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Mapping the Circular/Green Electronics Ecosystem

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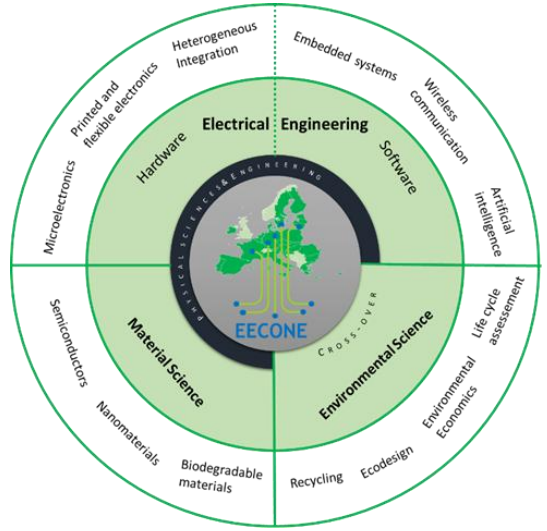
Agenda of the presentation

- Objective
- Method
- Analysis
  - Participants' Profile
  - Motivation and Impact of the 6R
  - Key Actors in 6R
  - 6R Integration & Implementation
- Summary of the main takeaways



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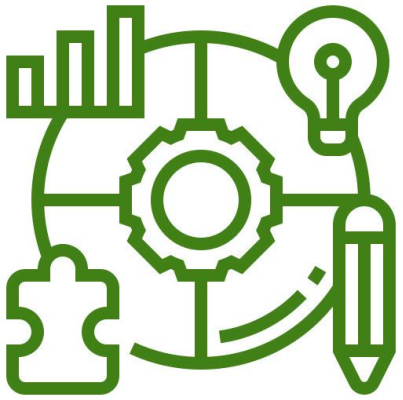
Objective of the Survey

Understand state-of-the-art practices and knowledge levels across the ecosystem



- Identify key actors/drivers
- Assess the expertise
- Practices and needs
- Business opportunities

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Method of the Survey

- **Survey Scope:** 74 Participants
- **Data Collection Method:** Online survey
- **Key Focus Areas:**
  - Participants' Profile
  - Motivation and Impact of the 6R
  - Key Actors in 6R
  - 6R Integration & Implementation

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Survey Analysis

1 **Participants' Profile**

- Sector & Role in Supply Chain
- Expertise & Background
- Experience
- Knowledge on Sustainability
- Participants' Expertise and their Team Involvement in Each R

2 **Motivation and Impact of the 6R**

- Motivations of Companies
- Potential Impact of the 6Rs
- Business Opportunities of 6Rs

3 **Key Actors in 6R**

- Actors Involved in 6R
- Actors Should be Involved in 6R

4 **6R Integration & Implementation**

- R Implementation Scale (Material, System, PCB, etc.)
- Product Development Tools for Circularity and Eco-design
- Companies' Plan to Improve their Current State on 6R

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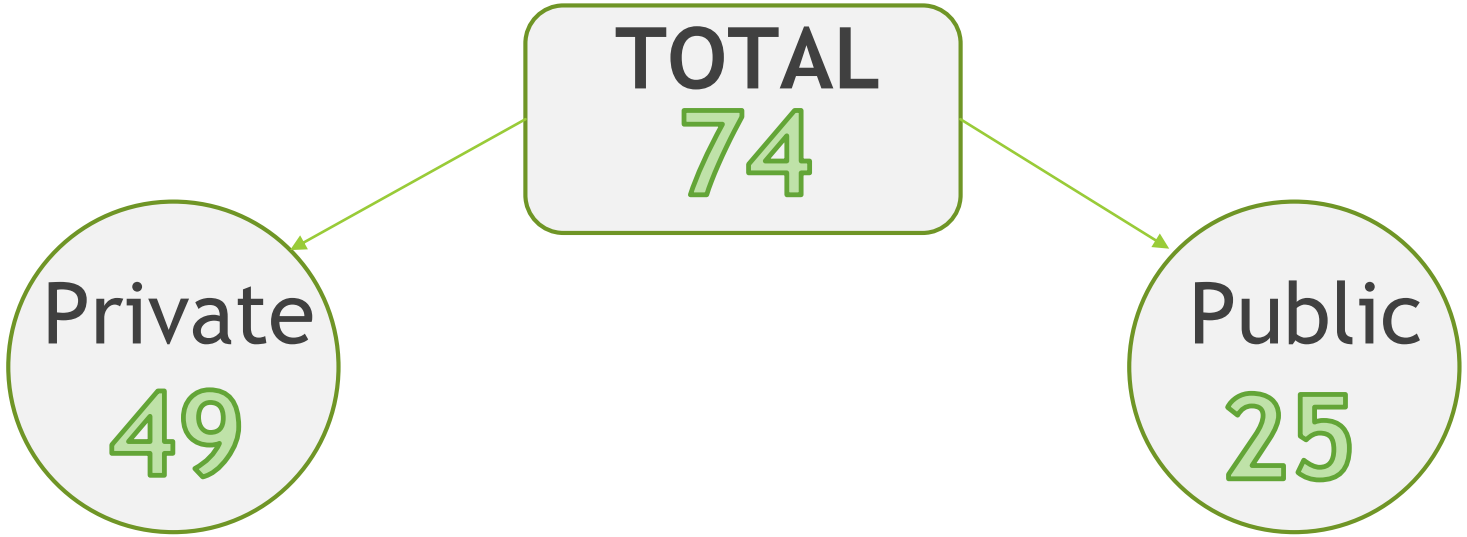
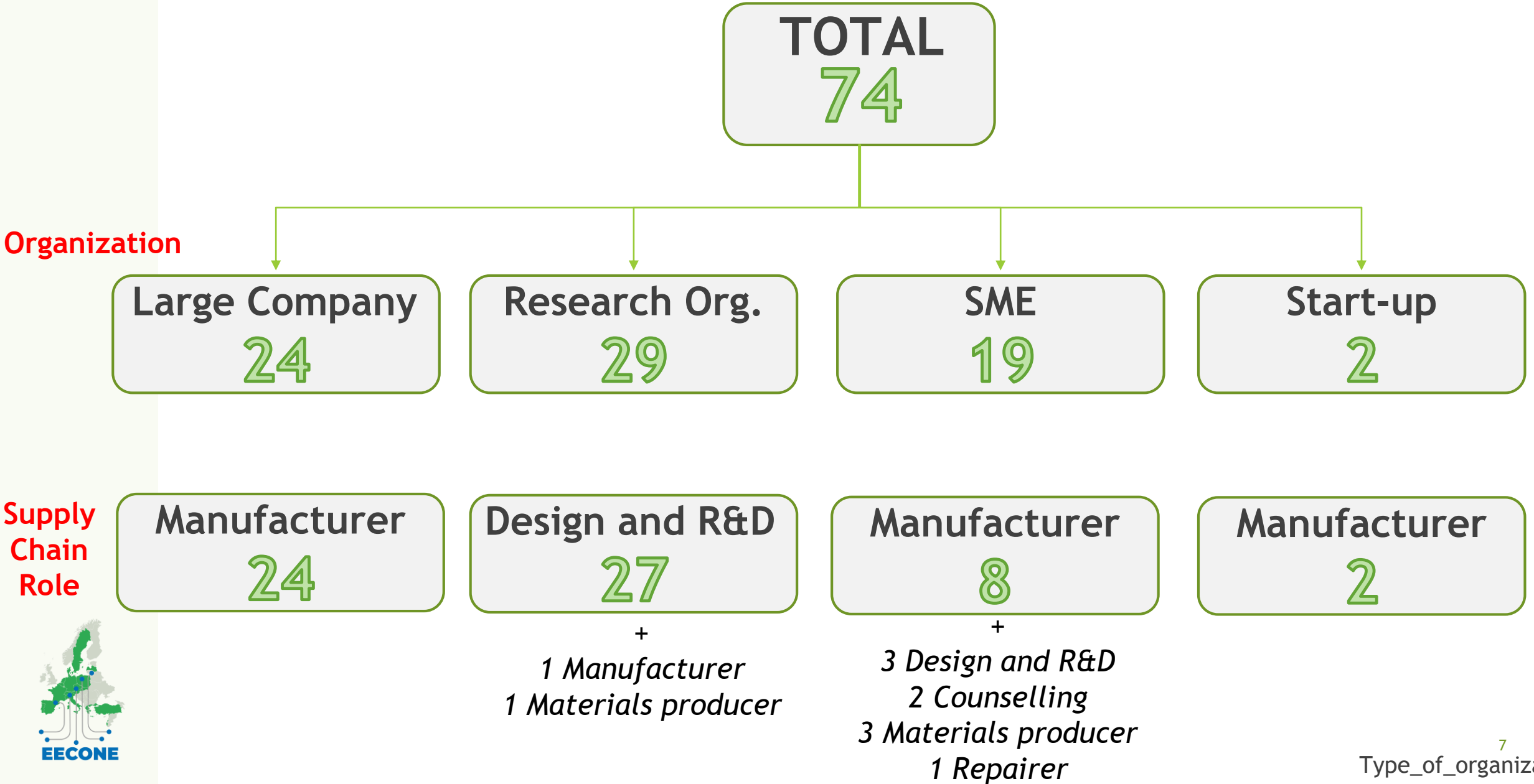
Participants'Companies' by Supply Chain



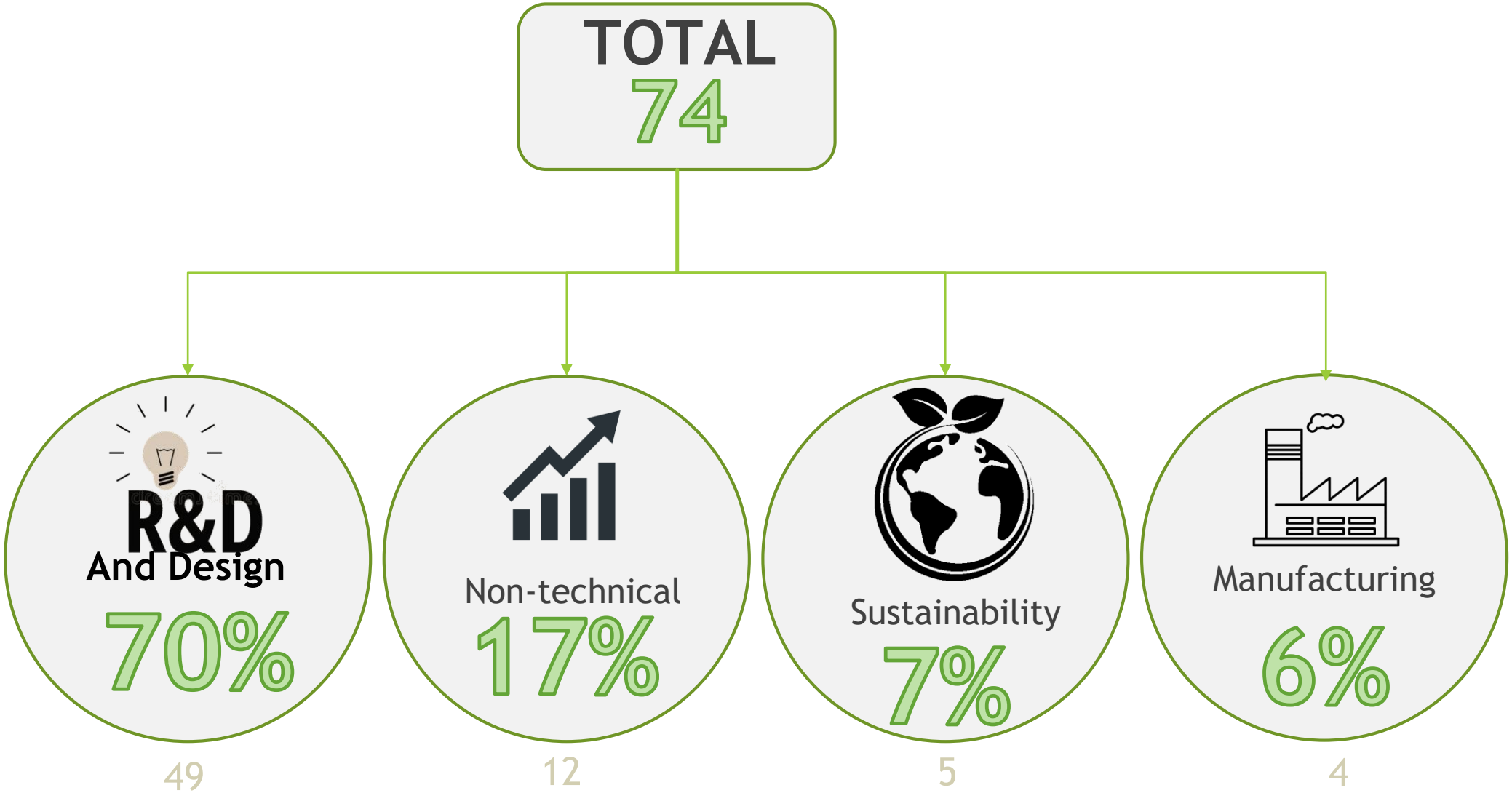
You can follow the questions in the bottom right corner

Participants by Type of Organization/Supply Chain



Type_of_organization

Participants by Expertise



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What is your expertise related to your company's activities

Participants by Background

-Engineering -Science	-Engineering -Business- Management	-Engineering -Science	-Engineering -Science

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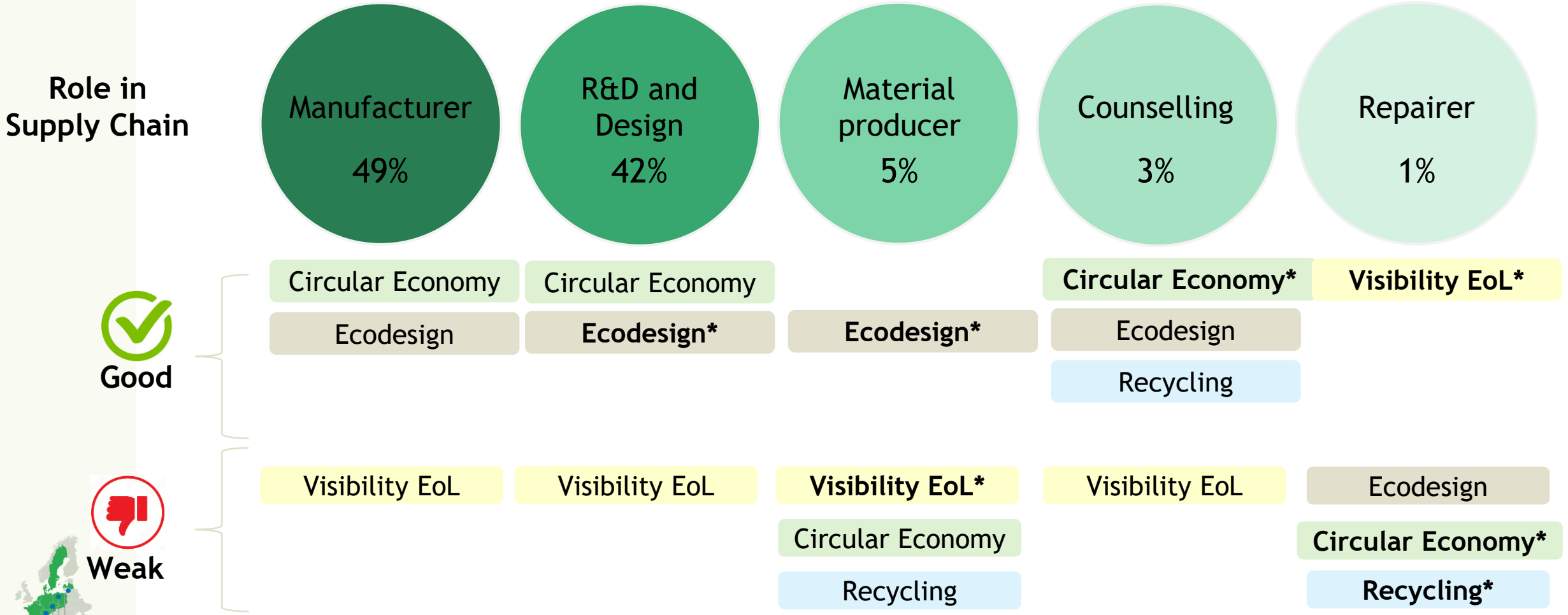
Participants' Knowledge Level

Predefined categories = Circular Economy, Ecodesign, Recycling, Visibility EoL



11. What is your level of maturity in terms of : Knowledge of the reality of end-of-life of products; Recycling; Circular economy; Ecodesign

Quick Reminder

Definition of 6R Approaches

Reduce

Material's reduction, optimization of resource' use, while assuring less material goes into e-waste

Reliability

All options that extend the lifespan of a product while minimizing its environmental burden

Repair

Return a defective product to a condition where it fulfils its intended use

Reuse

Reusing products or components for their original purpose

Refurbish

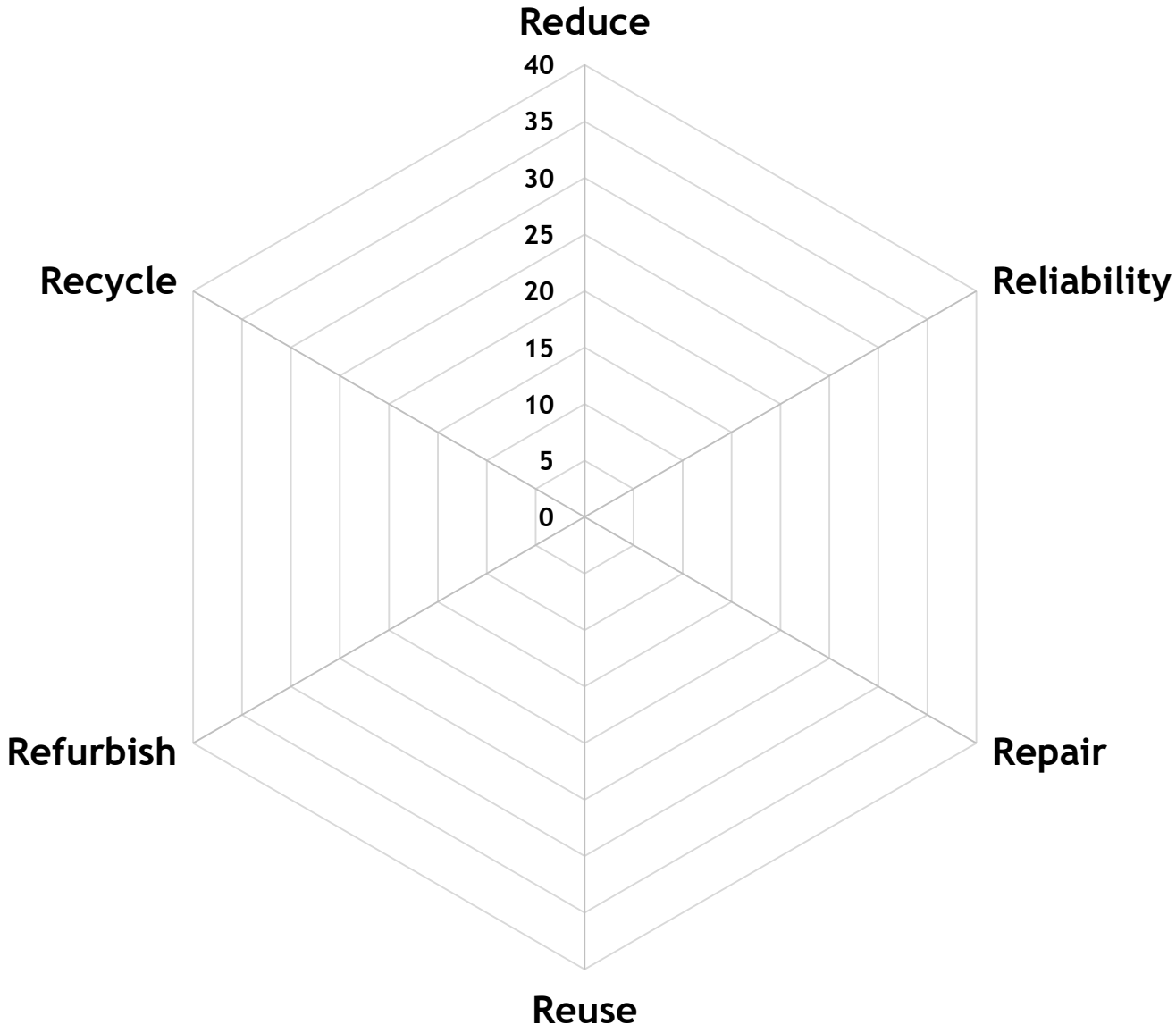
Restore/Remanufacture/ Upgrade

performance/functionality of the product within the originally intended performance range

Recycle

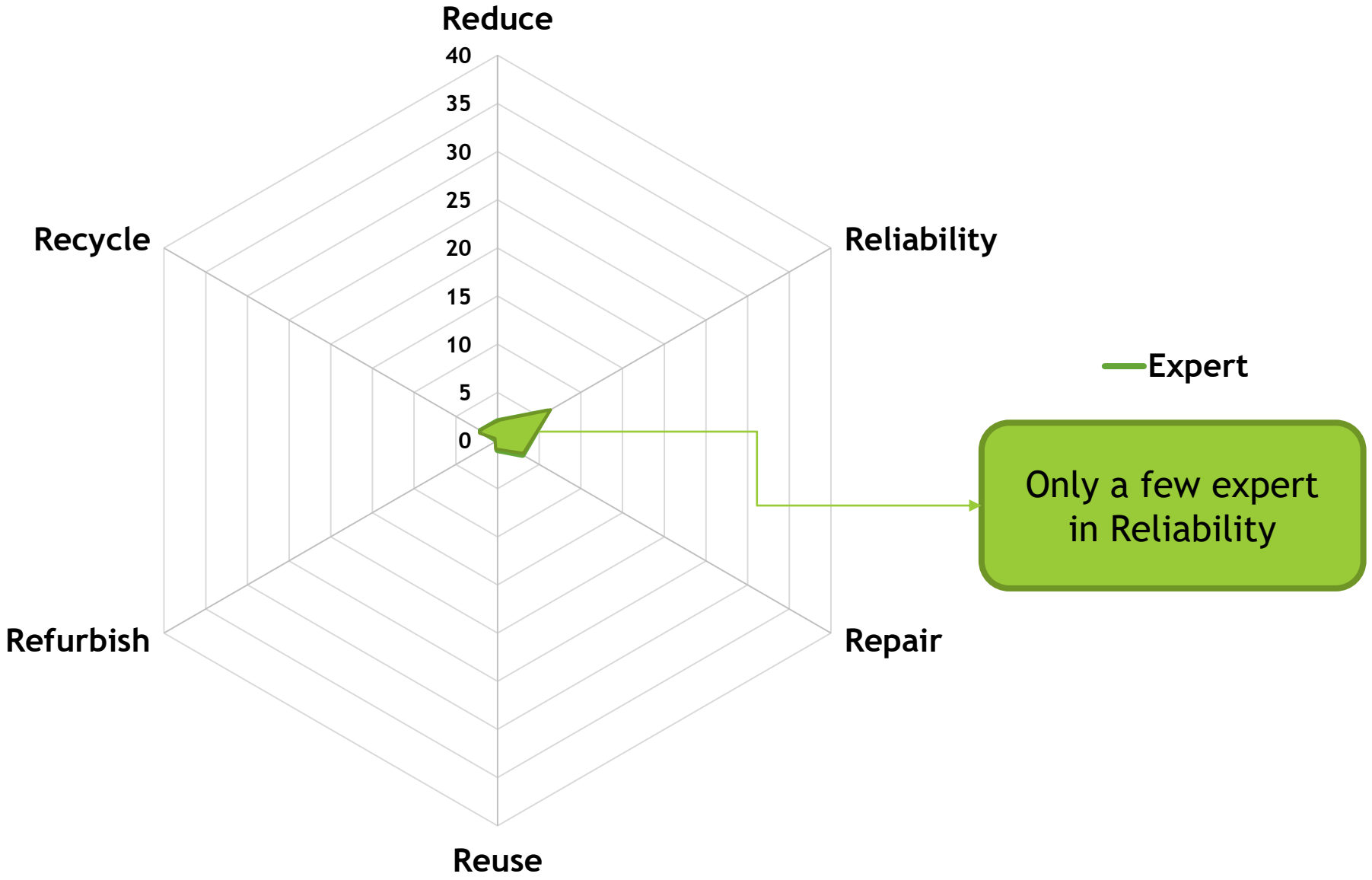
Activities to obtain recovered resources for use in a process or a product, excluding energy recovery

Participants' Personal Expertise in 6R



What is your personal level of expertise with respect to each 6R in electronics?

Participants' Personal Expertise in 6R



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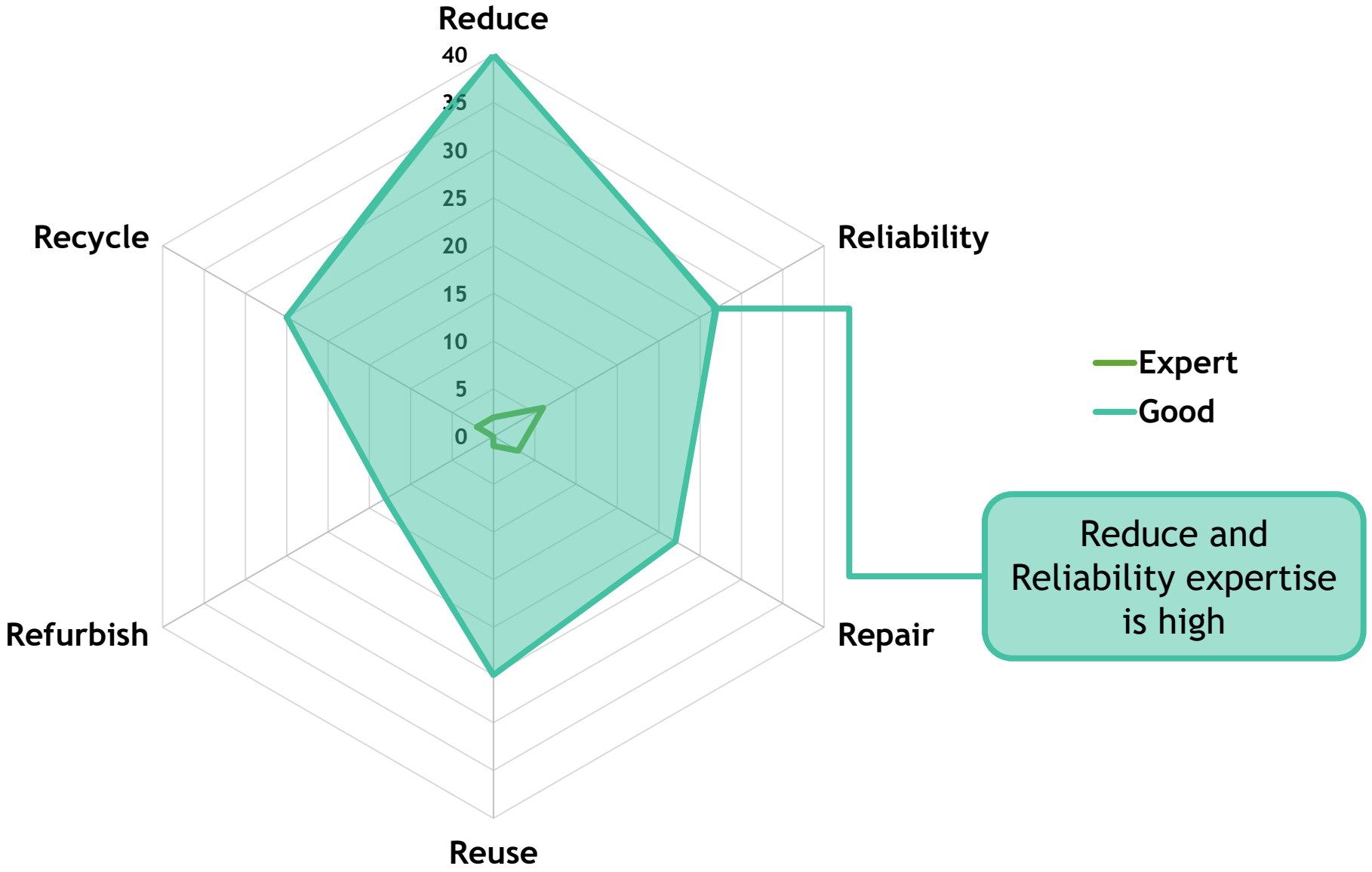
Participants' Personal Expertise in 6R



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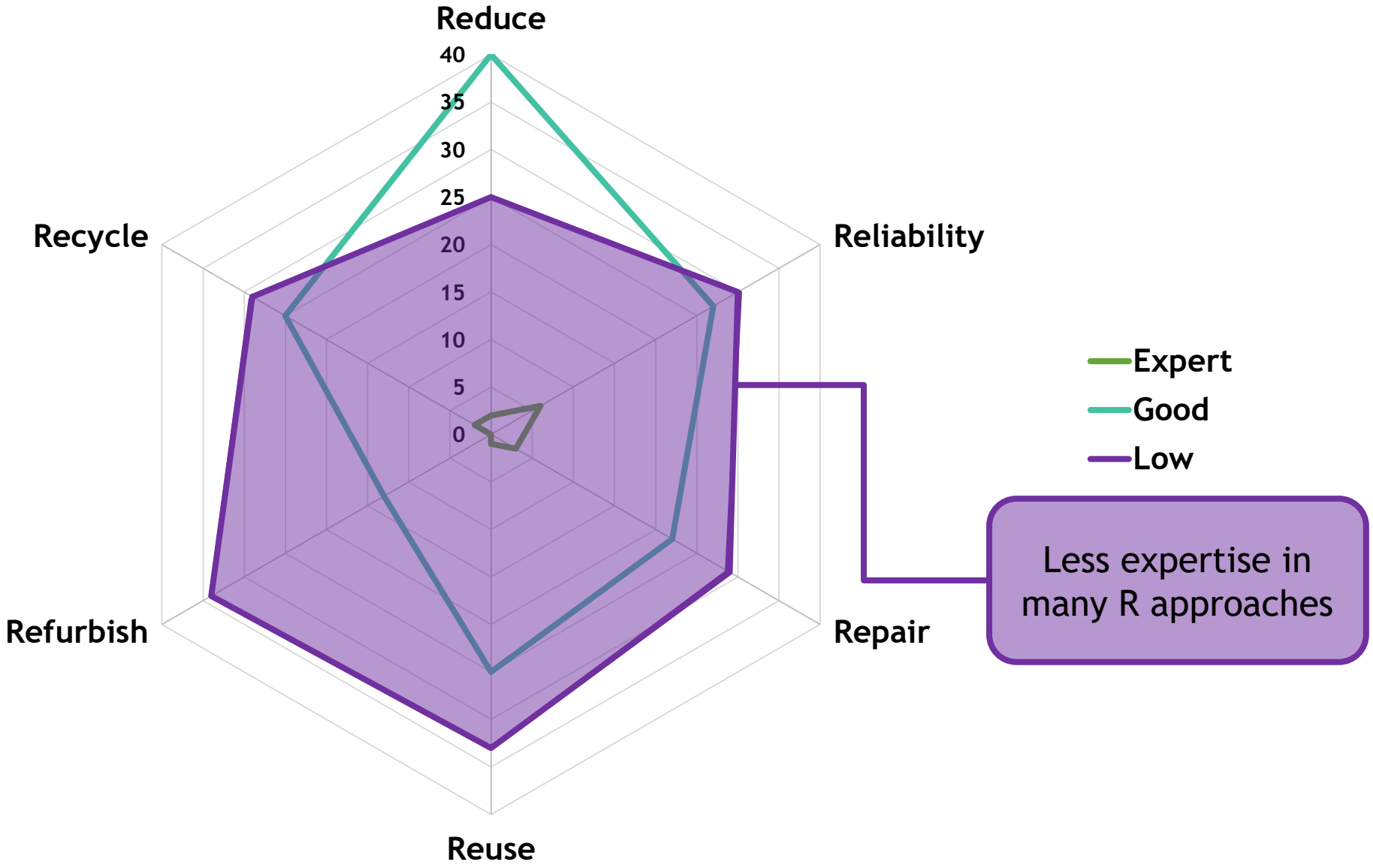
Participants' Personal Expertise in 6R



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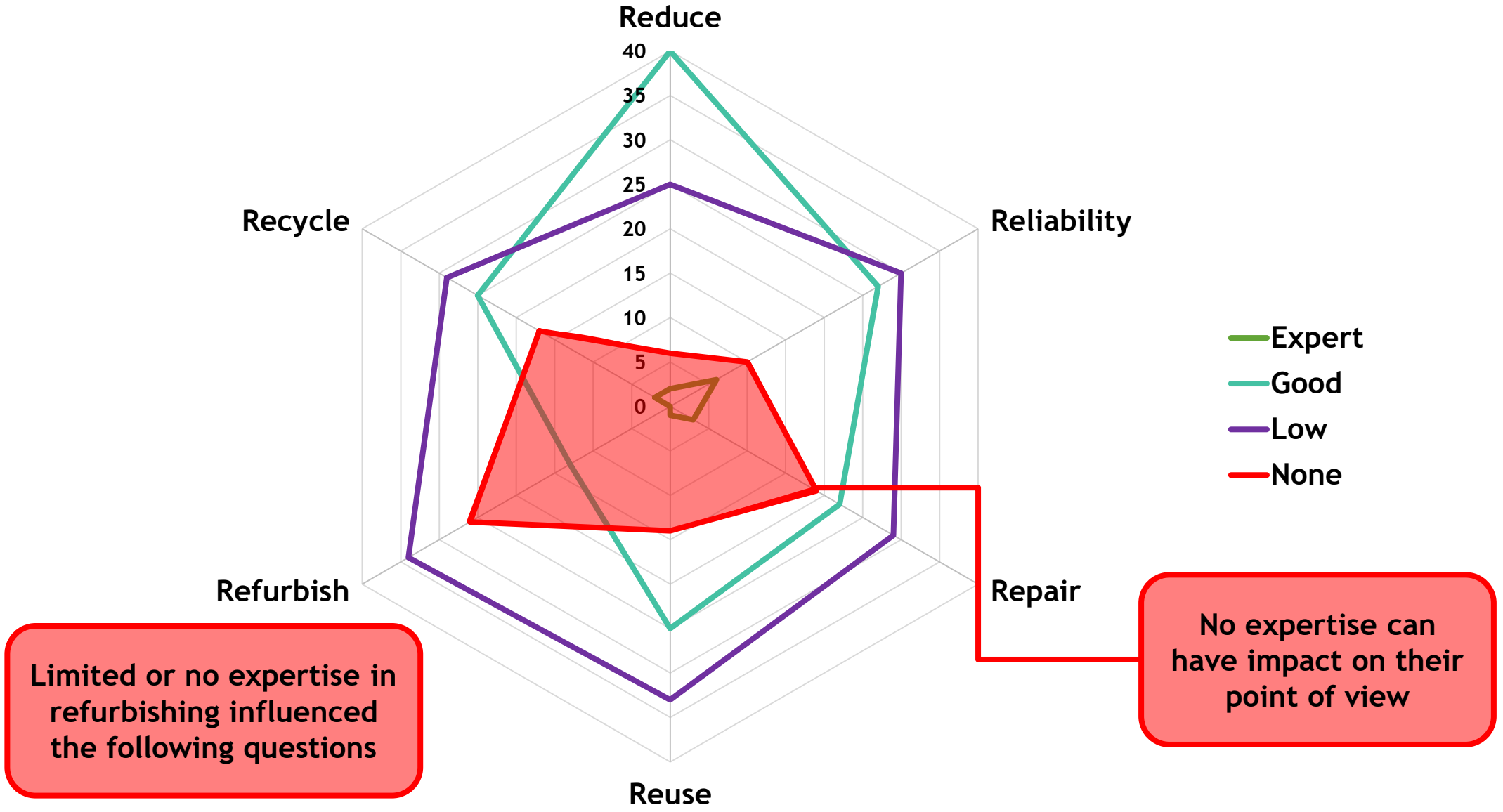
Participants' Personal Expertise in 6R

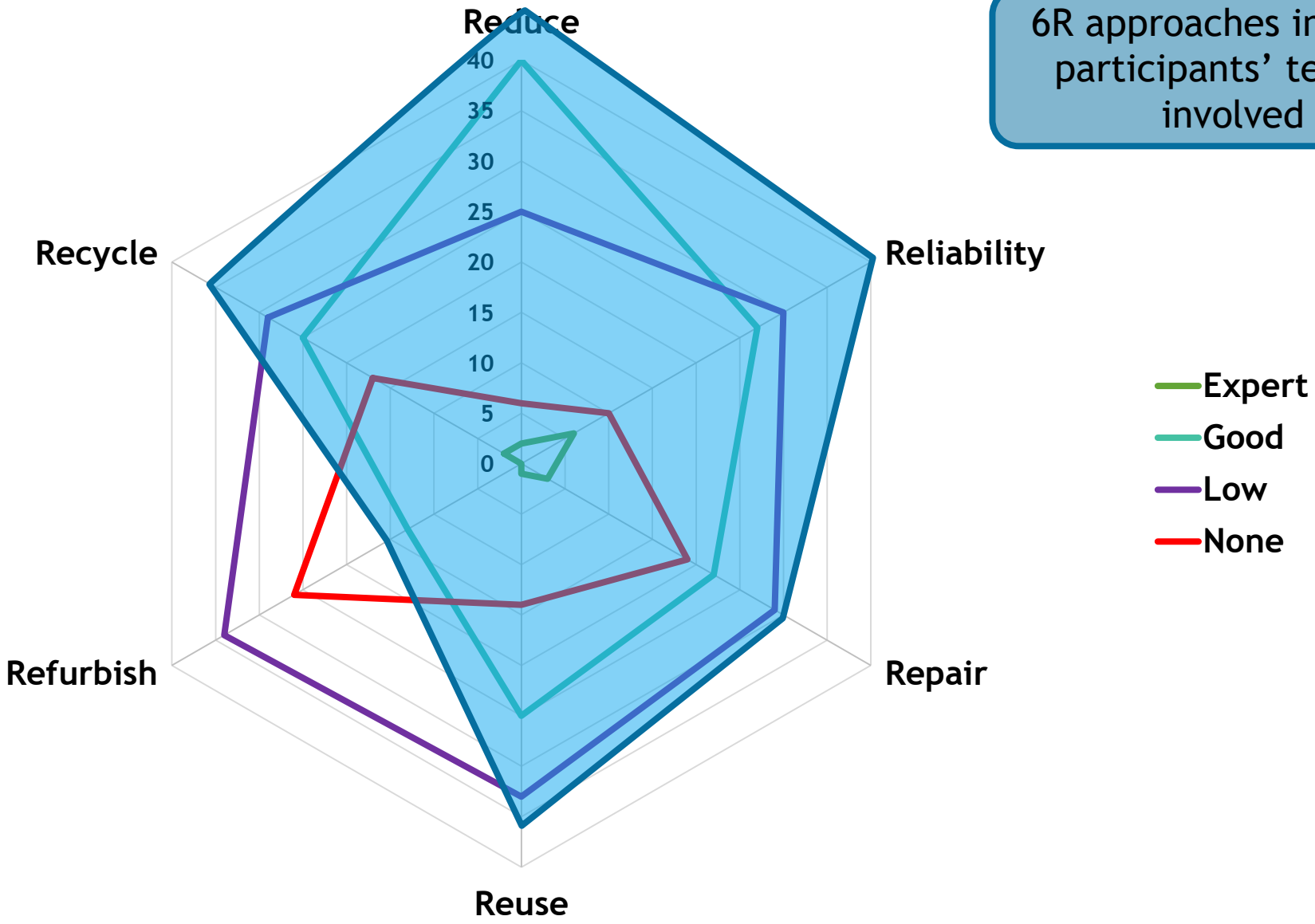


What is your personal level of expertise with respect to each 6R in electronics?

Participants' Team Involvement in 6R

Traditional sustainability efforts
-Reduce
-Reliability

6R approaches in which participants' team is involved



1. Select the 6R approaches in which your team is involved

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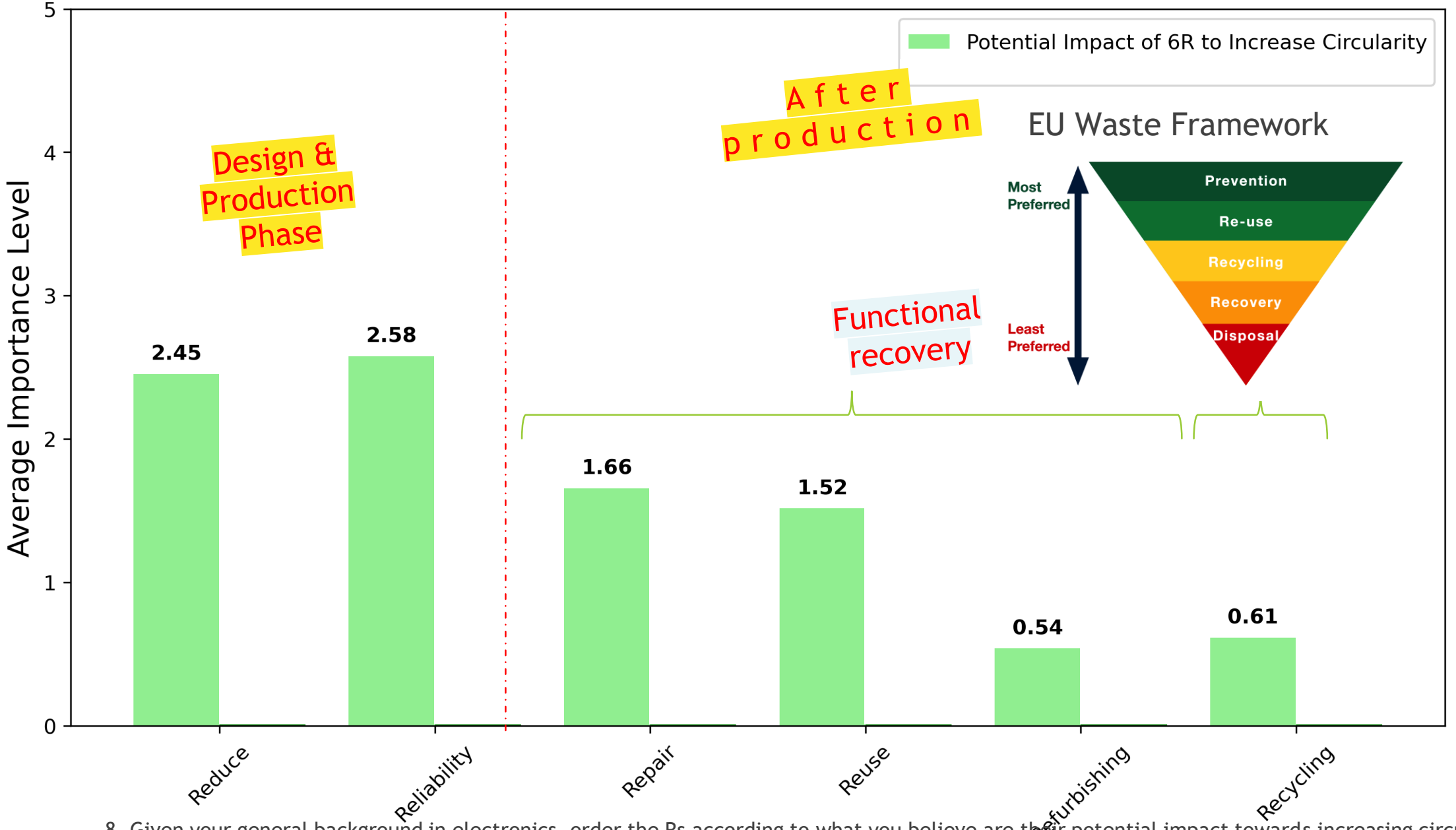
Motivation of Companies to Implement 6R

Proactivity is the biggest driver

	Large Company	Research Org.	SME	Start-up
	24	29	19	2
Proactivity	15	21	12	1
Requirement	13	8	10	2
Legislative	9	4	5	1
Economic	8	9	9	2

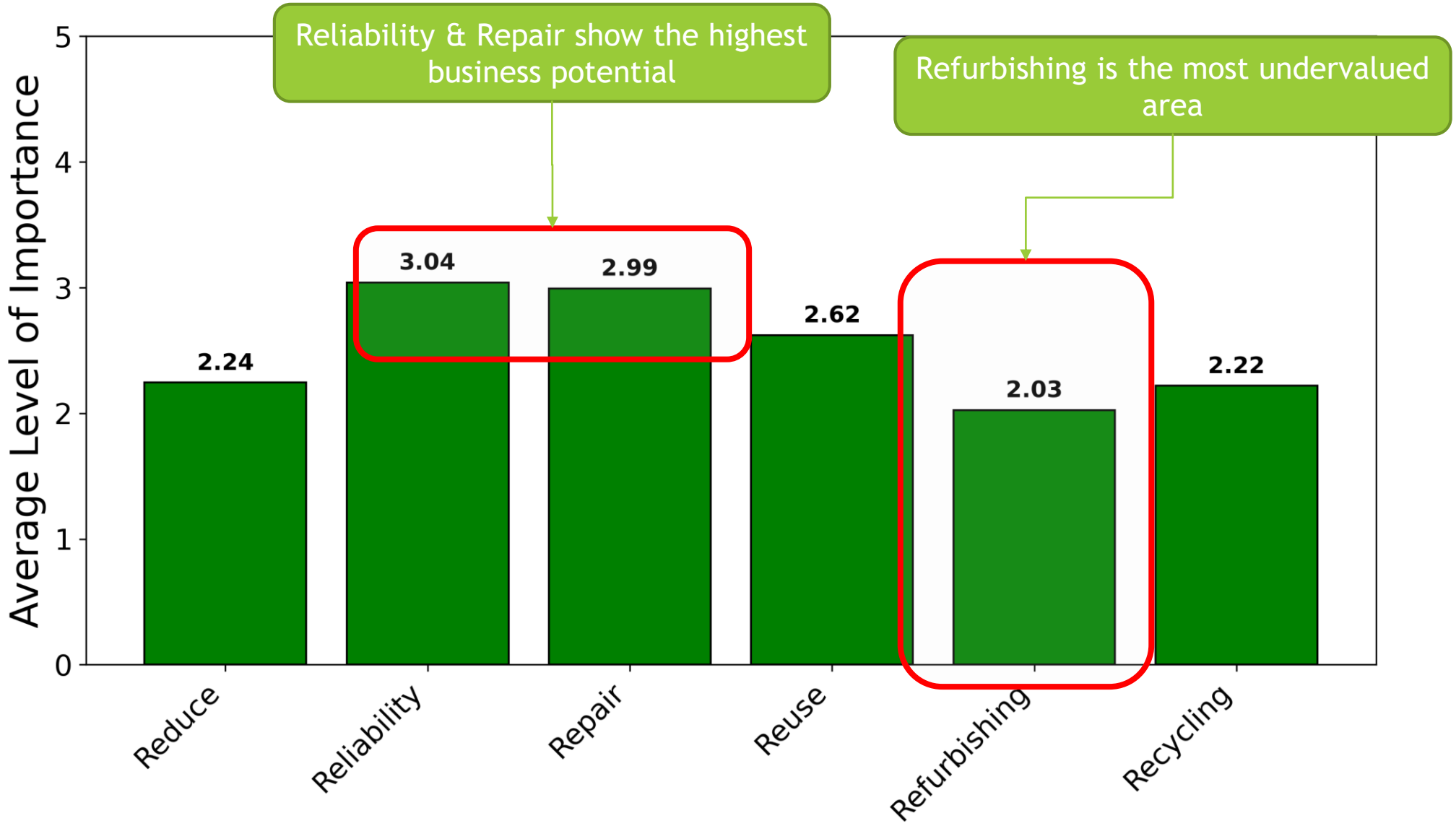
3. Why is your company implementing 6R practices in electronics?

Potential Impact of 6R for Circularity



8. Given your general background in electronics, order the Rs according to what you believe are their potential impact towards increasing circularity

Possible Business Opportunity



9. In your personal opinion, do you think that there may be a future business opportunity for your company by the implementation of (0 : none, 5: strong)

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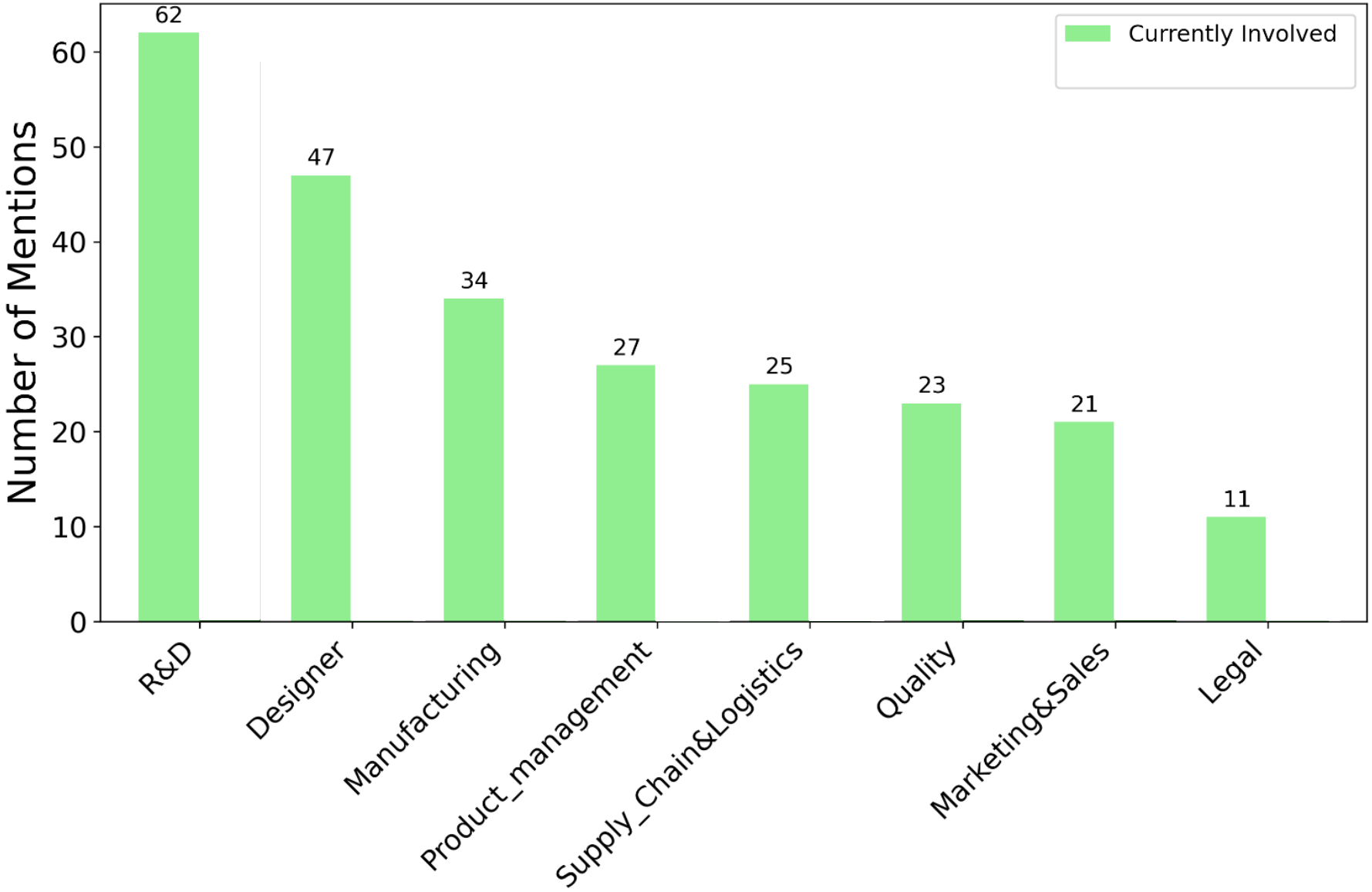
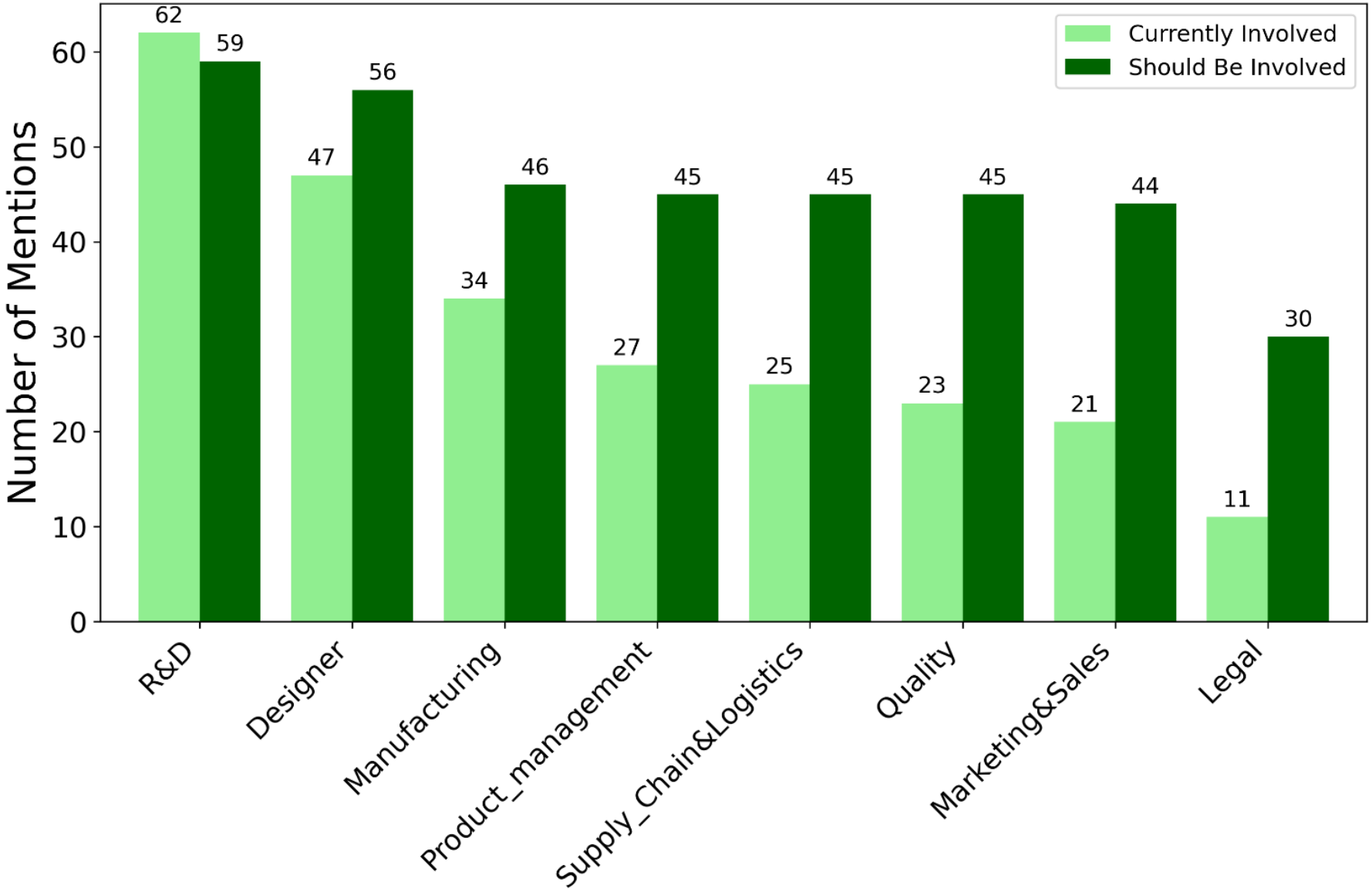
Actors Involved in 6R



12. Who are the actors involved in the implementation of the 6Rs that you work with? (e.g., designers, supply chain...)

Actors Involved/Should Involve in 6R



12. Who are the actors involved in the implementation of the 6Rs that you work with? (e.g., designers, supply chain...)
13. In your opinion, which actors in your company should be involved in the deployment of 6R strategy?

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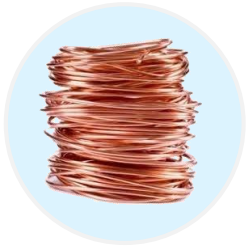
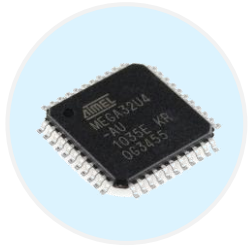
Implementation Scale of 6R



Materials



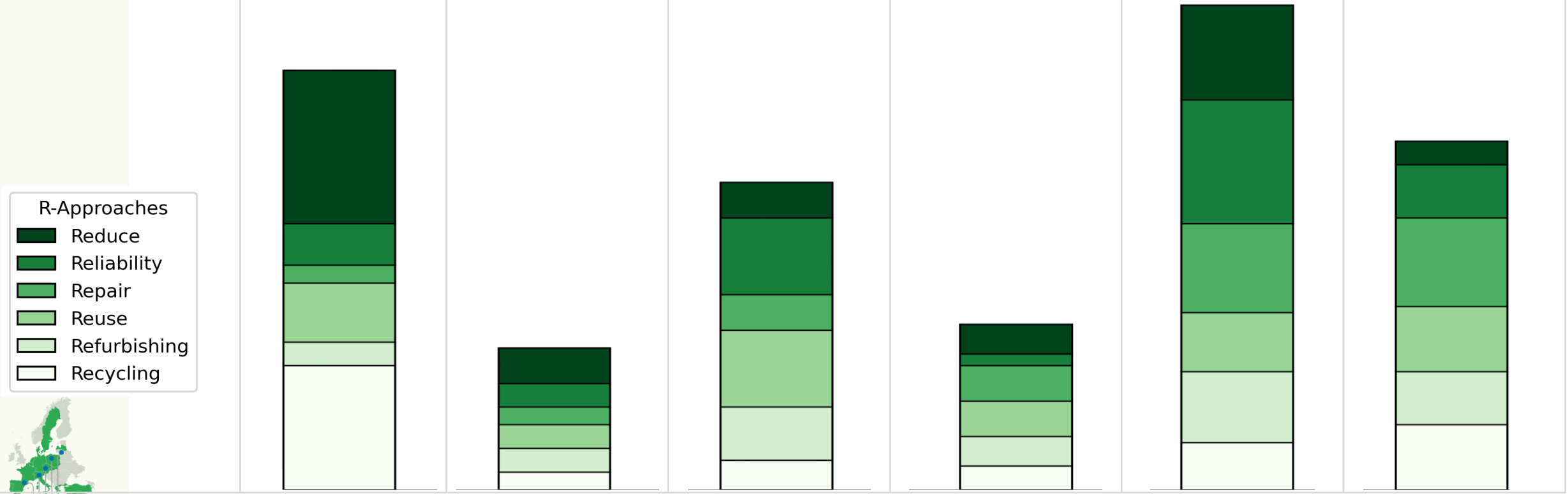
IC

Component

PCB

System

End Product



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2. For each R, at what scale do you implement each R?

Tools Integrated in Product Development for Circularity/Eco-Design

1. Life Cycle Assessment (LCA)

- LCA tool, PCB LCA Calculator

2. Eco-Design & Regulations

- Eco-design guidelines, rules, and regulations based on LCA results
- Product Life Cycle management with ESG criteria
- Obsolescence management in processes

3. Software & Simulations

- Design, modeling, and simulation tools
- Traceability systems for components
- Reliability analysis and decision-making tools
- In-house and open-source software, scripts, and spreadsheets (Excel, Matlab, BOM management)

4. Other Tools

- Literature research for innovation

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21. What type of tools have been integrated into product development processes to take circularity and eco-design issues into account?

Companies Conducting LCA

TOTAL
74

In-House
37

Most are research organizations

External
4

Frequency of LCA

Systematically	Few per year	Once per year	Once
11	19	4	5
Most are large companies	*Most are research organizations*	*Most are research organizations*	*Most are research organizations*

Most Common Tools Used for LCA

- Specialized LCA software (28)
- Excel impact calculation (8)

Most Commonly Used LCA Databases

- Internal to company (20)
- Ecoinvent (9)

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Companies' Plan to Improve their Current State on 6R

Greenhouse Gas Reduction

- *Decarbonization roadmap*
- *Green electricity*
- *Material recycling*
- *Lower resource consumption*

Circular Economy, Eco-Design & LCA

- *Integrating eco-design into products*
- *LCA for material selection-resource optimization*
- *Reliability-repairability-disassemblability-modularity*

R&D and Training

- *Eco-design*
- *Circular economy*
- *Material innovations*
- *Incorporating eco-design into education, research, and management practices*

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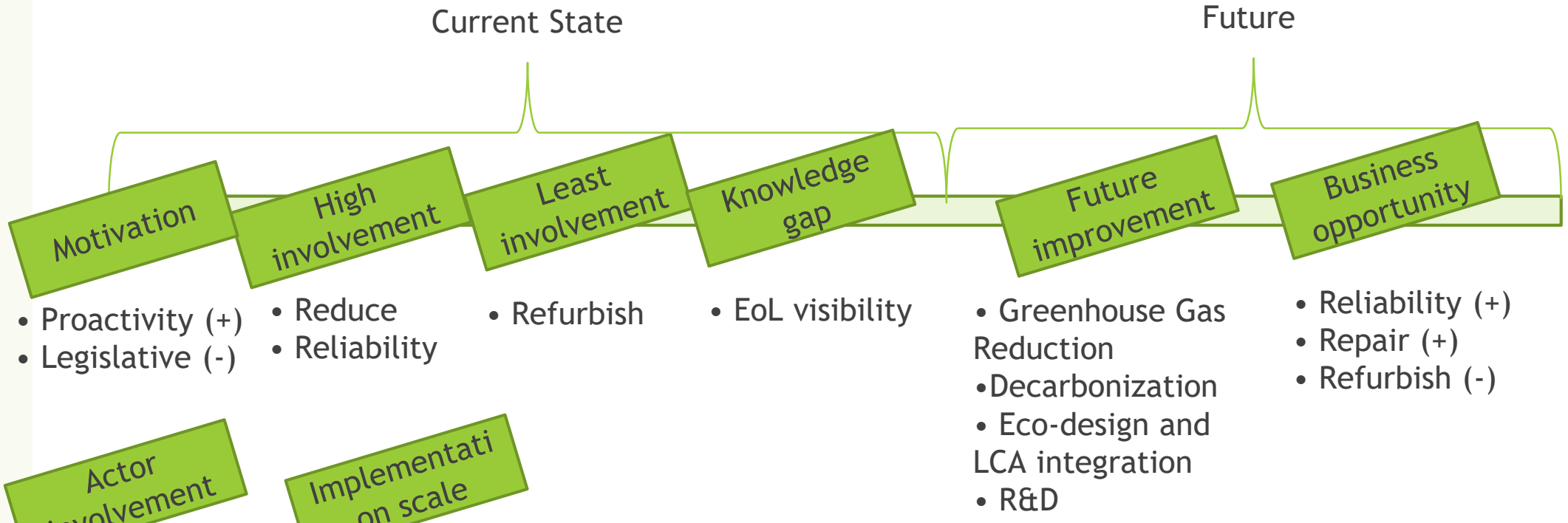
19. How is your company planning to improve their current 6R practices?

Summary of Key Findings



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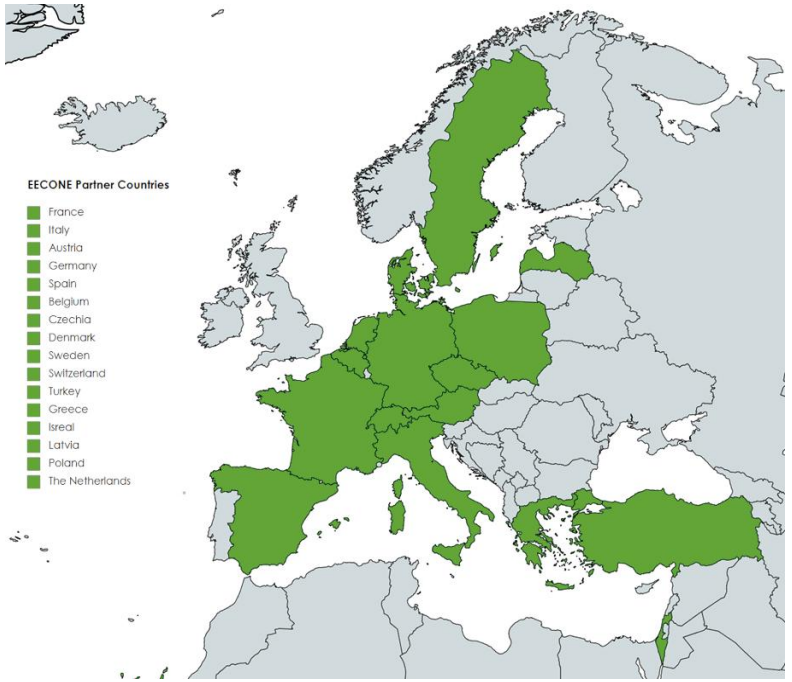

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