Activating Circular Services in the Electric and Electronic Sector

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Deliverable 1.1: Survey Design and Planning

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1. Executive Summary

Deliverable 1.1 (Survey Design and Planning) is part of the activities of WP1 "Requirements for the new circular economic models". The aim of this report is to provide a summary of the completed Task 1.1 (Preparation of surveys) actions.

The initial stage in the development of Deliverable 1.1 set out to capture WPLs requirements for the questionnaire surveys and supplementing these with a literature review.

The next stage was to cluster the captured data and information into topics which were then organized into the categories of circular economy awareness, current practices relating to circular economy, and circular economy opportunities, barriers and enablers, respectively.

The final survey structure was converted into a master survey draft, which was subsequently reviewed by WPLs.

Based on the initial stakeholder list (from Task 8.1), eight specific stakeholder groups have been clustered, representing the key E&E supply chain actors. The surveys focuses on these 8 groups.

The developed eight stakeholder specific surveys were reviewed by partners and the advisory board.

The final stage of survey development involved incorporating relevant feedback from partners and the advisory board in the creation of the final stakeholder surveys.

Deliverable 1.1 report is supported by 16 Annexes which refer to the main contents of the surveys.

Content

Annexes

Acronyms and abbreviations

AB	Advisory Board
E&E	Electrical and Electronic
TMC	Technical Management Committee
WEEE	Waste Electrical and Electronic Equipment
WP	Work Package
WPL	Work Package Leader
WIP	Work Implementation Plan
CE	Circular Economy
CEBMs	Circular Economy Business Models
B2C	Business to Customer
B2B	Business to Business

1. Introduction

The purpose of Deliverable D1.1. Survey design and planning, is to prepare surveys that will be used to collect information from a range of stakeholders on the barriers and opportunities for circular economy models in the E&E sector.

Task 1.1 Preparation of the Surveys, has been led by LOU with the participation of SAT, WEEE FORUM, CIRCULARISE and EXERGY and the collaboration of all the partners. The duration of this task was from Month 1 to Month 6 (May – October 2018).

D1.1 report is part of WP1. Requirements for the new circular economic models and contains the following sections: an overview of WP1, the actions and steps taken to accomplish Task 1.1; a description of the methodology that was used for Task 1.1; a summary of the survey development stages; a description of the structure and content of the master survey; commentary on the mapping process of master survey questions against stakeholder relevance; a description of the production of tailored stakeholder surveys; an explanation of final partners and advisory board reviewed surveys; information about the online survey design; a summary of the next tasks in WP1; and Annexes containing key documents.

2. WP1 overview

The main objective of WP1 is to provide guidance for a successful implementation of circularity in the E&E sector based on consultation of stakeholders. The specific objectives are:

- Engagement and consultation of relevant stakeholders throughout the entire EEE value chain.
- Analysis of technical, economic, socio-cultural, regulatory and environmental barriers and opportunities for the Eco innovative solutions proposed in the project.
- Identification of the requirements of stakeholders regarding circular economic models.

WP1 is divided into three different tasks that outline the working steps: the first task (T1.1) will identify and define the information that needs to be collected during the second task. The second task, the longest in duration, will collect quantitative and qualitative data from different stakeholders, which will be analysed in Task 1.3.

3. Task 1.1 actions and steps

Task T1.1 (Preparation of surveys) defines the range of information on the barriers and opportunities for circular economy models in the E&E sector that will need to be collected from a range of stakeholders during Task 1.2. The information to be collected

will encompass techno-economic, socio-cultural, regulatory and environmental aspects relevant for the solutions proposed.

The Table 3.a below shows the main actions scheduled and implemented for Task 1.1.

Table 3.a Actions for Task 1.1. Preparation of surveys

Action	Description	Start	FROM	Provider	Expected results	End	TO
A1.1.1	Initial meeting – brainstorm data needs for the collection of information on the barriers and opportunities for circular economic models in the E&E sector	M02	All WPs	LOU WF	Detailed outline of data requirements for the project.	M02	T1.1
A1.1.2	Feedback from partners on A1.1.1 outcomes.	M02	All WPs	LOU	Definitive outline of data that needs to be collected in WP1.	M03	T1.1.
A1.1.3	Define groups of stakeholders specific to survey in collaboration with WP8 and all partners.	M02	WP1	LOU SAT WF CIRCULA RISE EXERGY	List of target groups of stakeholders (input for T 8.1)	M03	T8.1 T1.2
A1.1.4	Preparation of draft survey(s) for different stakeholders and survey methods.	M03	WP1	LOU SAT WF CIRCULA RISE EXERGY	Draft survey(s)	M05	T5.2
A1.1.4	Consultation on draft survey(s)/data collection methods with relevant partners (WP leaders) and Advisory Board.	M06	-	WPLs AB	Feedback on draft survey(s)/data collection methods	M06	T5.2

A1.1.5	Completion of survey(s) and report	M06	WP1	LOU SAT WF CIRCULA RISE EXERGY	D1.1 with survey(s)	M06	T5.2

4. WP1 Methodology

WP1 methodology is shown in Figure 4.a below, and explained in the next sections.

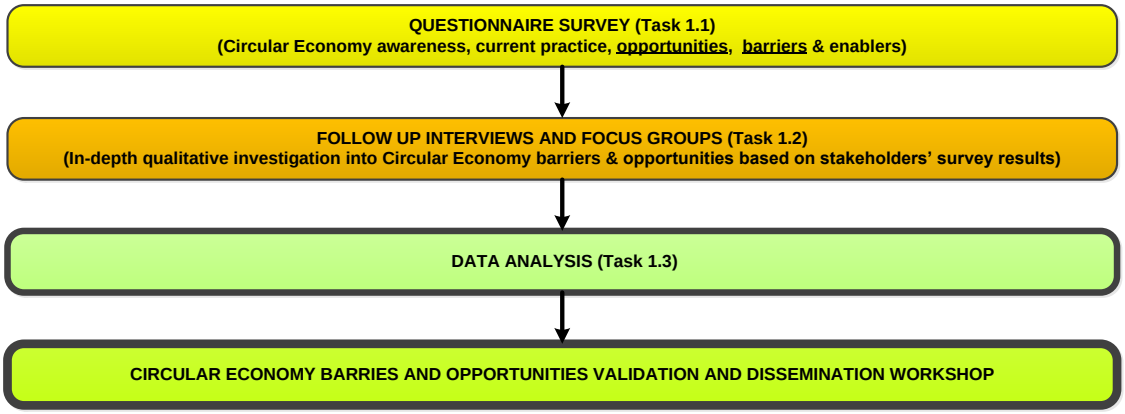

Figure 4.a: Scheme of the WP1 Methodology

The methodology used to develop the stakeholders' surveys (Task 1.1) is shown in Figure 4.b below.

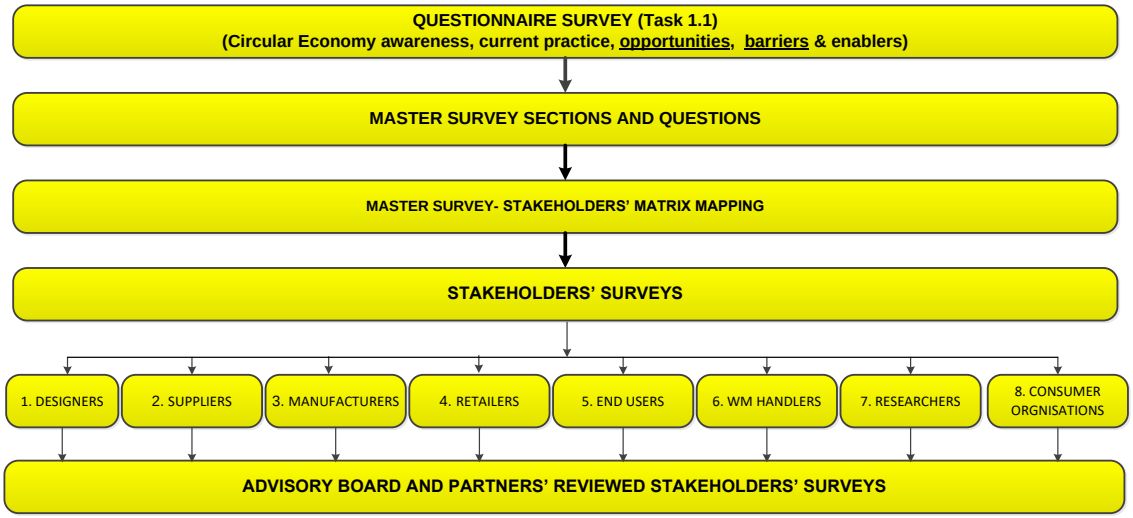

Figure 4.b: Scheme of the Task 1.1 Methodology

4.1 Questionnaire

Task 1.1 was the development of stakeholders' questionnaire surveys. The data collected from this task will inform the follow-up interviews and focus groups (Task 1.2).

4.2 Follow-up interviews and focus groups

Follow-up interviews and focus groups will be conducted with selected stakeholders to gather more detailed information and to ask for some of the information that partners requested but was not suitable for questionnaire survey format.

4.3 Data analysis

The surveys will be distributed to stakeholders and the data collected will be analysed using SPSS. Based on this analysis, follow up interviews and focus groups will be conducted as part of Task 1.2 to investigate in greater depth the circular economy barriers and opportunities responses obtained from the surveys. This information will be reviewed as part of a qualitative data analysis.

4.4 Validation workshop

A final workshop will take place to validate WP1 quantitative and qualitative data on circular economy opportunities and barriers and to disseminate the resulting findings.

5. Survey development stages

The survey development stages took place over a period of six months and involved all partners and the AB. This process resulted in approval of stakeholders' surveys.

5.1 WPLs circular economy requirements

Survey development was initiated with a WebEx meeting on 5th June 2018, which aimed to capture the initial data requirements of WPLs. This initial data capture was compiled into one overarching spreadsheet following the TMC meeting (teleconference call) on 10 July 2018. WPLs were contacted for the purposes of clarifying their requests and to provide further details in July and August 2018. A supporting literature review was carried out by LOU in addition to a request for additional literature input from WPLs.

5.2 Circular economy data clustering

Following a mapping of WPLs data requirements supplemented with a literature review, the information and data collected was first clustered into topics and then organised into the categories of circular economy awareness, current practices, opportunities, barriers and enablers.

5.3 Development and consolidation of survey structure

On 24 July 2018, there was a face to face meeting with WEEE Forum (WP1 Leader) at LOU to discuss WP1 data collection methodology and engagement of the Advisory Board for reviewing the surveys.

In the period from 24 July 2018 to 22 August 2018, a series of thematic spreadsheets was generated as part of a process of refining and streamlining the information that had been gathered. The spreadsheets with associated themes were then converted into a consolidated survey structure with sections, questions and question options. It was found that further clarification from WPLs was required.

The format and feedback to inform the final survey structure was agreed in a TMC meeting that took place on 11 September 2018. Following this meeting, several drafts of the master survey sections, questions and question options were produced. The final master survey draft was reviewed by WEEE Forum.

It was found that certain questions were relevant to only a subset of the stakeholders and that even if the question was relevant, it would need to be reworded. This information was later noted in the master survey - stakeholders' matrix mapping.
Finally, the matrix mapping was used to develop surveys for the eight stakeholder groups by including only the questions relevant to a particular stakeholder and rewording the questions, as appropriate.

6. Structure and content of master survey

A master survey (Annex 2) was developed from the consolidated survey structure. The purpose of the master survey was to act as an overarching source of questions for the stakeholder surveys. The thematic consolidation of the information gathered for the surveys resulted in the master survey being structured into seven sections, which are described below.

6.1 Background information

The first section focuses on questions that in an anonymous way gather demographic and occupational information about respondents. The exact information collected would vary based on the stakeholder. Specific questions relate to age (end-users only), years of experience in industry or research (except end-users), gender, household size (end-users only), size of the organisation (except end-users and researchers), education level (end-users only), position in organisation (except end-users), income (end-users) and turnover (except end-users and researchers).

6.2 Circular economy awareness

The second section seeks to gather information about the level of circular economy awareness of respondents. The first question relates to WEEE methods ranging from WEEE prevention to WEEE disposal. The second question examines the awareness level in relation to circular economy concepts, initiatives and reports. A fundamental first check is whether respondents are aware of the linear versus circular economy concepts and any related initiatives. The question options presented to respondents include those produced by organisations such as the Ellen MacArthur Foundation and the European Committee of Domestic Equipment Manufacturers. In the third question, three environmental and circular economy standards are given to respondents to assess their awareness: BS8001 (Circular Economy), ISO14001 (Environmental Management), and the EU Ecodesign standard. The third and fourth questions comprise of documents and projects that are known in EU circular economy spheres. The aim of the final question in this section is to assess respondents' awareness of existing circular economy business models.

6.3 Circular economy current practices

The third section aims to determine the level of implementation of circular economy practices in current processes and products. The first question looks at strategic practices such as the use of Life Cycle Costing and reliance on sourcing of primary and secondary raw materials. This is followed by questions on environmental policies and practices. The final three questions examine capacity building, design and business model practices respectively.

6.4 Circular economy opportunities

The aim of the fourth section is to garner the level of respondents' agreement with circular economy opportunities that could add value to their organisation. The questions focus on five categories of opportunities: economic, environmental, social, technical and circular economy business models' adoption opportunities.

6.5 Circular economy challenges

The fifth section centres on identifying the severity of challenges that could impede the implementation of circular economy practices in respondents' processes and products. The economic challenges are mainly about cost implications. The social challenges are targeted at end users with issues related to perception of circular economy products and accessibility to circular economy services. The question on technical challenges covers various aspects related to products from design to data security. Business and management challenges are covered in a question concerning issues such as the business case for circular economy and organisational circular economy strategy. This is followed by two further questions on supply chain and legislative challenges, respectively. The final question in this section is about the challenges in implementing circular economy business models.

6.6 Circular economy enablers

The sixth section looks at assessing the viability of enablers that could drive the implementation of circular economy practices. Specifically, the economic enablers range from funding and financial viability to fiscal incentives. The environmental enablers focus on future innovation with respect to material substitution, green sources of energy, and improved recycling and recovery processes. Social enablers are mainly about awareness and accessibility of circular economy related services. Technical enablers span the lifecycle of products from design to end of life. Similarly, business and management enablers cover issues such as training and customers to viable means of achieving long-term circular economy goals. The supply chain enablers look at both forward and reverse issues for a comprehensive view of materials and products throughout their lifecycle. The legislative enablers feature understanding and compliance with a global perspective. The last question on business models' implementation enablers covers promotion, procurement, design and manufacturing as well as product return.

6.7 Further comments

The final (seventh) section of the survey has as its purpose the capture of additional information in the form of qualitative comments.

7. Mapping process of master survey questions against stakeholders relevance

The final step before generating the stakeholder specific surveys was to carry out a mapping of each question based on relevance to each stakeholder group. A mapping matrix was developed which related each item of data or information in the categories to one or more stakeholders. A spreadsheet was used to capture this information. This resulted in the production of 8 stakeholder specific surveys.

Based on the initial stakeholder list (from Task 8.1), eight specific stakeholder groups have been clustered, representing the key E&E supply chain actors.

At the 2nd General meeting in Brussels which took place 16-17 October 2018, feedback on the surveys from partners and the AB was requested by 21 October 2018 to allow production and submission of partners and AB reviewed stakeholder surveys by 30 October 2018. This feedback has been considered in the final surveys.

The classification that was used determined whether master survey questions were relevant, not relevant or needed rewording in order to be appropriate for the stakeholder under consideration.

8. Production of tailored stakeholder surveys

The respective surveys tailored to each of the eight stakeholders were produced based on the mapping matrix. This was done by deleting items that were not relevant, keeping items that were relevant and rewording items that needed to be phrased differently in order to be relevant for a particular stakeholder. This process resulted in eight tailored stakeholder surveys: designers (Annex 3), suppliers (Annex4), manufacturers (Annex 5), retailers (Annex 6), end users (Annex 7), WEEE handlers (Annex 8), researchers (Annex 9), and consumer organisations (Annex 10).

The sections below indicate the parts of the master survey that were retained for use in each of the stakeholder specific surveys. Essentially, questions that did not have any relation to the stakeholder under consideration based on the logic of their role in the value chain were removed. Some questions were reworded for relevance of the different stakeholder groups.

8.1 Designers survey

The designers' survey includes all of the questions in the circular economy awareness section of the master survey. From the circular economy business models practices section, four items were removed as designers are not involved in the provision of circular materials, services, or recovery of products at the end of life. From the circular economy opportunities section, economic opportunities questions were all removed. Boosting servitisation and improving digitalisation were removed from the social opportunities section. Using more efficient manufacturing processes and improving collection methods for e-waste were removed from the technical opportunities section. All master survey questions in relation to circular economy challenges and enablers were retained.

8.2 Suppliers survey

The suppliers' survey retained all of the circular economy awareness sections. In the circular economy practices section, all of the design practices were removed. In the business models practices, the question about recovery of end of life products was removed. In the circular economy opportunities section, four questions relating to manufacturing, design, 3D printing and detection of defective batches were removed. All master survey questions in relation to circular economy challenges and enablers questions were retained.

8.3 Manufacturers survey

The manufacturers' survey retained all of the circular economy awareness sections. In the circular economy practices section, only one question was removed from the business model practices as it concerned the recovery of end of life products. All master

survey questions in relation to circular economy opportunities, challenges, and enablers were retained.

8.4 Retailers survey

All master survey questions in relation to circular economy awareness were retained. In the circular economy practices section, all of the questions relating to strategic practices and design practices were removed from the retailers' survey. Also, in the business models practices, questions about provision of materials and recovery of useful feedstock/energy out of end of life products were removed. In the circular economy opportunities section all master survey questions were retained except four in technical opportunities. The technical opportunities removed concerned manufacturing, design, 3D printing and detection of defective batches. All master survey questions on circular economy challenges and enablers were retained.

8.5 End-users survey

All master survey questions on environmental and circular economy standards and circular economy projects in the circular economy awareness section were removed, in addition to one in the EU circular economy related documents on the EU circular economy action plan. All master survey questions in relation to circular economy practices questions were removed. In the circular economy opportunities section, the only question retained from the economic opportunities was on building trust. The environmental opportunities were all retained. From social opportunities, only boosting servitisation was removed. From technical opportunities, questions about manufacturing, design, 3D printing and detection of defective batches were removed. All master survey questions on circular economy business models adoption opportunities were retained. Similarly, all master survey questions on circular economy challenges and circular economy enablers were retained.

8.6 WEEE handlers survey

In the circular economy awareness section, all master survey questions in relation to WEEE methods were removed as it was assumed that waste management handlers would be familiar with these. The only other questions removed from the awareness section were four questions under environmental and circular economy policies and regulations which relate to WEEE, again as awareness was assumed. In the circular economy practices section, all of the design practices were removed and two questions in business models practices relating to the provision of fully circular materials and return of products, respectively. In the circular economy opportunities section, four questions were removed: one from social opportunities relating to servitisation and three from technical opportunities related to manufacturing, design and 3D printing. All master survey questions on circular economy challenges and enablers sections were retained.

8.7 Researchers survey

The rationale behind adding researchers is not to include them as stakeholders (e.g. users) but as part of a validation process during the data analysis. As such, master survey questions were reworded by asking them about the findings of their research in relation to CE opportunities and barriers. This will eventually add value to the data analysis (Task 1.3) correlating researchers' replies to those of the stakeholders.

The following questions were removed from the master survey to create the researchers survey from the circular economy awareness section: all master survey questions on WEEE; four questions from the circular economy concepts, initiatives and reports section related to linear and circular economy in general; and four questions from environmental and circular economy policies and regulations relating to WEEE Directive, Waste framework directive and legal frameworks in their home and other countries. Only two sections were retained from the circular economy section, the one on strategic practices and the other on capacity building practices. From social opportunities, the question on servitisation was removed. From technical opportunities, the questions on manufacturing, design, 3D printing and detection of defective batches were removed. All master survey questions on circular economy challenges and circular economy enablers sections were retained.

8.8 Consumer organisations survey

All of the questions in the awareness section were retained for the consumer organisations survey. The only part retained from the circular economy practices section was on capacity building practices. Of circular economy opportunities, environmental opportunities, social opportunities and circular economy business models adoption opportunities were fully retained. In technical opportunities, questions on manufacturing, design, 3D printing and detection of defective batches were removed. All master survey questions on circular economy challenges and enablers were retained.

9. Partners and Advisory Board reviewed surveys

The stakeholder surveys were forwarded to partners and the AB for their feedback by 21st October 2018. Based on the feedback received, the stakeholder surveys were modified. The tables below contain AB and partners' feedback for each stakeholder survey associated actions.

Table 9.a. Designers survey

Feedback	Action
Leave no more than 5-6 points for each section whenever possible.	This has been adopted whenever possible.
Remove this survey (strongly linked to either suppliers and manufacturers and thus	This was noted by one partner only. As such, the designers' survey has not been removed.

included).	
Keep only the sections in the following order: • *CIRCULAR ECONOMY OPPORTUNITIES* • *CIRCULAR ECONOMY CHALLENGES* • *CIRCULAR ECONOMY ENABLERS* • *BACKGROUND INFORMATION*	This has been implemented in all Advisory Board and partners' reviewed surveys.
In order to avoid delays and refuse in completing them, I would try to compress them. Is hard to tell what to exclude, but people are not willing to spend too much time.	This has been adopted for all questions whenever possible. Additionally, 'Awareness' and 'Circular Economy Practices' sections were remove in all Advisory Board and partners' reviewed surveys.
Challenges: add "limited circular economy exchange between designers of different industry sectors"	This has been added.
Enablers: add "Green Public Procurement"	This has been added.
Minor track changed edits	The suggested track changes were added in the Advisory Board and partners' reviewed surveys.

Table 9.b. Manufacturers survey

Feedback	Action
Leave no more than 5-6 points for each section whenever possible.	This has been adopted whenever possible.
In some cases, two or more points can be rephrased into one.	This has been adopted whenever possible.
The "challenges" and "enablers" may pose repetitive questions, and are at the end of the survey, the respondents may skip them.	Questions in both sections were reviewed to avoid repetitions
Keep only the sections in the following order: • *CIRCULAR ECONOMY OPPORTUNITIES* • *CIRCULAR ECONOMY CHALLENGES* • *CIRCULAR ECONOMY ENABLERS* • *BACKGROUND INFORMATION*	This has been implemented in all Advisory Board and partners' reviewed surveys.
In order to avoid delays and refuse in completing them, I would try to compress them. Is hard to tell what to exclude, but people are not willing to spend too much time.	This has been adopted for all questions whenever possible. Additionally, 'Awareness' and 'Circular Economy Practices' sections were remove in all Advisory Board and partners' reviewed surveys.
Minor track changed edits	The suggested track changes were added in the Advisory Board and partners' reviewed surveys.

Table 9.c. Suppliers survey

Feedback	Action
Leave no more than 5-6 points for each section whenever possible.	This has been adopted whenever possible.

Keep only the sections in the following order: • *CIRCULAR ECONOMY OPPORTUNITIES* • *CIRCULAR ECONOMY CHALLENGES* • *CIRCULAR ECONOMY ENABLERS* • *BACKGROUND INFORMATION*	This has been implemented in all Advisory Board and partners' reviewed surveys.
In order to avoid delays and refuse in completing them, I would try to compress them. Is hard to tell what to exclude, but people are not willing to spend too much time.	This has been adopted for all questions whenever possible. Additionally, 'Awareness' and 'Circular Economy Practices' sections were remove in all Advisory Board and partners' reviewed surveys.
Some parts, however, (especially for components supply chain) are unclear and should be removed and/or rephrased. Please see attached our comments. The survey overall is too long.	Questions were reworded. The survey was shortened by removing 2 sections (Awareness and Circular Economy Practices) and associated questions.
Minor track changed edits	The suggested track changes were added in the Advisory Board and partners' reviewed surveys.

Table 9.d. Retailers survey

Feedback	Action
Leave no more than 5-6 points for each section whenever possible.	This has been adopted whenever possible.
Keep only the sections in the following order: • *CIRCULAR ECONOMY OPPORTUNITIES* • *CIRCULAR ECONOMY CHALLENGES* • *CIRCULAR ECONOMY ENABLERS* • *BACKGROUND INFORMATION*	This has been implemented in all Advisory Board and partners' reviewed surveys.
In order to avoid delays and refuse in completing them, I would try to compress them. Is hard to tell what to exclude, but people are not willing to spend too much time.	This has been adopted for all questions whenever possible. Additionally, 'Awareness' and 'Circular Economy Practices' sections were remove in all Advisory Board and partners' reviewed surveys.

Table 9.e. End-users survey

Feedback	Action
Split into 2 surveys: B2B and B2C	The end-users survey was split into two associated surveys: 'B2C end-users survey' (Annex 15a) and 'B2B end-users survey' (Annex 15b)
Keep only the sections in the following order: • *CIRCULAR ECONOMY OPPORTUNITIES* • *CIRCULAR ECONOMY CHALLENGES* • *CIRCULAR ECONOMY ENABLERS* • *BACKGROUND INFORMATION*	This has been implemented in all Advisory Board and partners' reviewed surveys.
In order to avoid delays and refuse in	This has been adopted for all questions

completing them, I would try to compress them. Is hard to tell what to exclude, but people are not willing to spend too much time.	whenever possible. Additionally, 'Awareness' and 'Circular Economy Practices' sections were remove in all Advisory Board and partners' reviewed surveys.
From my point of view you should ask which EEE products they have and how many in their household, how old their EEEs are and how often they buy a new one, and why (old out of order, new technology, etc. *Have they ever bought a second used or refurbished EEE, what and why or why not* *Do they have unused EEE in their household, what and how many, why* *What do they do which old EEE (shop, recycling station, hand over to family members or friends..)* *Have they ever used a repair coffee, or did repair by themselves, why and why not* *Are they sharing EEE, which and why, how often* *And I would ask some open questions as well, to figure out what they think about circular economy, what it is and how it should work that they benefit most from.* *Beside age, gender, income, household etc., ask the population of their city, and country.*	These questions, which most of them require qualitative answers, would be asked to B2C end-users in the follow up interviews
Remove 'LEGISLATIVE CHALLENGES'	LEGISLATIVE CHALLENGES & ENABLERS were removed from the Advisory Board and partners' reviewed B2C end-users survey.
Remove 'LEGISLATIVE ENABLERS'	
Minor track changed edits	The suggested track changes were added in the Advisory Board and partners' reviewed surveys.

Table 9.f. Waste management handlers survey

Feedback	Action
For "waste management handlers", in the section ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS it is missing the WEEELABEX and the EN50625 series of standards.	Not relevant as the 'Awareness' section has been removed.
Leave no more than 5-6 points for each section whenever possible.	This has been adopted whenever possible.
Keep only the sections in the following order: • *CIRCULAR ECONOMY OPPORTUNITIES* • *CIRCULAR ECONOMY CHALLENGES* • *CIRCULAR ECONOMY ENABLERS* • *BACKGROUND INFORMATION*	This has been implemented in all Advisory Board and partners' reviewed surveys.

In order to avoid delays and refuse in completing them, I would try to compress them. Is hard to tell what to exclude, but people are not willing to spend too much time.	This has been adopted for all questions whenever possible. Additionally, 'Awareness' and 'Circular Economy Practices' sections were remove in all Advisory Board and partners' reviewed surveys.
LEGISLATIVE CHALLENGES: add "not enough compliance checks at Member States level"	This has been added.
ECONOMIC ENABLERS: add "Green Public Procurement"	This has been added.
Minor track changed edits	The suggested track changes were added in the Advisory Board and partners' reviewed surveys.

Table 9.g. Researchers survey

Feedback	Action
Remove this survey	Researchers' survey has been removed.
Remove this survey as a researcher is a EEE user and by that we cover them anyway.	

Table 9.h. Consumer organisations survey

Feedback	Action
Remove this survey (already included under user category).	Consumer organisations' survey has been removed.
Remove this survey as consumer organisations have a political agenda and might not represent the real views of the consumers - prefer to get the response directly from the users.	

The final AB and partners' reviewed surveys may be found in Annexes 11-16.

- Annex 11: C-SERVEES Advisory Board partners reviewed **designers'** survey
- Annex 12: C-SERVEES Advisory Board partners reviewed **suppliers'** survey
- Annex 13: C-SERVEES Advisory Board partners reviewed **manufacturers'** survey
- Annex 14: C-SERVEES Advisory Board partners reviewed **retailers'** survey
- Annex 15a: C-SERVEES Advisory Board partners reviewed **B2C end-users'** survey
- Annex 15b: C-SERVEES Advisory Board partners reviewed **B2B end-users'** survey
- Annex 16: C-SERVEES Advisory Board partners reviewed **waste management handlers'** survey

10. Online survey design

Online survey design was based on the master survey. Initially survey questions were formatted into Survey Monkey. Then the master survey was converted into an online survey (onlinesurveys.ac.uk) with each question having four options. All questions also contain a text box where respondents can add their own option under 'other'.

This online master survey was a pilot exercise to assess the design and get partners' feedback. Based on this feedback, online stakeholder specific surveys will be developed by WEEE FORUM to collect data.

11. Next WP1 tasks

The next two WP1 tasks are data collection (T1.2) and analysis of results and conclusions (T1.3).

11.1 Data collection (Task 1.2)

Task 1.2, led by WEEE FORUM, will involve a combination of surveys (sent by e-mail), structured interviews (via conference calls or face-to-face meetings. EEE manufacturers in the C-SERVEES consortium (LEXMARK, ADVA and ARCELIK) will reach out to companies from their supply chains. They will also contact end users (mainly through their sales departments), including large users, public authorities and retailers. To collect the views of private consumers, AIMPLAS, LOU and SAT will ask their University students. WEEE FORUM, its Linked 3rd Parties and industrial partners (manufacturers plus EMAUS, INDUMETAL and GREEN) will liaise with the sectoral organisations. All partners will be involved in reaching policymakers at EU and Member State levels.

11.2 Data analysis (Task 1.3)

Task T1.3, led by WEEE FORUM, will involve analysis of the information collected in T1.2. A workshop at one major event will be organised by SAT and WEEE FORUM to present the project objectives and preliminary results of WP1. It will serve to fine tune the results obtained in the survey launched in T1.2. Communication and dissemination activities planned in WP8 will support the data collection exercise and the dissemination of WP1 results. A guide compiling the views of stakeholders together with their analysis and conclusions will be prepared. It will provide recommendations for the successful implementation of circularity in the E&E sector, including requirements from stakeholders and useful information for the development of circular economic business models (in WP2) and ICT tools/services (in WP3), as well as data relevant to other WPs.

Annexes

Annex 1: Target Stakeholder groups

Based on the initial stakeholder list (from Task 8.1), eight specific stakeholder groups have been clustered, representing the key E&E supply chain actors. This was followed by the production of matrix mapping of master survey questions against stakeholders' relevance.

The C-SERVEES stakeholder list includes: Industrial design and engineering , EEE manufacturing sector, Retail sector, Suppliers to the EEE manufacturing sector, Transportation and/or reverse logistics, Traceability and SMART monitoring solutions, Primary raw material sector, Secondary raw material sector, E-waste management sector (collection, treatment, EPRs), Re-manufacturing / re-use sector, Policy makers and regulatory bodies, Economic and financial sector, IT technology / Blockchain, Venture Capital/Cryptocurrency and Academia.

Considering the objectives of the surveys, the target groups of stakeholders which the survey will focus on are:

- EEE product designers
- Suppliers to EEE manufacturers (primary raw materials, components, packaging, etc.)
- EEE manufacturers
- EEE retailers
- EEE Users (organisations and individuals)
- E-waste management handlers (collection, transport, reuse, recovery, processing and supply of secondary raw materials for (re-)manufacturers)
- Researchers
- EEE Consumer organisations

Annex 2: Master Survey

1. BACKGROUND INFORMATION

- Age (end-users only)
- Years of experience in the industry/research? (all, except end-users)
- Gender (end-users only?)
- Household size (end-users only)
- Size of organisation (all, except end-users & researchers)
- Education level (end-users only)
- Position: (all, except end-users)
- Income (end-users only)
- Turnover (all, except end-users & researchers)

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration

- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):

  ……
  ….

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):

  ……
  .

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):

  ……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):

  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)

- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

  ……
  ….

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices in your current processes and products** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

STRATEGIC PRACTICES

- Developing circular economy business models
- Reliant solely on sourcing primary raw materials
- Reliant solely on sourcing secondary raw materials
- Sourcing a combination of primary and secondary raw materials
- Using Life Cycle Costing (LCC)
- Offering Product Service Systems (PSS)
- Other (please specify below):

  ……

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy

- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other

  ……

ENVIRONMENTAL PRACTICES

- Responsible material sourcing for own products
- Responsible material sourcing for suppliers' products
- Energy efficiency in processes and products
- Water efficiency in processes and products
- Emissions reduction from processes and products
- Waste management
- Other (please specify below):

  ……

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……

DESIGN PRACTICES

- Designing for durability
- Designing for product life extension
- Designing for maintainability
- Designing for repairability
- Designing for disassembly
- Designing for reuse
- Designing for repurposing
- Designing for recyclability/Recovery
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Provide fully circular materials to replace single-lifecycle products and components

- Extend the lifecycle of products and components by repairing, remanufacturing, refurbishing, and upgrading
- Enable increased utilisation of services and platforms by making possible shared access and use
- Offer product access and retain ownership
- Recover useful feedstock/energy out of end of life products
- Incentivise return of products
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your organisation (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Improving resilience of economic systems
- Enhancing economic growth
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing sourcing cost
- Reducing risk
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste handling and transportation cost
- Reducing waste disposal cost
- Other (please specify below):

  ……

ENVIRONMENTAL OPPORTUNITIES

- Reducing material use
- Reducing energy use
- Reducing water use
- Reducing carbon emissions
- Reducing waste generation

- Improving air quality
- Other (please specify below):

  ……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Using more efficient manufacturing processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Better detection of defective batches for repair or remanufacturing
- Improving collection methods for e-waste
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Difficulty controlling costs associated with materials, components and products' tracking
- Rising energy cost for recycling
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Lack of manufacturers' incentives for reuse and remanufacturing
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):
  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):
  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Lack of transparency about products' content
- Limited information for tracking products

- Limited circular design
- Limited circular economy key performance indicators
- Lack of circular economy metrics
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties
- Supply chain reluctance to change from linear practices
- Fragmented supply chain
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity
- Other (please specify below):

  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):

  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your processes and products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes

- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):

  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products
- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

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Annex 3: Designers Survey

1. BACKGROUND INFORMATION

- Years of experience in the industry/research?
- Size of organisation
- Position
- Turnover

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)

- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):
  ……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):
  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

……
….

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):
  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices in your current design practices** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

STRATEGIC PRACTICES

- Developing circular economy business models
- Reliant solely on sourcing primary raw materials
- Reliant solely on sourcing secondary raw materials
- Sourcing a combination of primary and secondary raw materials
- Using Life Cycle Costing (LCC)
- Offering Product Service Systems (PSS)
- Other (please specify below):
  ……

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy
- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other

ENVIRONMENTAL PRACTICES

- Specifying responsible material sourcing for own products
- Energy efficiency in processes and products
- Water efficiency in processes and products
- Emissions reduction from processes and products
- Waste management
- Other (please specify below):

  ……

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……
  ….

DESIGN PRACTICES

- Designing for durability
- Designing for product life extension
- Designing for maintainability
- Designing for repairability
- Designing for disassembly
- Designing for reuse
- Designing for repurposing
- Designing for recyclability/Recovery
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Specify fully circular materials to replace single-lifecycle products and components
- Design to extend the lifecycle of products and components by repairing, remanufacturing, refurbishing, and upgrading
- Enable increased utilisation of services and platforms by making possible shared access and use
- Offer product access and retain ownership
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your design practices (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

SOCIAL OPPORTUNITIES

- Optimising digitalisation
- Presence of product certifications and guarantees
- Offering reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Better detection of defective batches for repair or remanufacturing
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your design practices (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Difficulty controlling costs associated with materials, components and products' tracking
- Rising energy cost for recycling
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Lack of manufacturers' incentives for reuse and remanufacturing
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):
  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):
  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools

- Insufficient incentives for designing and manufacturing products for end of life circularity
- Lack of transparency about products' content
- Limited information for tracking products
- Limited circular design
- Limited circular economy key performance indicators
- Lack of circular economy metrics
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties
- Supply chain reluctance to change from linear practices
- Fragmented supply chain
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity

- Other (please specify below):
  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):
  ……
  ….

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):
  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your design practices (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):

  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products
- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects

- Other (please specify below):
  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):
  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):
  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements

- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

Annex 4: Suppliers' Survey

1. BACKGROUND INFORMATION

- Years of experience in the industry
- Size of organisation
- Position
- Turnover

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):

……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):
  ……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):
  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

……
….

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices in your current processes and products** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

STRATEGIC PRACTICES

- Developing circular economy business models
- Reliant solely on sourcing primary raw materials
- Reliant solely on sourcing secondary raw materials
- Sourcing a combination of primary and secondary raw materials
- Using Life Cycle Costing (LCC)
- Offering Product Service Systems (PSS)
- Other (please specify below):

  ……

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy
- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other

……

ENVIRONMENTAL PRACTICES

- Responsible material sourcing for own products
- Responsible material sourcing for suppliers' products
- Energy efficiency in processes and products
- Water efficiency in processes and products
- Emissions reduction from processes and products
- Waste management
- Other (please specify below):

  ……

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Provide fully circular materials to replace single-lifecycle products and components
- Extend the lifecycle of products and components by repairing, remanufacturing, refurbishing, and upgrading
- Enable increased utilisation of services and platforms by making possible shared access and use
- Offer product access and retain ownership
- Incentivise return of products
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to the way your organisation trades (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets

- Generating new revenue streams
- Increasing market share
- Improving resilience of economic systems
- Enhancing economic growth
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing sourcing cost
- Reducing risk
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste handling and transportation cost
- Reducing waste disposal cost
- Other (please specify below):
  ……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):
  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use

- Renting or leasing products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Difficulty controlling costs associated with materials, components and products' tracking
- Rising energy cost for recycling
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Lack of manufacturers' incentives for reuse and remanufacturing
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):

……
….

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Lack of transparency about products' content
- Limited information for tracking products
- Limited circular design
- Limited circular economy key performance indicators
- Lack of circular economy metrics
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties
- Supply chain reluctance to change from linear practices
- Fragmented supply chain
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes

- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity
- Other (please specify below):

  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):

  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in processes and

products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):
  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):
  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):
  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products
- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators

- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……
  ….

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance

- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

Annex 5: Manufacturers Survey

1. BACKGROUND INFORMATION

- Years of experience in the industry/research?
- Size of organisation
- Position
- Turnover

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):

  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):
  ……
  ….

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):
  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices in your current manufacturing processes and products** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

STRATEGIC PRACTICES

- Developing circular economy business models
- Reliant solely on sourcing primary raw materials
- Reliant solely on sourcing secondary raw materials
- Sourcing a combination of primary and secondary raw materials
- Using Life Cycle Costing (LCC)
- Offering Product Service Systems (PSS)
- Other (please specify below):

  ……

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy
- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other

ENVIRONMENTAL PRACTICES

- Responsible material sourcing for own products
- Responsible material sourcing for suppliers' products

- Energy efficiency in processes and products
- Water efficiency in processes and products
- Emissions reduction from processes and products
- Waste management
- Other (please specify below):

  ……

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……

DESIGN PRACTICES

- Designing for durability
- Designing for product life extension
- Designing for maintainability
- Designing for repairability
- Designing for disassembly
- Designing for reuse
- Designing for repurposing
- Designing for recyclability/Recovery
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Manufacturing products where fully circular materials replace single-lifecycle products and components
- Manufaturing products that can have their extended by repairing, remanufacturing, refurbishing, and upgrading
- Manufacturing products suitable for increased utilisation through shared access and use
- Offer access to poducts and retaining ownership
- Incentivise return of products
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your organisation (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Improving resilience of economic systems
- Enhancing economic growth
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing sourcing cost
- Reducing risk
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste handling and transportation cost
- Reducing waste disposal cost
- Other (please specify below):

  ……

SOCIAL OPPORTUNITIES

- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Using more efficient manufacturing processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Better detection of defective batches for repair or remanufacturing

- Improving collection methods for e-waste
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your manufacturing processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Difficulty controlling costs associated with materials, components and products' tracking
- Rising energy cost for recycling
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Lack of manufacturers' incentives for reuse and remanufacturing
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products

- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Lack of transparency about products' content
- Limited information for tracking products
- Limited circular design
- Limited circular economy key performance indicators
- Lack of circular economy metrics
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……
  ….

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties

- Supply chain reluctance to change from linear practices
- Fragmented supply chain
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity
- Other (please specify below):

  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Other (please specify below):

  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your manufacturing processes and products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):
  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):
  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):
  ……
  ….

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products

- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

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Annex 6: Retailers Survey

1. BACKGROUND INFORMATION

- Years of experience in the industry
- Size of organisation
- Position
- Turnover

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):

……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):

  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):

  ……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):

  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):
  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices in your current retail operations** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

STRATEGIC PRACTICES

- Developing circular economy business models
- Offering Product Service Systems (PSS)
- Other (please specify below):
  ……

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy
- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other (please specify below):
  ……

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques

- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Provide fully circular materials to replace single-lifecycle products and components
- Offer services to extend the lifecycle of products and components by repairing, remanufacturing, refurbishing, and upgrading
- Offer services ensuring increased utilisation of services and platforms via shared access and use
- Offer product access and retain ownership
- Offer a service for return of products
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your retail operations in the e-sector (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Improving resilience of economic systems
- Enhancing economic growth
- Enhancing Corporate Social Responsibility reputation
- Reducing sourcing cost
- Reducing risk
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste handling and transportation cost
- Reducing waste disposal cost
- Other (please specify below):

  ……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Improving collection methods for WEEE
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your retail operations with the electrical and electronic products you sell (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- Low value and low profit margin of recycled products
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Limited market infrastructure and mechanisms for recovery

- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Lack of transparency about products' content
- Limited information for tracking products
- Limited circular design
- Limited circular economy key performance indicators
- Lack of circular economy metrics
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products

- Other (please specify below):
  ……

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties
- Supply chain reluctance to change from linear practices
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity
- Other (please specify below):
  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models

- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):

  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your e-sector retail operations (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):

  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products
- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……
  ….

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training

- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……
  ….

Annex 7: End-users Survey

1. BACKGROUND INFORMATION

- Age
- Gender
- Household size
- Education level
- Income (end-users only)

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- Other (please specify below):

  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages

- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 your level of agreement of the following **factors that influence your decision to purchase electrical and electronic products** (1= strongly disagree; 2=disagree; 3= agree; 4= strongly agree).

- Responsible sourced products
- Energy and/or water efficient products
- Durable products
- Cost of products
- High quality/value of products
- Low maintenance products
- Easily repairable products
- Reused products
- Recycled products

- Products associated with leasing services
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities that could potentially add value to electrical and electronic equipment users/customers** (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ENVIRONMENTAL OPPORTUNITIES

- Reducing energy use
- Reducing water use
- Reducing carbon emissions
- Reducing waste generation
- Other (please specify below):

  ……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Using 3D printing
- Improving collection methods for electrical and electronic equipment waste
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Realising repair, remanufacture, refurbishment, upgrade and resale
- Renting or leasing products

- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges to users' circular consumption of electrical and electronic products** (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

SOCIAL CHALLENGES

- Lack of knowledge and understanding of circular products and practices
- Lack of awareness on circular economy benefits
- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive users' circular consumption of electrical and electronic products** (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Availability of information for tracking products
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Campaigns for legislation awareness, understanding and compliance
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

Annex 8: Waste Management Handlers Survey

1. BACKGROUND INFORMATION

- Years of experience in the industry
- Size of company
- Position
- Turnover

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- countries
- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):

  ……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):

  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices in your current WEEE processes** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy
- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……

WEEE PRACTICES

- WEEE collection from private users
- WEEE collection from business users
- WEEE Transportation
- WEEE resale
- WEEE repairs
- WEEE recycling/recovery/treatment
- Sale of reused and/or recycled WEEE products
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Provide fully circular materials to replace single-lifecycle products and components
- Extend the lifecycle of products and components by repairing, remanufacturing, refurbishing, and upgrading
- Enable increased utilisation of services and platforms by making possible shared access and use
- Offer product access and retain ownership

- Recover useful feedstock/energy out of end of life products
- Incentivise return of products
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your company (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing risk
- Other (please specify below):

  ……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):

  ……
  ….

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Improving WEEE collection methods
- Using more resource efficient recycling and recovery processes
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Developing efficient repair, recycling and recovery tools and technologies
- Other (please specify below):

……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing recycled products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Difficulty controlling costs associated with materials, components and products' tracking
- Rising energy cost for recycling
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Lack of incentives for reuse and remanufacturing
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption

- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Lack of transparency about products' content
- Limited information for tracking products
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties
- Supply chain reluctance to change from linear practices
- Fragmented supply chain
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes

- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity
- Other (please specify below):

  ……

LEGISLATIVE CHALLENGES

- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):

  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your processes and products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):

  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products
- Availability of information for tracking products
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative recycling and recovery technologies for circular products
- Other (please specify below):

  ……

Annex 9: Researchers Survey

1. BACKGROUND INFORMATION

- Position
- Years of experience in research

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 your **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

CIRCULAR ECONOMY REPORTS

- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):
  ……
  .

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Other (please specify below):
  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):

……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):

  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY PRACTICES

Based on your ongoing or recently completed research work, please rate from 1-4 the level of implementation of the following **circular economy practices by the stakeholders in the electrical and electronic sector** (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

STRATEGIC PRACTICES

- Developing circular economy business models
- Reliant solely on sourcing primary raw materials
- Reliant solely on sourcing secondary raw materials
- Sourcing a combination of primary and secondary raw materials
- Using Life Cycle Costing (LCC)
- Offering Product Service Systems (PSS)
- Other (please specify below):

  ……

ORGANISATIONAL ENVIRONMENTAL POLICIES

- Sustainability policy
- Circular economy policy
- Responsible sourcing policy
- Circular procurement policy
- Waste management policy
- Other (please specify below):

  ……

ENVIRONMENTAL PRACTICES

- Responsible material sourcing for own products
- Responsible material sourcing for suppliers' products
- Energy efficiency in processes and products
- Water efficiency in processes and products
- Emissions reduction from processes and products
- Waste management
- Other (please specify below):

  ……

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):

  ……

DESIGN PRACTICES

- Designing for durability
- Designing for product life extension

- Designing for maintainability
- Designing for repairability
- Designing for disassembly
- Designing for reuse
- Designing for repurposing
- Designing for recyclability/Recovery
- Other (please specify below):

  ……

BUSINESS MODELS PRACTICES

- Providing fully circular materials to replace single-lifecycle products and components
- Extending the lifecycle of products and components by repairing, remanufacturing, refurbishing, and upgrading
- Enabling increased utilisation of services and platforms by making possible shared access and use
- Offering product access and retain ownership
- Recovering useful feedstock/energy out of end of life products
- Incentivising return of products
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

From your research experiences please rate your level of agreement that the following are **opportunities** that adopting circular business practices could bring to organisations in the electrical and electronic sector (1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Improving resilience of economic systems
- Enhancing economic growth
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing sourcing cost
- Reducing risk
- Reducing production process cost
- Reducing raw material cost

- Reducing energy cost
- Reducing water cost
- Reducing waste handling and transportation cost
- Reducing waste disposal cost
- Other (please specify below):

  ……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Increased supporting circular economy knowledge, skills and tools
- Other (please specify below):

  ……
  ….

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Using more efficient manufacturing processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Better detection of defective batches for repair or remanufacturing
- Improving collection methods for e-waste
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increasing recycled content in products
- Realising repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

From your research experience how do you rate the following as **challenges to the implementation of circular economic practices** within organisations in the electrical and electronic sector (1=not a challenge; 2=insignificant challenge; 3=significant challenge; 4=major challenge)

ECONOMIC CHALLENGES

- Cost related to circular economy skills training of people
- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Difficulty controlling costs associated with materials, components and products' tracking
- Rising energy cost for recycling
- Ensuring repairs, refurbishment, remanufacture and recycling costs are competitive
- Lack of manufacturers' incentives for reuse and remanufacturing
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Other (please specify below):
  ……

SOCIAL CHALLENGES

- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):
  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Lack of transparency about products' content

- Limited information for tracking products
- Limited circular design
- Limited circular economy key performance indicators
- Lack of circular economy metrics
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Limited circular economy awareness
- Lack of circular economy knowledge
- Lack of interest from supply chain
- Lack of collaboration between supply chain parties
- Supply chain reluctance to change from linear practices
- Fragmented supply chain
- Increased supply chain complexity
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Limited data sharing and transparency among parties in the supply chain
- Lack of assurance schemes for reuse of secondary materials
- Undeveloped infrastructure and technologies for e-waste recovery and circularity
- Other (please specify below):

  ……

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Inconsistent level of monitoring of legislative requirements
- Unregulated circular economy competition
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):

  ……
  ….

6. CIRCULAR ECONOMY ENABLERS

From your research experience how would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in the electrical and electronic sector (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products

- Ensuring financial viability of takeback schemes
- Ensuring ssecondary raw materials are cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):

  ……

ENVIRONMENTAL ENABLERS

- Increased substitution of virgin materials by secondary raw materials
- Availability of cost effective and reliable green sources of energy
- Innovative resource efficient recycling and recovery processes
- Increased use of renewable energy in product manufacturing and recovery processes
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Adopting circular strategies in the design and manufacturing of products
- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Developing tools and strategies to foster circular economy collaborative practice within the supply chain
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for recovery
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

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Annex 10: Consumer Organisations Survey

1. BACKGROUND INFORMATION

- Years of experience in the industry/research?
- Size of organisation
- Position
- Turnover

2. CIRCULAR ECONOMY AWARENESS

Please rate from 1-4 electrical and electronic equipment customers' **level of awareness** of the following circular economy related methods, concepts, initiatives, policies, standards, reports, projects and business models (1=unware; 2=slightly aware; 3=considerably aware; 4=fully aware).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) METHODS

- WEEE prevention methods
- WEEE reduction methods
- WEEE methods
- WEEE reuse methods
- WEEE recycling methods
- WEEE recovery methods (e.g. energy recovery)
- WEEE disposal methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY CONCEPTS, INITIATIVES AND REPORTS

- Linear economy
- Circular economy
- Circular economy initiatives in your country
- Circular economy initiatives globally
- Remanufacturing Market Study November
- CECED (European Committee of Domestic Equipment Manufacturers) – Material Flows of the Home Appliance Industry
- The Global E-waste Monitor
- Ellen MacArthur – Circular Consumer Electronics: An initial exploration
- thinkstep –Regulatory barriers for the Circular Economy
- WRAP – Electrical and Electronic Equipment Sustainability Action Plan 2025 (esap 2025)
- Other (please specify below):

……

ENVIRONMENTAL AND CIRCULAR ECONOMY POLICIES AND REGULATIONS

- EU Circular Economy packages
- EU Waste Electrical and Electronic Equipment Directive
- EU Ecodesign Directive
- EU Energy Labelling Regulation
- Extended Producer Responsibility (EU EPR)
- Waste Framework Directive (end-of-waste criteria)
- Legal framework for waste electrical and electronic equipment in your country
- Legal framework for waste electrical and electronic equipment in other countries
- Other (please specify below):

  ……

ENVIRONMENTAL AND CIRCULAR ECONOMY STANDARDS

- BS8001 (Circular Economy)
- ISO14001 (Environmental Management)
- EU Ecodesign standard
- Other (please specify below):

  ……

EU CIRCULAR ECONOMY RELATED DOCUMENTS

- The EU Circular Economy Action Plan
- The EU Circular Economy Plastic Roadmap
- EU Report on Critical Raw Materials and the Circular Economy
- Other (please specify below):

  ……

CIRCULAR ECONOMY PROJECTS

- CloseWEEE (Closing the loop of post-consumer high-grade plastics, advanced recovery of critical raw materials antimony and graphite)
- ProSUM (Prospecting Secondary raw materials in the Urban mine and Mining wastes)
- REBus (Resource Efficient Business Models)
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS

- Circular supplies (providing fully recyclable input material to replace single-lifecycle inputs)
- Product life extension (extending the working lifecycle of products and components by repairing, remanufacturing, refurbishing, upgrading and reselling)
- Sharing network and services (enabling increased utilisation of products by making possible shared use / access/ ownership)
- Product as a service (offering product access and retaining ownership to internalise benefits of circular resource productivity)
- Resource recovery (recovering useful resources/energy out of disposed products or by-products)
- Other (please specify below):
  ……

3. CIRCULAR ECONOMY PRACTICES

Please rate from 1-4 the level of implementation of the following **circular economy practices** within your organisation (1=not implemented; 2=partially implemented; 3=considerably implemented; 4=fully implemented).

CAPACITY BUILDING PRACTICES

- Enhancing circular economy skills
- Improving circular economy knowledge
- Developing in-house circular economy tools and techniques
- Developing circular economy enabling infrastructure and/or equipment
- Other (please specify below):
  ……

4. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to electrical and electronic equipment users / customers (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ENVIRONMENTAL OPPORTUNITIES

- Reducing energy use
- Reducing water use
- Reducing carbon emissions
- Reducing waste generation
- Other (please specify below):

……

SOCIAL OPPORTUNITIES

- Boosting servitisation
- Optimising digitalisation
- Improving customer relations
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Incorporating information and communication technology into products and processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Using 3D printing
- Improving collection methods for e-waste
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Realising repair, remanufacture, refurbishment, upgrade and resale
- Use of products through shared access business models
- Renting or leasing products
- Recovering useful materials and energy from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

5. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges to consumers' circular consumption** of electrical and electronic products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

SOCIAL CHALLENGES

- Lack of knowledge and understanding of circular products and practices
- Challenging the trend of replacing rather than repairing products
- Limited acceptance of reused and refurbished products

- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Difficulty accessing maintenance and repair services
- Limited leasing services
- Other (please specify below):
  ……

TECHNICAL CHALLENGES

- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):
  ……
  ….

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- No mandatory European circular economy legislative requirements
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inability to obtain fully recyclable input material to replace single-lifecycle inputs
- Inconsistent supply of secondary raw materials
- Difficulty facilitating repair, remanufacture, refurbishment, upgrade and resale
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Inconsistent recovery processes
- Difficulty incentivising return of products
- Other (please specify below):
  ……

6. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive users' circular practices** towards electrical and electronic products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Other (please specify below):
  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):
  ……

TECHNICAL ENABLERS

- Adopting circular strategies in the design and manufacturing of products
- Mechanisms to avoid exposure of stored personal and/or organisational data in e-products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):
  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models

- Strengthening internal collaboration in the organisational business plans
- Developing tools and strategies to foster circular economy collaboration between the organisation and supply chain
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for capital and operational investments
- Other (please specify below):

  ……

LEGISLATIVE ENABLERS

- Campaigns for legislation awareness, understanding and compliance
- Mandatory circular economy legislative requirements at European Union level
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

.

Annex 11: Advisory Board and partners' reviewed **Designers** Survey

1. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your design practices (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste related costs
- Other (please specify below):
  ……

SOCIAL OPPORTUNITIES

- Improve customer loyalty
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):
  ……

TECHNICAL OPPORTUNITIES

- Incorporating labelling and ICT-enabled dematerialization into products
- Using more efficient manufacturing processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Disruptive development (improvements) in recycling and recovering technologies

- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increased recycled content in products
- Realising in house repair, remanufacture, refurbishment and upgrade
- Realising third party repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

2. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your design practices (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Overregulation
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Not enough compliance checks at Member States level
- Unregulated circular economy competition
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……
  ….

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy

- Undeveloped circular economy skills and training
- Insufficient interest from customers
- Lack of collaboration between supply chain parties
- Shift from short-life products to extended life cycle of products
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Other (please specify below):

  ……

ECONOMIC CHALLENGES

- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Repairs, refurbishment, remanufacture and recycling costs
- Reverse Logistics costs
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Limited maintenance and repair services
- Limited leasing services
- Regional differences (e.g. USA versus China)
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Social trend of replacing rather than repairing products
- Limited social acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Limited maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Technical limitations in different circular economy loops (e.g. for parts reuse, life extension, etc.)

- Limited circular economy exchange between designers of different industry sectors
- Lack of transparency about products' content
- Limited information for tracking products
- Lack of circular economy metrics and indicators
- Limited circular components capability
- Concerns over personal and/or organisational data security
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Lack of interest from supply chain
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Undeveloped infrastructure and technologies for WEEE recovery and circularity
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inconsistent supply of secondary raw materials
- End-user unwillingness to accept shared access and use
- End-user reluctance to rent or lease products
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your design practices (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock

- Regulated competition
- Campaigns for WEEE legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):
  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Developing new circular procurement
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for circular economy related capital and operational investments
- Other (please specify below):
  ……

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement
- Other (please specify below):
  ……
  ….

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services

- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Innovative resource efficient recycling and recovery processes
- Availability of information for tracking products
- Development of circular economy metrics
- Development of circular economy key performance indicators
- Mechanisms to avoid exposure of stored personal and/or organisational data in E&E products
- Designing out waste
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for WEEE recovery
- Other (please specify below):

  ……
  ….

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

4. BACKGROUND INFORMATION

- Position
- Years of experience in the industry
- Size of organisation
- Turnover
- Country
- City

Annex 12: Advisory Board and partners' reviewed **Suppliers** Survey

1. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to the way your organisation trades (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste related costs
- Other (please specify below):
  ……

SOCIAL OPPORTUNITIES

- Improve customer loyalty
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):
  ……

TECHNICAL OPPORTUNITIES

- Incorporating labelling and ICT-enabled dematerialization into products
- Using more efficient manufacturing processes
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Disruptive development (improvements) in recycling and recovering technologies

- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increased recycled content in products
- Realising in house repair, remanufacture, refurbishment, upgrade and resale
- Realising third party repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

2. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Overregulation
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Not enough compliance checks at Member States level
- Unregulated circular economy competition
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……
  ….

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy

- Undeveloped circular economy skills and training
- Insufficient interest from customers
- Lack of collaboration between supply chain parties
- Shift from short-life products to extended life cycle of products
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Other (please specify below):
  ……

ECONOMIC CHALLENGES

- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- repairs, refurbishment, remanufacture and recycling costs
- Reverse Logistics costs
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Limited maintenance and repair services
- Limited leasing services
- Regional differences (e.g. USA versus China)
- Other (please specify below):
  ……

SOCIAL CHALLENGES

- Social trend of replacing rather than repairing products
- Limited social acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Other (please specify below):
  ……
  ….

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Technical limitations in different circular economy loops (e.g. for parts reuse, life extension, etc.)
- Lack of transparency about products' content
- Limited information for tracking products
- Lack of circular economy metrics and indicators

- Limited circular components capability
- Concerns over personal and/or organisational data security
- Other (please specify below):
  ……

SUPPLY CHAIN CHALLENGES

- Lack of interest from supply chain
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Undeveloped infrastructure and technologies for WEEE recovery and circularity
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inconsistent supply of secondary raw materials
- End-user unwillingness to accept shared access and use
- End-user reluctance for renting or leasing products
- Other (please specify below):
  ……
  ….

3. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in processes and products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for WEEE legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement

- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Developing new circular procurement
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for circular economy related capital and operational investments
- Other (please specify below):

  ……

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Innovative resource efficient recycling and recovery processes
- Availability of information for tracking products
- Development of circular economy metrics
- Mechanisms to avoid exposure of stored personal and/or organisational data in E&E products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for WEEE recovery
- Other (please specify below):

  ……

4. BACKGROUND INFORMATION

- Position
- Years of experience in the industry
- Size of organisation
- Turnover
- Country
- City

Annex 13: Advisory Board and partners' reviewed **Manufacturers** Survey

1. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your organisation (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste related costs
- Other (please specify below):
  ……

SOCIAL OPPORTUNITIES

- Improve customer loyalty
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):
  ……

TECHNICAL OPPORTUNITIES

- Incorporating labelling and ICT-enabled dematerialization into products
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Disruptive development (improvements) in recycling and recovering technologies
- Using 3D printing

- Using blockchain to support and accelerate circular supply chains
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increased recycled content in products
- Realising in house repair, remanufacture, refurbishment, upgrade and resale
- Realising third party repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

2. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your manufacturing processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

LEGISLATIVE CHALLENGES

- Lack of understanding of legislative requirements
- Overregulation
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Not enough compliance checks at Member States level
- Unregulated circular economy competition
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Insufficient interest from customers

- Lack of collaboration between supply chain parties
- Shift from short-life products to extended life cycle of products
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Other (please specify below):

  ……

ECONOMIC CHALLENGES

- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Repairs, refurbishment, remanufacture and recycling costs
- Reverse Logistics costs
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Limited maintenance and repair services
- Limited leasing services
- Regional differences (e.g. USA versus China)
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Social trend of replacing rather than repairing products
- Limited social acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Technical limitations in different circular economy loops (e.g. for parts reuse, life extension, etc.)
- Lack of transparency about products' content
- Limited information for tracking products
- Lack of circular economy metrics and indicators
- Limited circular components capability
- Concerns over personal and/or organisational data security

- Other (please specify below):
  ……

SUPPLY CHAIN CHALLENGES

- Lack of interest from supply chain
- Competing/conflicting priorities among parties in the supply chain
- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Undeveloped infrastructure and technologies for WEEE recovery and circularity
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inconsistent supply of secondary raw materials
- End-user unwillingness to accept shared access and use
- End-user reluctance to rent or lease products
- Other (please specify below):
  ……

3. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your manufacturing processes and products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for WEEE legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory National circular economy legislative requirements
- Global regulatory consensus

- Other (please specify below):
  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Developing new circular procurement
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for circular economy related capital and operational investments
- Other (please specify below):
  ……

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement
- Other (please specify below):
  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):
  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Innovative resource efficient recycling and recovery processes
- Availability of information for tracking products
- Development of circular economy metrics
- Mechanisms to avoid exposure of stored personal and/or organisational data in E&E products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for WEEE recovery
- Other (please specify below):

  ……
  ….

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative design and manufacturing for circular products
- Incentivised return of products e.g. deposits
- Other (please specify below):

  ……

4. BACKGROUND INFORMATION

- Position
- Years of experience in the industry
- Size of organisation
- Turnover
- Country
- City

Annex 14: Advisory Board and partners' reviewed **Retailers** Survey

1. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your retail operations in the e-sector (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Reducing production process cost
- Reducing raw material cost
- Reducing energy cost
- Reducing water cost
- Reducing waste related costs
- Other (please specify below):
  ……

SOCIAL OPPORTUNITIES

- Improve customer loyalty
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):
  ……

TECHNICAL OPPORTUNITIES

- Incorporating labelling and ICT-enabled dematerialization into products
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Disruptive development (improvements) in recycling and recovering technologies
- Using 3D printing

- Using blockchain to support and accelerate circular supply chains
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Increased recycled content in products
- Realising in house repair, remanufacture, refurbishment, upgrade and resale
- Realising third party repair, remanufacture, refurbishment, upgrade and resale
- Acquiring new customers and business through shared access and use
- Renting or leasing products
- Recovering useful materials from end of life products
- Incentivising return of products
- Other (please specify below):

  ……

2. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your retail operations with the electrical and electronic products you sell (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

LEGISLATIVE CHALLENGES

- Lack of awareness of legislative requirements
- Lack of understanding of legislative requirements
- Overregulation
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Not enough compliance checks at Member States level
- Unregulated circular economy competition
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy

- Undeveloped circular economy skills and training
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Other (please specify below):

  ……

ECONOMIC CHALLENGES

- Low value and low profit margin of recycled products
- Repairs, refurbishment, remanufacture and recycling costs
- Limited market infrastructure and mechanisms for recovery
- Limited maintenance and repair services
- Limited leasing services
- Regional differences (e.g. USA versus China)
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Social trend of replacing rather than repairing products
- Limited social acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Technical limitations in different circular economy loops (e.g. for parts reuse, life extension, etc.)
- Lack of transparency about products' content
- Limited information for tracking products
- Limited circular components capability
- Concerns over personal and/or organisational data security
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Lack of interest from supply chain
- Competing/conflicting priorities among parties in the supply chain

- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Undeveloped infrastructure and technologies for WEEE recovery and circularity
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Limited understanding of circular economy business models
- Unclear added value in adopting circular economy business models
- Inconsistent supply of secondary raw materials
- End-user unwillingness to accept shared access and use
- End-user reluctance to rent or lease products
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your e-sector retail operations (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for WEEE legislation awareness, understanding and compliance
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Developing new circular procurement
- Long-term management approach to circular economy

- Considering customer preferences in circular economy business models
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for circular economy related capital and operational investments
- Other (please specify below):

  ……

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Innovative resource efficient recycling and recovery processes
- Availability of information for tracking products
- Mechanisms to avoid exposure of stored personal and/or organisational data in E&E products
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Developing new circular procurement
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for circular economy related capital and operational investments
- Other (please specify below):

  ……
  .

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for WEEE recovery
- Other (please specify below):

  ……

4. BACKGROUND INFORMATION

- Position
- Years of experience in the industry
- Size of organisation
- Turnover
- Country
- City

Annex 15a: Advisory Board and partners' reviewed **B2C End-users** Survey

1. DECISION FACTORS TO PURCHASE E&E PRODUCTS

Please rate from 1-4 your level of agreement of the following **factors that influence your decision to purchase electrical and electronic products** (1= strongly disagree; 2=disagree; 3= agree; 4= strongly agree).

- Responsible sourced products
- Energy and/or water efficient products
- Durable products
- Low maintenance and easily repairable products
- Availability of repair shops
- Products associated with leasing services
- Other (please specify below):

  ……

2. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities that could potentially add value to electrical and electronic equipment users** (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

SOCIAL OPPORTUNITIES

- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Reuse and easy maintenance and repair of products
- Improving WEEE collection methods
- Optimization/improvements in WEEE recycling methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Renting or leasing products
- Incentivising return of products
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges to users' circular consumption of electrical and electronic products** (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

SOCIAL CHALLENGES

- Lack of knowledge and understanding of circular products and practices
- Lack of awareness on circular economy benefits
- Social trend of replacing rather than repairing products
- Limited social acceptance of reused, refurbished and recycled products
- Limited maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive users' circular consumption of electrical and electronic products** (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement

- Other (please specify below):
  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):
  ……

TECHNICAL ENABLERS

- Mechanisms to avoid exposure of stored personal data in E&E products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):
  ……

5. BACKGROUND INFORMATION

- Age
- Gender
- Household size
- Education level
- Income
- Country
- City

Annex 15b: Advisory Board and partners' reviewed **B2B End-users** Survey

1. DECISION FACTORS TO PURCHASE E&E PRODUCTS

Please rate from 1-4 your level of agreement of the following **factors that influence your decision to purchase electrical and electronic products** (1= strongly disagree; 2=disagree; 3= agree; 4= strongly agree).

- Responsible sourced products
- Energy and/or water efficient products
- Durable products
- Low maintenance and easily repairable products
- Availability of repair shops
- Products associated with leasing services
- Other (please specify below):

  ……

2. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities that could potentially add value to electrical and electronic equipment business users** (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

SOCIAL OPPORTUNITIES

- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):

  ……

TECHNICAL OPPORTUNITIES

- Reuse and easy maintenance and repair of products
- Improving WEEE collection methods
- Optimization/improvements in WEEE recycling methods
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS OPPORTUNITIES

- Renting or leasing products
- Incentivising return of products
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges to business users' circular consumption of electrical and electronic products** (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

SOCIAL CHALLENGES

- Lack of knowledge and understanding of circular products and practices
- Lack of awareness on circular economy benefits
- Social trend of replacing rather than repairing products
- Limited social acceptance of reused, refurbished and recycled products
- Limited maintenance and repair services
- Limited leasing services
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Technical limitations in different circular economy loops (e.g. for parts reuse, life extension, etc.)
- Other (please specify below):

  ……

4. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive business users' circular consumption of electrical and electronic products** (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products

- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Availability of information for tracking products
- Mechanisms to avoid exposure of stored personal data in E&E products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):

  ……

5. BACKGROUND INFORMATION

- Position
- Years of experience in the industry
- Size of organisation
- Turnover
- Country
- City

Annex 16: Advisory Board and partners' reviewed **WEEE Handlers** Survey

1. CIRCULAR ECONOMY OPPORTUNITIES

Please rate from 1-4 your level of agreement of the following **circular economy opportunities** that could potentially add value to your company (1=strongly disagree; 2=disagree; 3=agree; 4= strongly agree).

ECONOMIC OPPORTUNITIES

- Capturing new markets
- Generating new revenue streams
- Increasing market share
- Enhancing Corporate Social Responsibility reputation
- Building trust
- Other (please specify below):
  ……

SOCIAL OPPORTUNITIES

- Improve customer loyalty
- Presence of product certifications and guarantees
- Reuse and easy maintenance and repair of products
- Enhance circular economy knowledge and skills
- Overcome gender, age and social barriers
- Other (please specify below):
  ……

TECHNICAL OPPORTUNITIES

- Incorporating labelling and ICT-enabled dematerialization into products
- Design and manufacturing for product reuse, maintenance, repair, refurbishment, remanufacture and recycling
- Disruptive development (improvements) in recycling and recovering technologies
- Using 3D printing
- Using blockchain to support and accelerate circular supply chains
- Other (please specify below):
  ……

CIRCULAR ECONOMY BUSINESS MODELS ADOPTION OPPORTUNITIES

- Realising in house repair, remanufacture, refurbishment, upgrade and resale
- Realising third party repair, remanufacture, refurbishment, upgrade and resale
- Recovering useful materials from end of life products
- Other (please specify below):
  ……

2. CIRCULAR ECONOMY CHALLENGES

How would you assess the severity of the following **challenges that could impede the implementation of circular economy practices** in your processes and products (1=not a challenge; 2= insignificant challenge; 3= significant challenge; 4= major challenge)

LEGISLATIVE CHALLENGES

- Overregulation
- Inconsistent level of compliance with legislative requirements
- Varying level of enforcement of legislative requirements
- Not enough compliance checks at Member States level
- Unregulated circular economy competition
- Undecided national circular economy legislative requirements
- Lack of global regulatory consensus
- Other (please specify below):
  ……
  ….

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Lack of collaboration between supply chain parties
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Other (please specify below):
  ……

ECONOMIC CHALLENGES

- Low primary raw material prices
- High secondary raw material prices
- Low value and low profit margin of recycled products
- Repairs, refurbishment, remanufacture and recycling costs

- Reverse Logistics costs
- Limited market infrastructure and mechanisms for recovery
- Unclear cost implications to adopt and implement circular economy business models
- Limited maintenance and repair services
- Other (please specify below):

  ……

SOCIAL CHALLENGES

- Social trend of replacing rather than repairing products
- Limited social acceptance of reused and refurbished products
- Off-putting perception of recycled content in new products
- Lack of promotion for sustainable consumption
- Lack of knowledge and understanding of circular products and practices
- Other (please specify below):

  ……

TECHNICAL CHALLENGES

- Limited circular economy technical knowledge and supporting tools
- Lack of transparency about products' content
- Limited information for tracking products
- Concerns over personal and/or organisational data security
- Limited best practice circular economy demonstration projects
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Limited interest from senior management
- Insufficient interest from customers
- Lack of collaboration between organisation and supply chain
- Shift from short-life products to extended life cycle of products
- Other (please specify below):

  ……

SUPPLY CHAIN CHALLENGES

- Lack of interest from supply chain
- Competing/conflicting priorities among parties in the supply chain

- Concerns over confidentiality among parties in the supply chain
- Limited suppliers offering circular products
- Lack of takeback schemes
- Lack of information on product and material traceability
- Undeveloped infrastructure and technologies for WEEE recovery and circularity
- Other (please specify below):

  ……

CIRCULAR ECONOMY BUSINESS MODELS IMPLEMENTATION CHALLENGES

- Unclear circular economy business case
- No organisational circular economy policy/strategy
- Undeveloped circular economy skills and training
- Insufficient interest from customers
- Lack of collaboration between supply chain parties
- Shift from short-life products to extended life cycle of products
- Insufficient incentives for designing and manufacturing products for end of life circularity
- Other (please specify below):

  ……

3. CIRCULAR ECONOMY ENABLERS

How would you assess the viability of the following **enablers that could drive the implementation of circular economy practices** in your processes and products (1=not an enabler; 2= insignificant enabler; 3= significant enabler; 4= major enabler)

LEGISLATIVE ENABLERS

- Taxing virgin materials more than recycled feedstock
- Regulated competition
- Campaigns for WEEE legislation awareness, understanding and compliance
- Development of organisational and supply chain tools for compliance monitoring and enforcement
- Mandatory National circular economy legislative requirements
- Global regulatory consensus
- Other (please specify below):

  ……

BUSINESS AND MANAGEMENT ENABLERS

- Clear circular economy business case
- Circular economy training programmes
- Developing new circular procurement
- Long-term management approach to circular economy
- Considering customer preferences in circular economy business models
- Research and development initiatives to devise strategies and methods to extend the lifecycle of products
- Viable financial feasibility studies for circular economy related capital and operational investments
- Other (please specify below):

  ……

ECONOMIC ENABLERS

- Additional government funding for circular economy skills training of people
- Funding research to optimise circular products
- Ensuring financial viability of circular products
- Ensuring financial viability of takeback schemes
- Producing secondary raw materials cheaper than primary raw materials
- Fiscal incentives for repair, remanufacture, refurbishment, upgrade and resale e.g. reduced VAT
- Green Public Procurement
- Other (please specify below):

  ……

SOCIAL ENABLERS

- Campaigns to promote circular economy consumption and practices
- Making products' repair and replacement services available
- Increasing accessibility to products' repair and replacement services
- Affordable and reliable leasing services
- Other (please specify below):

  ……

TECHNICAL ENABLERS

- Enhancing circular economy technical knowledge and skills through training
- Innovative resource efficient recycling and recovery processes
- Availability of information for tracking products

- Development of circular economy metrics
- Mechanisms to avoid exposure of stored personal and/or organisational data in E&E products
- Designing and manufacturing for end of life reuse and circularity
- Dissemination of best practice circular economy demonstration projects
- Other (please specify below):
  ……

SUPPLY CHAIN ENABLERS

- Improved circular economy awareness across supply chain
- Enhanced circular economy knowledge and skills through training
- Available information on materials', products and components' traceability
- Suppliers offering circular products
- Accepted assurance schemes for reuse of secondary materials
- Viable takeback schemes
- Viable and cost effective technologies for WEEE recovery
- Other (please specify below):
  ……

BUSINESS MODELS' IMPLEMENTATION ENABLERS

- Disseminating the benefits of renting and leasing products
- Developing new circular procurement systems
- Developing innovative recycling and recovery technologies for circular products
- Other (please specify below):
  ……

4. BACKGROUND INFORMATION

- Position
- Years of experience in the industry
- Size of organisation
- Turnover
- Country
- City