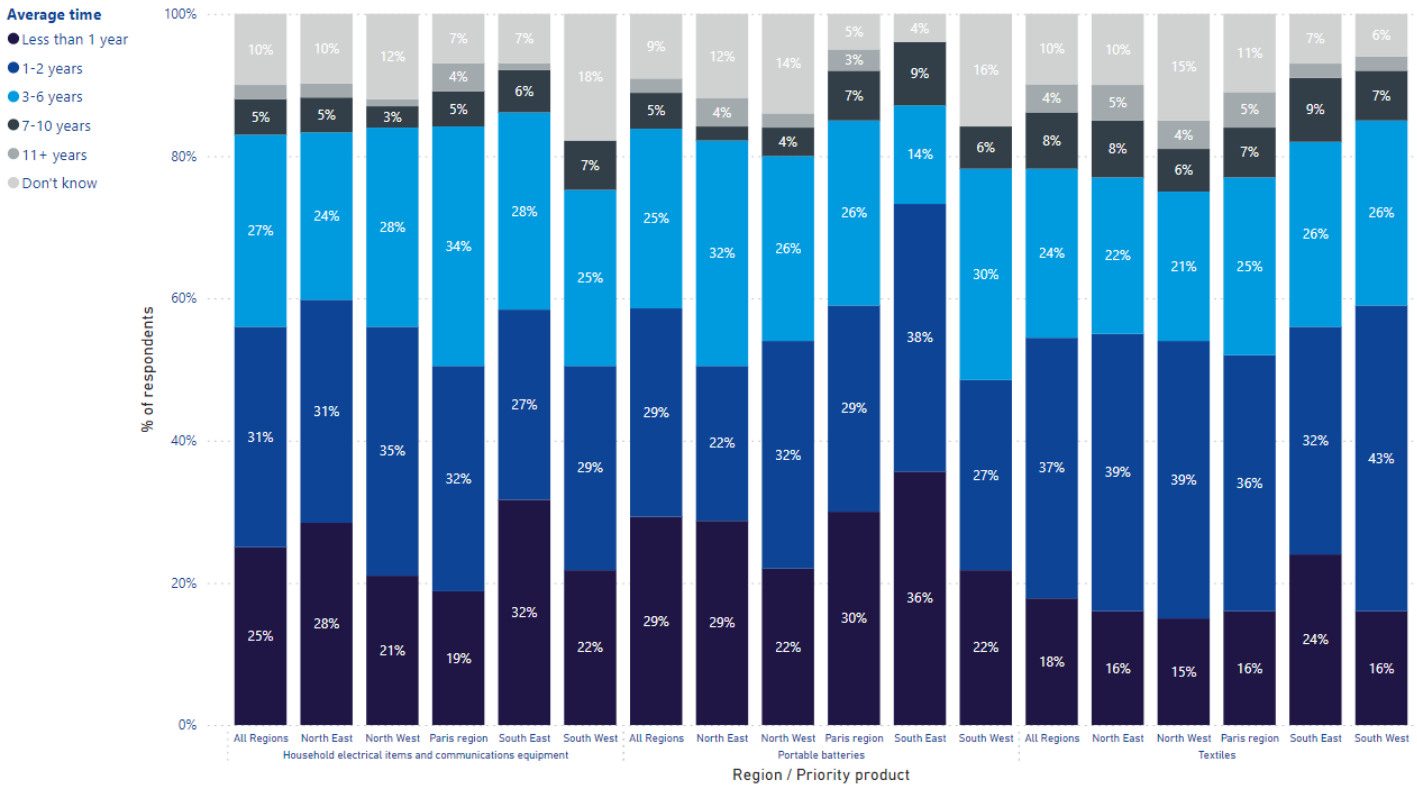


Figure 33 below shows the estimated number of years products owned by households had been unused for, broken down by region. For 'Household electrical items and communications equipment', households within the North East, North West and South West regions most commonly owned these unused items for 1 – 2 years. Households within the Paris region most commonly owned them for 3 – 6 years, which may be a reflection of space constraints and lifestyle patterns unique to more urbanised spaces. This could guide the development of services and infrastructure, such as those that facilitate easier recycling and networks for exchanging and sharing goods. South East households most commonly owned 'Household electrical items and communications equipment' items for less than 1 year.

For 'Textiles', households within every region most commonly owned unused items for 1 – 2 years, with on average 37% of respondents selecting this option.

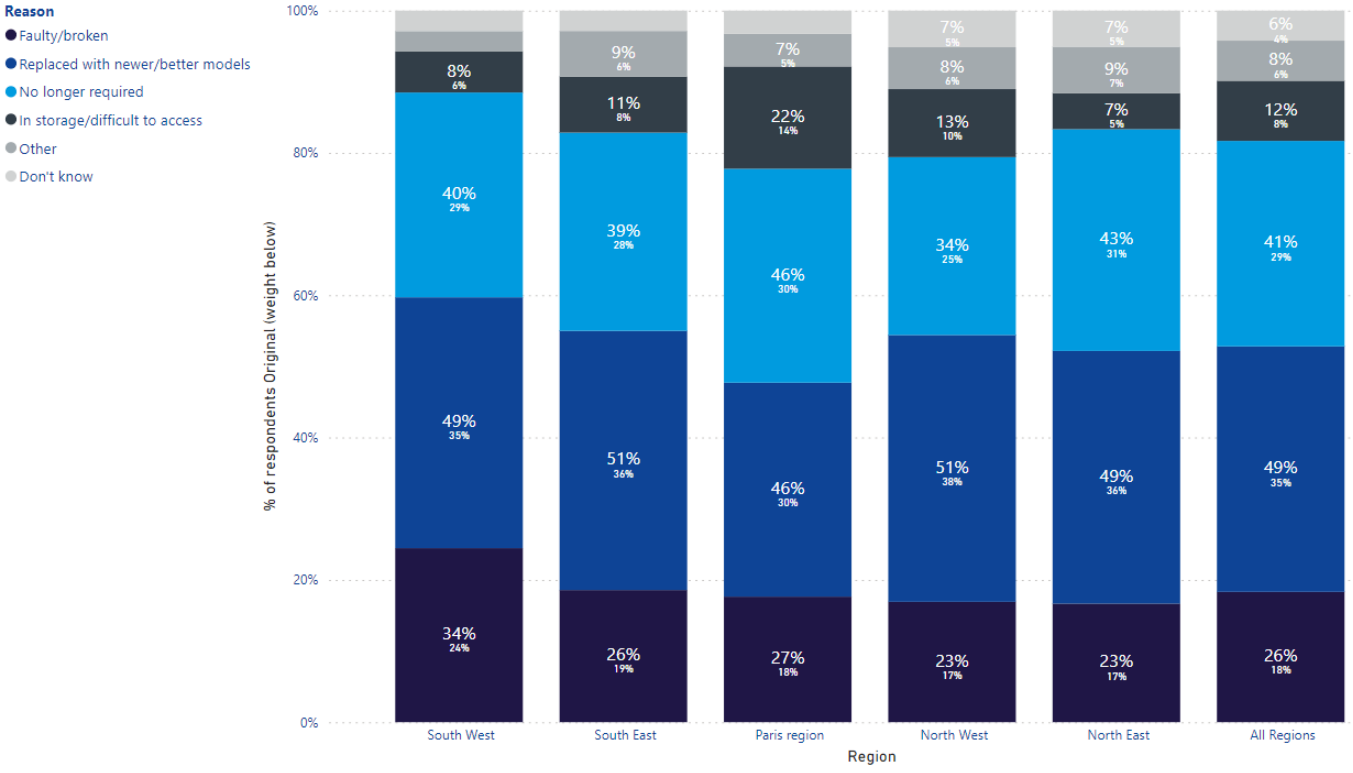
For 'Portable batteries', significant regional differences were reported. Households within the North East and South West regions most commonly owned the unused items for 3 – 6 years, whilst households within the North West and South West regions most commonly owned them for 1 – 2 years. Within the Paris region, households most commonly owned the items for less than 1 year.

Figure 33. Estimated number of years high priority products have been unused for by households, broken down by region (2024)



As Figure 34 below highlights, across all regions, the most common reasons for households owning unused goods was due to products being replaced with newer or better models (49% of respondents) and products no longer being required (41% of respondents). One major regional disparity identified was in the Paris region, where 22% of respondents stated they have unused products due to them being in storage and difficult to access. In comparison, only 12% of respondents selected this option across all regions.

Figure 34. Reasons for households owning unused goods, broken down by region



Please view Appendix 8.9 for the raw survey data.

7.2.2 Limitations

The following limitations have been identified through the testing programme:

- Due to time constraints, only regional data within one EU Member State (i.e. France) was collected and analysed. This meant that only results from the specific regions within France were compared, rather than specific regions within two or more EU Member States. For many of the results there were only minor regional differences within France itself. Therefore, it is thought that more valuable and useful results would be determined if this indicator was rolled-out to all EU Member States.
- Within the survey questions, numerical ranges were used to allow respondents to provide an estimate, which means they not face 'recall difficulty' (i.e. needing to think back and recall each specific action/behaviour from the previous year). However, the downside of this approach is that the survey results did not generate exact number of unused goods a household currently owns. The collected data was therefore more difficult to analyse than if an open format was used, and it may have also resulted in bias.
- Due to the use of numerical ranges within the survey question, mid-points were used to conduct further analysis. Although this was deemed a sensible approach for this testing programme, using mid-points assumes that responses are uniformly distributed within each range, which may not be the case. Depending on the actual distribution of data within each range, using midpoints could lead to overestimation or underestimation of the true average. However, due to the fairly small ranges used, it would have had a lesser impact, apart from potentially the option for '11+ items'.
- Closed-end, qualitative questions were included within the survey, with a pre-determined list of potential answers for respondents to select. Closed-end questions prevent respondents from providing in-depth answers.
- The use of self-reported data for determining the number of unused household goods will have introduced recall bias, and potentially social desirability bias. The respondents may not have accurately remembered how many products they currently own but do not use, or they may have reported what they think is socially acceptable (rather than their actual practices).
- A lack of a concrete definition for 'unused' was a limitation of this study. This was particularly difficult as some products which households own may only require a use once every year or more (such as power tools or sportswear). Therefore, it was important to consider how long each product had to be not used for in order to be classed as 'unused'. Desk-based research was conducted to explore this, however no publicly available definition was found which defined an 'unused product'. Due to time constraints, it was decided to continue with the survey without a concrete definition of 'unused'.
- There is a lack of information relating to product condition and functionality. Therefore, this indicator does not differentiate between products that are unused due to obsolescence or damage, and those which are simply not needed at that moment in time. Some products may be used seasonally and may be classified as 'unused' by the survey despite having a clear use at specific times of the year. This could skew data on the actual number of products that are truly unused.
- Household goods may have been accumulated and unused by households for over 10 years. Therefore, there is a high change of error and double counting in the data collection for this indicator.
- This indicator focuses on the number of unused products within households, and does not take it the step further to quantify the tonnage and type of materials within those products. In terms of the CE, understanding the amount and type of materials is more valuable than the number, in order to understand the 'lost opportunity' in terms of what could be recirculated again. It is recommended that more work is carried out to understand how this indicator could be translated from products into materials.

7.2.3 Performance

Table 40 below compares the RACER score allocated to the original indicator during Task 4 (named *"Hoarded WEEE and EEE*") against the final indicator after the Task 5 testing process. During Task 4, the original indicator was allocated a score of 7 out of 15 against the RACER evaluation process. This was due to the relative concerns surrounding accessing the data and the subsequent accuracy and robustness of it.

Following the Task 5 testing, the indicator was allocated a score of 10 out of 15, due to performing higher than expected for the criteria 'Credibility', 'Ease' and 'Robustness'. This was due to the development and dissemination of a citizen's survey via YouGov, which was a simple process and provided relatively robust results due to a large sample size of 1,019. However, due to the use of numerical ranges, the survey results did not generate the exact number of unused goods a household currently owns, which limits its score for 'Credibility'. The questions asked within the survey were also thought to be relatively difficult for the respondents to provide accurate responses to, limiting the indicators score for 'Ease' and 'Robustness'.

Table 40. RACER evaluation

Stage of project	RACER criterion					Score
	Relevance	Acceptability	Credibility	Ease	Robustness	
Task 4 (original RACER assessment)	2	2	1	1	1	7
After Task 5 (following testing)	2	2	2	2	2	10

To ensure consistency in applying RACER, the assessment matrix shown in Appendix 8.2 was applied to support the decision making process.

7.3 CHALLENGES AND LESSONS LEARNED

7.3.1 Challenges

The following challenges were identified during this testing programme:

- Due to the team's previous experience of disseminating surveys, it was agreed that gathering data at a citizen level was a significant challenge for this indicator. As a result, during the very early stages of the testing programme, it was decided to use a third party to disseminate the survey. This meant that a response rate of at least 1,000 would be guaranteed.
- The potential cost of data collection via surveys across individual Member States poses a challenge for applying this indicator in the future. As the EC conducts regular EU-wide consumer surveys, it may be appropriate to integrate this topic into these existing surveys or to consider adopting separate surveys related to sustainability and the CE.
- Due to rapid technological advancements in electronics and communications equipment, devices can become obsolete faster, which complicated the distinction between what is considered 'unused' and what is simply outdated but potentially recyclable or donatable.

7.3.2 Lessons learned

Lessons learnt were recorded throughout the process of creating and testing this indicator, which may be applied to inform future assessments of indicators:

- For indicators which are based on data from citizen surveys, a judgement needs to be made at the early stages of testing as to what level of data granularity is required. There is a direct trade-off between the level of granularity asked for and the burden on the respondent to answer the questions. Asking for actual numbers within an open-ended question format is a more burdensome approach and could lead to missing data, however it would result in more granular data. In comparison, using numerical ranges within a closed-ended question format would provide less granular data, but would alternatively be easier/quicker for the respondent to complete, which would likely result in higher response rates.
- For indicators which rely upon survey data from citizens or households, going through a third party supplier is the most effective approach to ensure high response rates. YouGov were able to guarantee a minimum response rate of 1,000, which allowed the team to make robust and evidence-led conclusions from the data. As mentioned above, as the EC conducts regular EU-wide consumer surveys, it may be appropriate to alternatively integrate this topic into these existing surveys or to consider adopting separate surveys related to sustainability and the CE.

- Providing clear definitions within the scope of this indicator is essential to retrieve accurate and robust results. There is a need for a clear and universally applicable definition of 'unused' which underscores the important of clarity in survey design and the interpretation of results. This definition should account for seasonal and occasionally use of products.

7.4 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that this indicator is considered for further development, with significant work required to facilitate its progress.

It is important to understand the level of unused and accumulated products within EU households as these products contain valuable materials which could be better utilised elsewhere (either by another household or via a new function). Monitoring this indicator is expected to help quantify the 'lost opportunity' in terms of the products that are stored in unused household products, which could alternatively be shifted to value retention processes (such as material recycling and reuse). Currently this is poorly understood, meaning the results of this testing programme were found to have provided useful preliminary data on the level of products which are accumulated in homes. Indeed, this indicator helps to deliver a more comprehensive understanding of product flows, through providing insight into household behaviours in between when a product is purchased and then subsequently disposed of. Ongoing monitoring of this indicator will assist in gaining a better understanding of household behaviours potentially allowing for the development of more targeted intervention activities. It is also expected to help increasing household awareness of their hoarding behaviours and may encourage them to properly dispose or donate their items.

At this moment in time, it is not recommended that a target should be set relating to this indicator due to the significant amount of work needed to be carried out before implementation. However, it is recommended that this is reassessed once the data collection process is improved.

In order to access the required data to measure this indicator, a citizen's survey was essential. Through disseminating this survey via a third party, the data had good availability, robustness and directness. The approach has the potential to be easily replicated on a yearly basis. There are concerns however surrounding the accuracy of the data. As the indicator is dependent on household self-reporting, and items may be accumulated and unused for over 10 years, there is a high chance of error and double counting. The use of numerical ranges within the citizens survey also resulted in the team not being able to directly quantify the number of unused products within households. Instead, the results provided insight into the most commonly unused products within households, the average number of these products which are currently unused and the average amount of time these products are unused for. It is hoped that these results can be used in the future to define more closely what is meant by 'unused'. This would need to be created through consultation with industry and households, in order to create a robust definition which could be used in the future implementation of this indicator.

The main findings from this indicator showed that on average across all regions, 'Textiles' are the most commonly owned unused product, with each French household currently owning an estimated 7.58 items. Households within the South West region were found to own slightly fewer unused textile products at 6.89 items each. 'Household electrical items and communications equipment' are the second most commonly owned unused product within French households. On average across all regions, households currently own an estimated 3.99 items. 'Portable batteries' were found to be the least commonly owned unused product, with each household across France currently owning an estimated 3.09 items. No regional disparities were identified for 'Household electrical items and communications equipment' and 'Portable batteries'.

If this indicator is implemented in the future, it is recommended to utilise the yearly results to implement targeted interventions which influence household hoarding behaviours, with the aim to reduce the number of unused products within households (e.g. communications campaigns). This could involve building awareness around alternative circular business models (such as PaaS), which would encourage households to rent or lease the products as and when they are needed. This would be particularly relevant for products which households do not use frequently.

It is also recommended that the EC further explores how this indicator could be translated from products into materials. This testing programme focused on the number of unused products within households. However, it would be extremely valuable to understand the amount and type of materials within these products in order to understand the 'lost opportunity' in terms of what could be recirculated back into the economy again. It is only

recommended to implement this indicator is this aspect can also be covered. Without understanding the quantify of materials within the products, the benefits of monitoring do not outweigh the costs and effort required.

Following the testing of this indicator, the initial indicator name is still deemed fit for purpose to take forward during any future development activities. However, if the scope of the indicator is expanded in the future to also cover materials (as per Table 41), it is recommended to update the indicator title to *'Unused household goods and associated materials, across priority products and material streams'*.

There are no direct cross overs with this indicator and the new EU monitoring framework for CE[31]. However, quantifying the number of unused products within households at a regional/city level would indirectly support improvements across the following macro level indicators within the framework:

- Material footprint: i.e. a quantification of the demand for material extractions triggered by consumption and investment by households, governments and businesses across the EU. Encouraging the higher utilisation of products across EU households will help to decrease our material footprint as we are using our products more intensely.
- Consumption footprint: i.e. the environmental impacts of EU and EU Member States consumption by combining data on consumption intensity and environmental impacts of representative products. Encouraging the higher utilisation of products across EU households will help to decrease our consumption footprint as households will be encouraged purchasing fewer new products through the promotion of alternative business models (such as PaaS).

[31] Eurostat, Monitoring framework. (The official website of the European Union, 2023). https://ec.europa.eu/eurostat/web/circular-economy/monitoring-framework. Accessed 10th April 2024.

Table 41. Summary of recommendations for H10

Type of recommendation	Recommendation	Timeline	Key stakeholders or partners	RACER Criteria addressed
Research and Development (R&D)	Develop a robust definition for 'unused' products through consultation with industry.	Short (0.5 – 1.5 years)	• **Responsible:** EC. • **Accountable:** EC. • **Consulted:** Industry, citizens/households, key trade associations. • **Informed:** National governments.	• **Credibility:** Supportive of the development of a more defined methodology. • **Ease:** Would make the indicator easier for stakeholders to understand and interpret. • **Robustness:** Would increase the consistency and accuracy of the reported data.
Policy	Implement targeted interventions to influence hoarding behaviours and reduce the number of unused products within households (such as communications campaigns).	Medium (1.5 – 5 years)	• **Responsible:** Local municipalities. • **Accountable:** National governments. • **Consulted:** EC, local recyclers/civic amenity sites. • **Informed:** Households/citizens.	NA – the recommendation will support the indicator through encouraging performance improvements.
R&D	Further exploration of how this indicator could be translated from products into materials. This would help the EC to understand the amount and type of materials within these products which could be recirculated back into the economy.	Medium (1.5 – 5 years)	• **Responsible:** EC. • **Accountable:** EC. • **Consulted:** Key trade associations, recyclers, manufacturers. • **Informed:** All key stakeholders.	• **Acceptance:** The indicator would be more accepted by key stakeholders as more useful from a CE perspective, through providing greater levels of granularity.

8. APPENDIX

8.1 INDICATOR 1 – SCRIPT FOR 'VEHICLES, ELECTRONICS AND ICT' SURVEY

See MS Word document 'DGRTD _H1_Vehicles, Electronics and ICT Survey Outline_V01.00' provided alongside this report.

8.2 ALL INDICATORS - RACER ASSESSMENT MATRIX

Criterion	Description	1 (Poor)	2 (Neutral)	3 (Good)
Relevance	Refers to whether the indicator is closely linked to the objectives to be reached.	Does not support a better understanding of true circularity.	Supports a better understanding of true circularity.	Highly supportive towards gaining a better understanding of true circularity.
		Supports no value-added circular opportunities.	Supports lower value-added opportunities (i.e. metrics related to waste generation, recycling, waste management, etc.)	Supports higher value-added opportunities (i.e. all R-strategies above remanufacturing) and wider systemic change (e.g. indicators that encourage PSS or circular design).
		Not linked to the project objectives and/or European policy objectives (existing or upcoming).	Linked to the project objectives, but not to European policy objectives (existing and/or upcoming).	Fully aligned with project objectives and European policy objectives (existing and/or upcoming).
Acceptance	Refers to whether the indicator is perceived and used by key stakeholders (such as policymakers, civil society, and industry).	Poorly accepted by key stakeholders, e.g. due to the use of confidential data.	Relatively accepted by key stakeholders as the benefits of measuring are clear.	Key stakeholders are motived to report this indicator, due to mandatory legislative requirements (current or upcoming), potential commercial benefit or being in the public interest.
Credibility	Refers to whether the indicator is transparent, trustworthy and easy to interpret.	No defined methodology associated with this indicator and/or interpretation of the indicator is ambiguous.	Methodologies have been proposed or currently existing, but not for this particular indicator (e.g. in a research article).	There is an EU defined methodology.
		Difficult to understand and communicate to stakeholders (e.g. units or measurement of something that stakeholders are not familiar with).	Moderately easy to understand and communicate to stakeholders (e.g. units or measurement of something that stakeholders are aware of but are not confident in practical use).	Easy to understand and communicate to stakeholders (e.g. units or measurement of something that stakeholders already use and are confident in applying).
Ease	Refers to the easiness of measuring and monitoring the indicator.	No defined methodology associated with this indicator and/or interpretation of the indicator is ambiguous.	Methodologies have been proposed or currently existing, but not for this particular indicator (e.g. in a research article).	There is an EU defined methodology.
		Difficult to understand and communicate to stakeholders (e.g. units or measurement of something that stakeholders are not familiar with).	Moderately easy to understand and communicate to stakeholders (e.g. units or measurement of something that stakeholders are aware of but are not confident in practical use).	Easy to understand and communicate to stakeholders (e.g. units or measurement of something that stakeholders already use and are confident in applying).
Robustness	Refers to whether data is biased and comprehensively assesses circularity.	No consistent methodology and dataset are available.	A consistent methodology and dataset available.	A consistent methodology and dataset available.
			A composite/aggregated indicator (based on multiples dimensions).	A one-dimensional indicator.
			A proxy indicator.	

8.3 INDICATOR 2 & 3 – SCRIPT FOR ‘PRODUCT SERVICE SYSTEMS’ SURVEY

See MS Word document ‘DGRTD _H3_H4_Product Service Systems Survey Outline_V01.00’ provided alongside this report.

8.4 INDICATOR 2 – SURVEY ANALYSIS

See MS Excel document ‘DGRTD_H3_Survey analysis_V01.00’ provided alongside this report.

8.5 INDICATOR 3 – SURVEY ANALYSIS

See MS Excel document ‘DGRTD_H4_Surnalysis_V01.00’ provided alongside this report.

8.6 INDICATOR 4, 5 & 6 - SCRIPT FOR ‘HOUSEHOLD GOODS’ SURVEY

See MS Word document “DGRTD _H5_H7_H8_H10_Household Goods Survey Outline_V01.00“ provided alongside this report.

8.7 INDICATOR 4 - SURVEY ANALYSIS

See MS Excel document ‘DGRTD_H5_Survey analysis_V01.00’ provided alongside this report.

8.8 INDICATOR 5 - RAW SURVEY DATA

See MS Excel document “DGRTD_H7_Raw survey data_V01.00” provided alongside this report.

8.9 INDICATOR 6 – SURVEY ANALYSIS

See MS Excel document “DGRTD_H10_Survey analysis_V01.00“ provided alongside this report.

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