Developing Reverse Logistics Maturity Model to Transition to Circular Economy

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13th Sep 2017
Scottish Institute of Remanufacturing

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Content

- **Circular economy –CE- business motivation.**
- CE challenges.
- Role And Requirements Of Logistics For A CE.
- Reverse Logistic Maturity Model: Study approach
- RL Archetypes: Different products driving RL requirements
- Reverse Logistics Maturity Model Structure
- Maturity Levels Pathway For Reverse Logistics

Reasons To Adopt CE Principles

Create value

- New business models
- Differentiation
- Cost savings
- Improve & innovate products

Strengthen resilience

- Supply stability
- Risk reduction
- Resilient supply chains
- Comply with regulations

Improve reputation

- Attracting talent
- Increase customer satisfaction
- Corporate Responsibility towards stakeholders

➢ **So why do we not yet see the implementation of CE on a large scale?**

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Key challenges limiting the scaling-up of CE principles

Complexity of managing the circular economy value chain, including:

- Managing the return, recovery and remarketing of varying product models
- Return products fed into the circular cycle at varying times and in varying conditions

Understanding reverse logistics requirements, regarding:

- Asset tracking
- Optimized product and material flows
- Compliance with waste handling regulations

Preserving the residual value of return products, considering:

- Product type and condition
- Recovery purpose

➢ **We need to understand the role and requirements of logistics for a CE**

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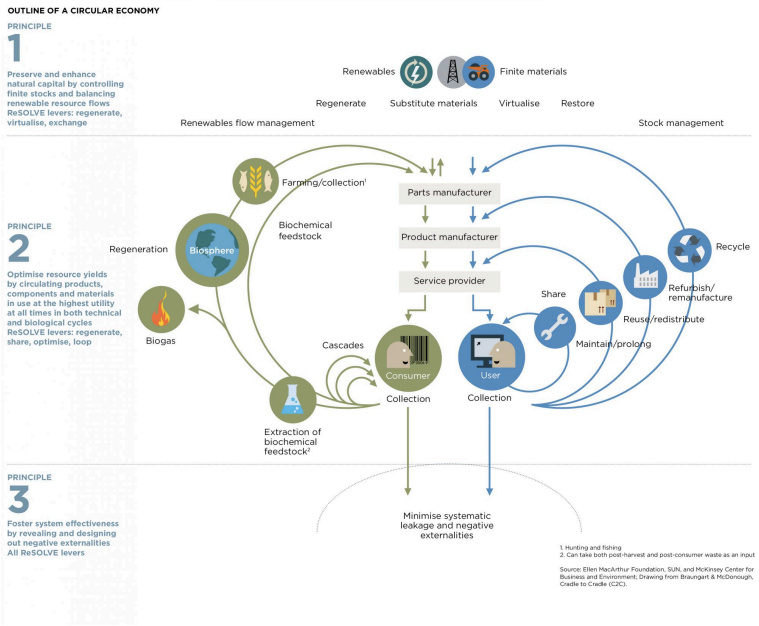
Role And Requirements Of Logistics For A CE

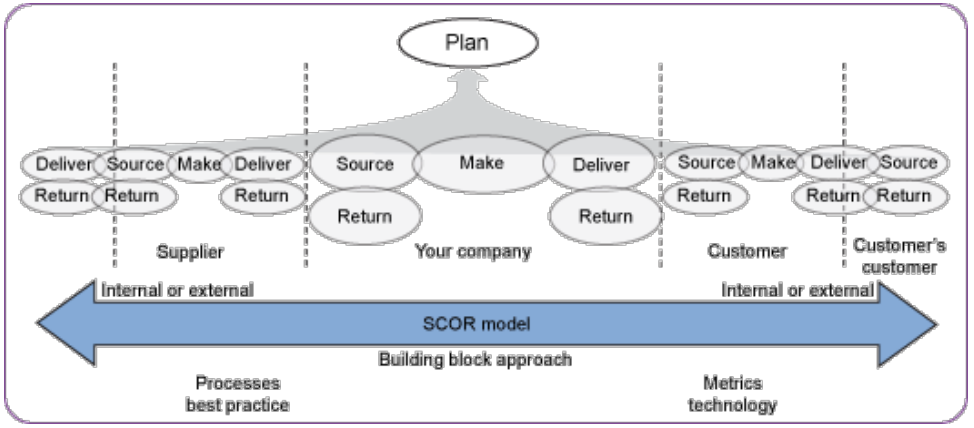
- Reverse logistics

1970s	1980s	1990s	2000
recycling	material against the primary flow	recycling waste disposal management of hazardous materials	Complete SC Process planning value recovery and creation

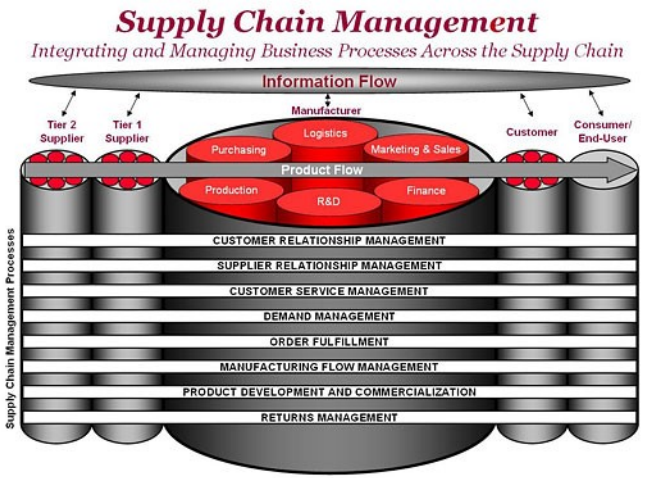
- Circular Economy



Ellen MacArthur Foundation, http://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram



Supply Chain Operations Reference model, SCOR, V9



Lambert, GSCF Model

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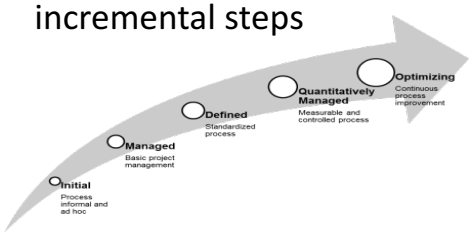
Designing the Reverse Logistics Maturity Model

Archetypical Models

- Standard, prototypical approaches to RL in use today
- Key conditions which determine appropriate model
- Example product classes

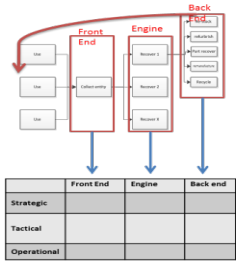
Maturity Pathway

- Detailed understanding of requisite component characteristics for developmental stages
- Developmental pathway and incremental steps



Reverse Logistics Framework

- Understanding of components of successful reverse logistics for CE
- Framework for self assessment of critical path items



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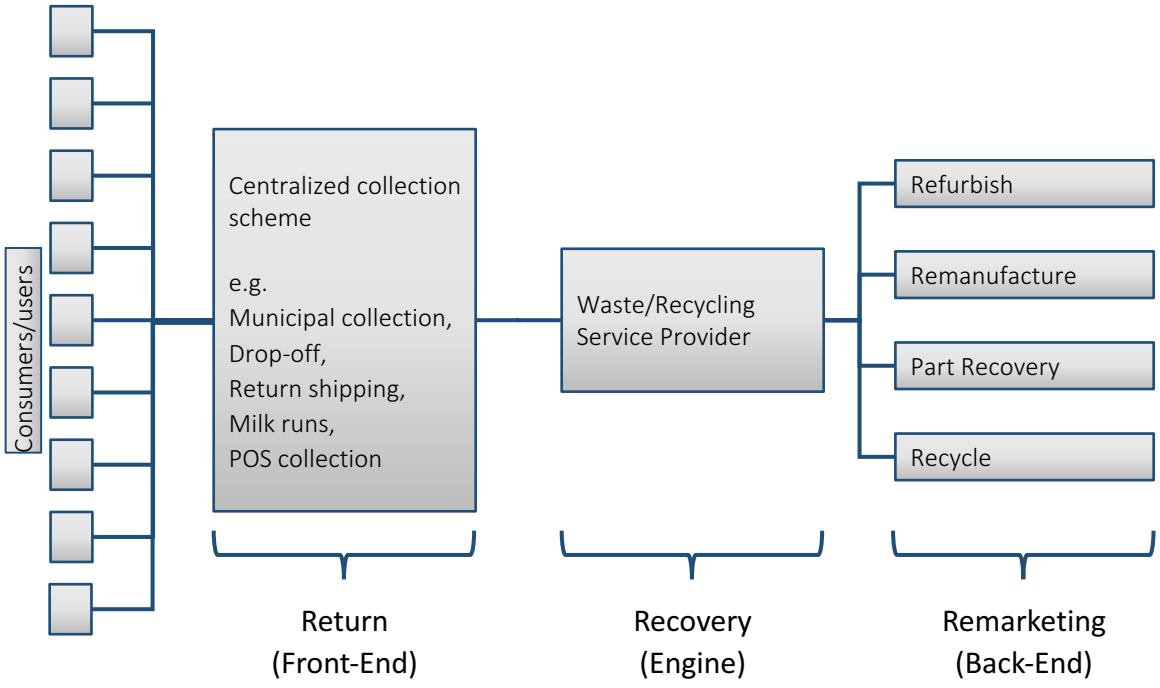
RL Archetypes: Different products driving RL requirements

A: Low value Extended Producer Responsibility



Product examples

- Tires
- Consumer electronics
- Shipping pallets

RL requirements

- Subject to increasing EPR [1)] legislation
- Maximize return volumes
- Standardize RL process

Realizing economies of scale

1) Extended Producer Responsibility

RL Archetypes: Different products driving RL requirements

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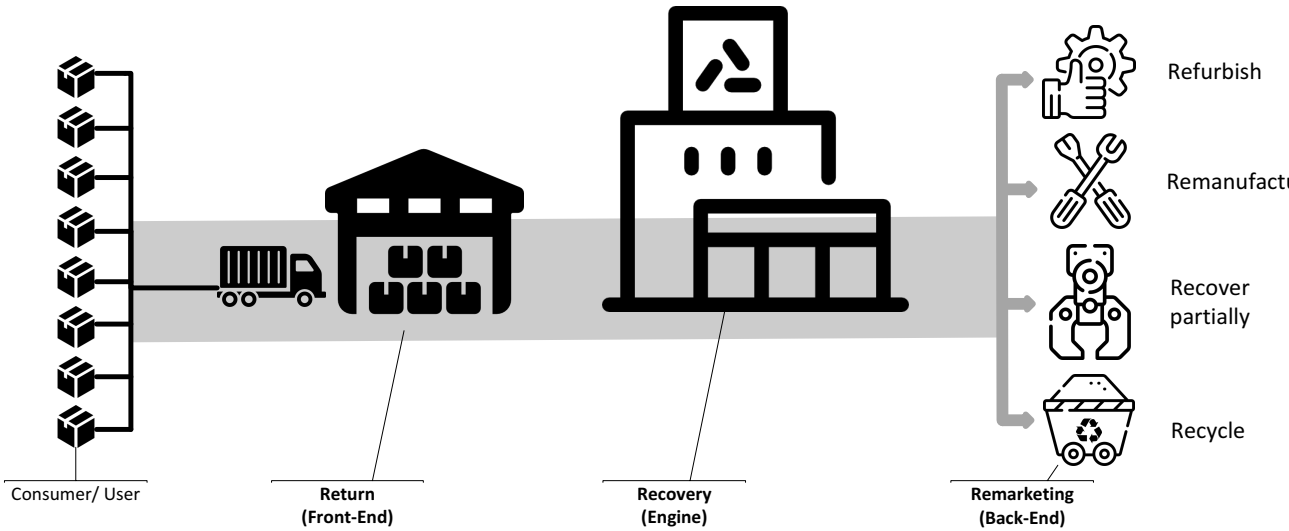

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Realizing economies of scale

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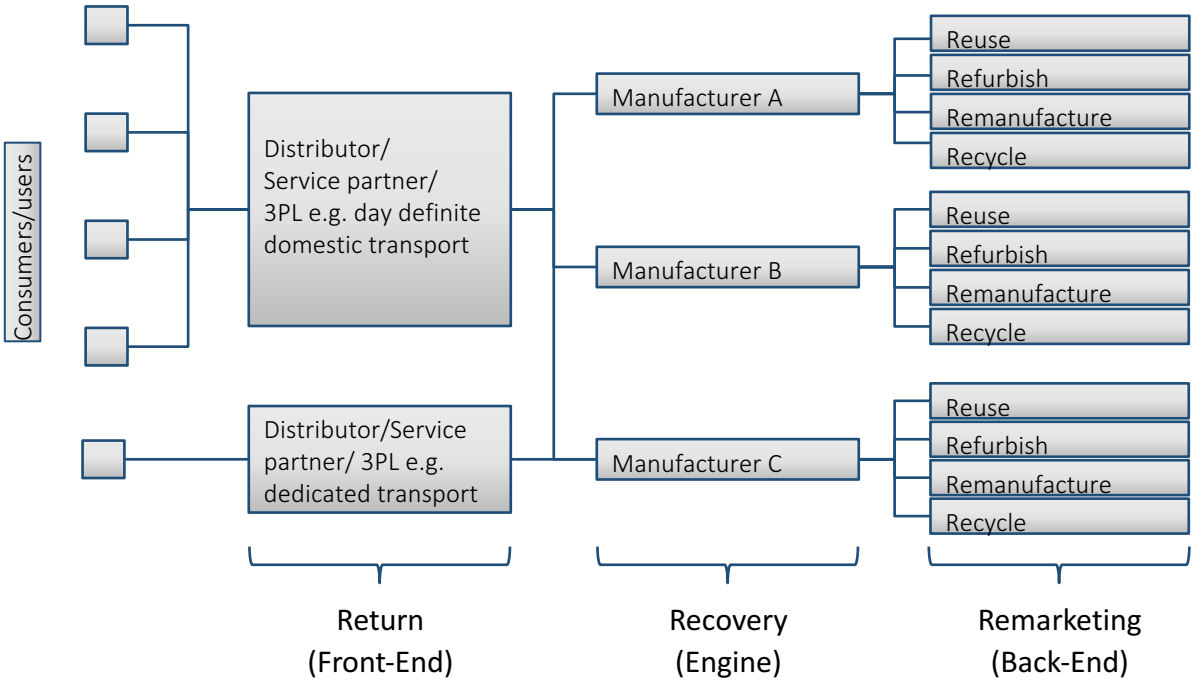
B: Service parts logistics



Product examples

- Machinery
- Automotive parts

RL requirements

- Combine the return of used parts with the supply of new or refurbished parts
- Optimized transport flows

Combination of return and delivery for seamless replacement

RL Archetypes: Different products driving RL requirements

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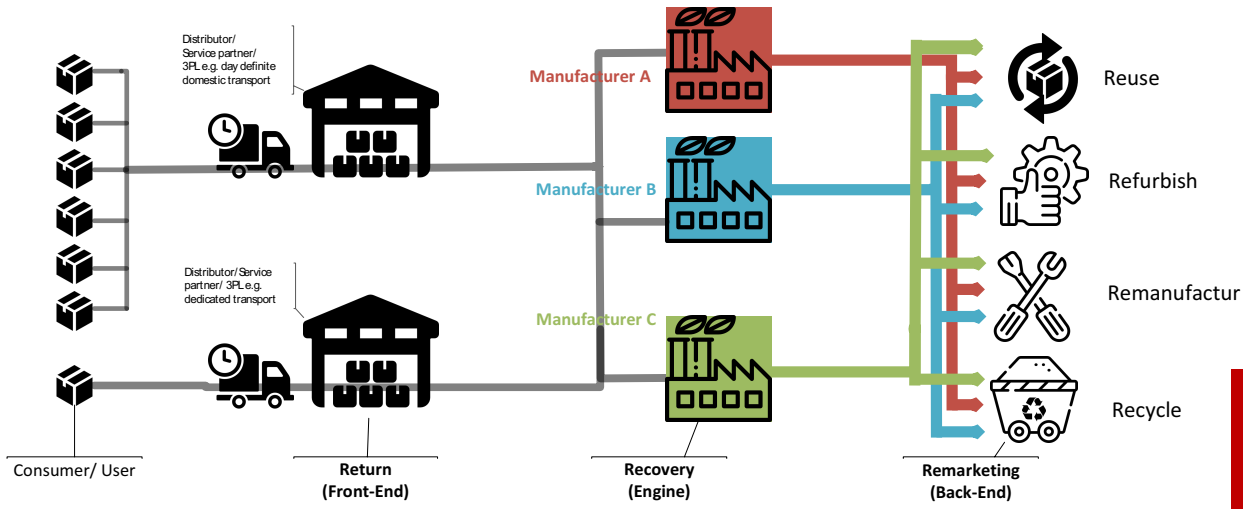

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RL requirements

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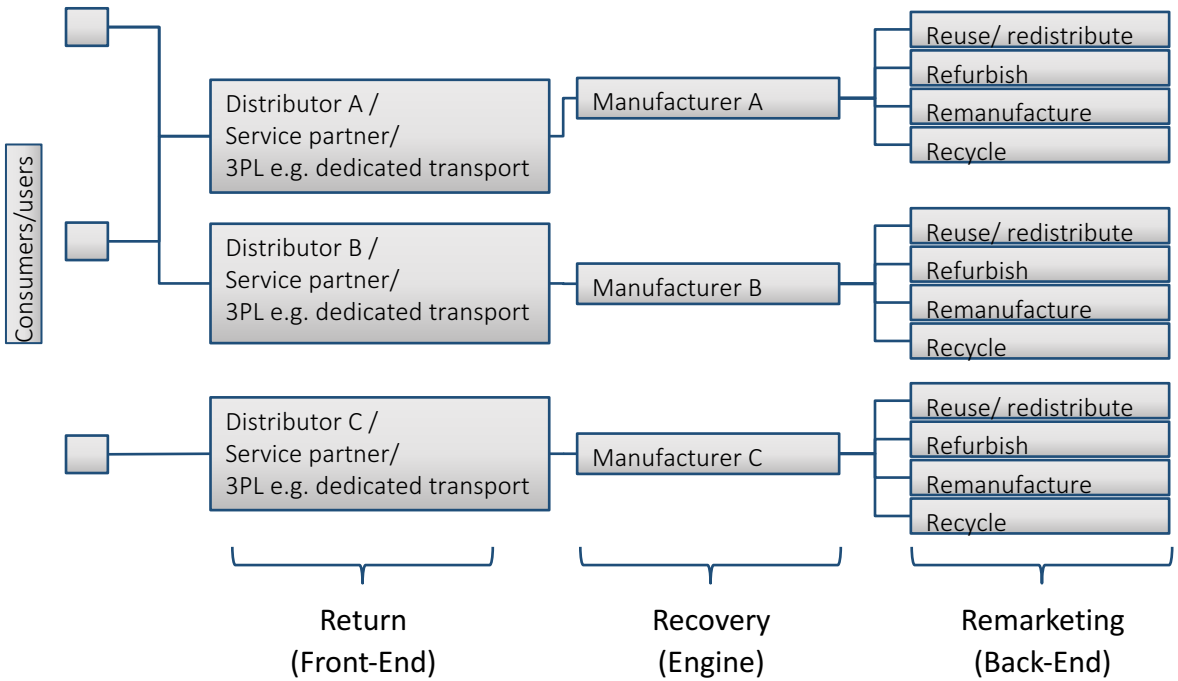
RL Archetypes: Different products driving RL requirements

C: Advanced Industrial Products Recovery



Product examples

- IT, network, telecom equipment
- Medical equipment

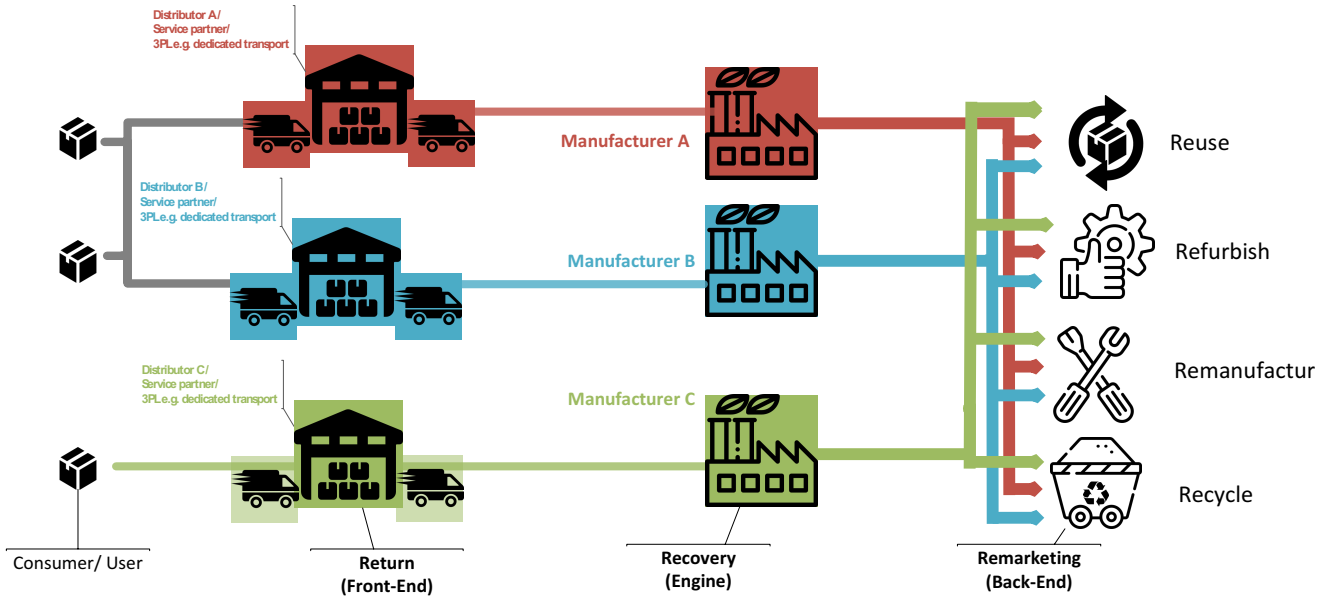
RL requirements

- High-touch requirements
- Preserve the product return value
- Collection should be combined with the replacement of the asset

Transparency and trusted or direct return

RL Archetypes: Different products driving RL requirements

C: Advanced Industrial Products Recovery



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Reverse Logistics Maturity Model Structure

RL component	Decision dimension	Areas to assess
RETURN (FRONT END)	Strategic	Reverse logistics strategy
	Tactical	Reverse logistics network structure
	Performance	Responsiveness and visibility of items in RL flow
RECOVERY (ENGINE)	Strategic	Recovery strategy
	Tactical	Returned products inventory control
	Performance	Returned material evaluation
REMARKETING (BACK END)	Strategic	Remarketing in secondary markets
	Tactical	Remarketing planning for secondary markets
	Performance	Remarketing data

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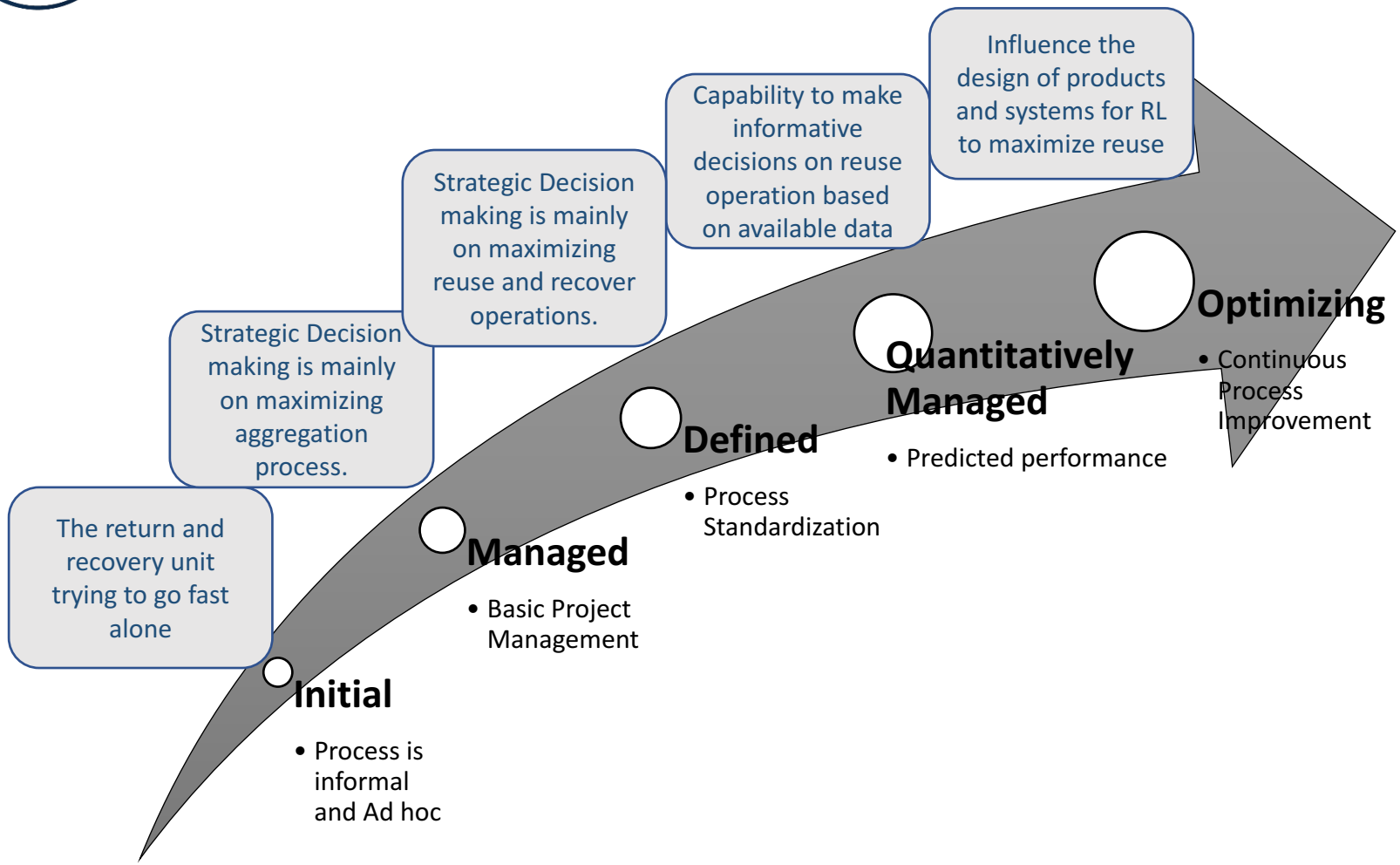


How to apply the RLMM

Companies wishing to assess their reverse logistics' maturity as a way to begin scaling-up their circular capabilities can apply the RLMM as follows:

1. Select a product/ product group to assess
2. Identify archetype
3. Consider all functions, partners and stakeholders who depend on/control the reverse logistics process
4. Map RLMM components (front end, engine, back end)
5. Map decision making levels (strategic, tactical, performance)
6. Assess maturity by matching the respective current level of maturity across each RL component and within each dimension
7. Identify and select focus areas for improvement

Reverse Logistics Maturity Model

Aspect	Initial level (Process informal, ad hoc)	Managed level (Basic project mgmt)	Defined level (Standardized process)	Quantitatively managed level (Measurable and controlled process)	Optimized level (Continuous process improvement)
RETURN (FRONT END)					
RL Strategy	Standalone RL with business goals limited to cost minimisation.	Basic strategy in place to manage RL.	RL strategy aligned with supply chain strategy, defined RL process in place.	RL is integrated with supply chain strategy driven by profit generation.	RL is integrated as cross-functional process within different business units. Driven by profit generation and is aligned with business goals.
RL Network Structure	RL network is not well defined and is managed reactively.	RL network is planned and established.	RL network is standardized. Return agreements or contracts in place for proactive collection.	RL network and flows are planned through collaboration agreements with stakeholders to define performance requirements.	RL network and flow is optimised through defined performance objectives in collaboration with logistics provider.
Responsiveness and Visibility in RL Flows	Items are collected with no record of lead time, return rate and volume.	Items are collected and traditional measurements are available (lead time, return rate and volume).	The RL time and flow are measured. Also items qualities are measured.	Items traceability metric is well defined and used, coordinated in shared system across value chain to monitor and assess return agreements.	The RL process is monitored and responsively updated, with real time exchange of value chain information on returned items between logistics provider and company.
RECOVERY (ENGINE)					
Recovery Strategy	Assets recovery program in operation but not directly aligned with strategy.	Recovery strategy in place based on economic and technical viability of recovery options.	Recovery strategy is aligned qualitatively with RL strategy and business strategy.	Recovery strategy stated and quantitatively driven based on economic, technical, and environmental viability of recovery options.	Fully aligned recovery strategy in place, including innovative product design which considers product recovery.
Returned products inventory control	Inventory control for returned products is unstable.	Returned products inventory control is planned and visible to management.	Returned products inventory with standardized processes and ability to forecast returns amount.	Returned products inventory process performance is established and prediction of returns condition is available through monitoring assets on the use stage.	Returned products inventory process is continuously improved based on quantitative understanding of the process and can respond to change in product mix, volume, equipment, sourcing, planning.
Returned material evaluation	Returned material data not or only partly in place (quantitative and qualitative).	Process in place to measure returned material data.	Returned material data is measured for pre-sorting and evaluating recovery options.	Returned material data is assessed and used for controlling recovery processes.	Returned material data is used for product design and recovery processes.
REMARKETING (BACK END)					
Remarketing in secondary markets	Knowledge about secondary markets for recovered assets is not in place.	Knowledge on secondary markets is available and understood.	Knowledge about demand markets for recovered assets is used during the returns processes.	Knowledge (e.g. demand forecasting) about secondary markets for recovered assets is integrated in management decisions for reverse flows.	Recovered asset demand and product development are integrated to identify new products, markets and business models.
Remarketing planning for secondary markets	Remarketing planning and pricing are not well established.	Remarketing planning and pricing are performed with limited transparency on demand.	Remarketing planning and pricing are performed and controlled through standardized processes with transparency on demand.	Remarketing and recovery data is used to measure and control the remarketing process and predict variation.	Recovered products are returned to market swiftly through proper remarketing planning and influencing customer behaviour.
Remarketing data	Market data is not in place to assess recovered products' potential for secondary markets.	Recovered products' market share data is available.	Recovered products' market share data is used for remarketing analysis.	Recovered products' market share data is used to expand market segmentation. Products value decline rate is monitored and controlled along product and technology life cycle.	Market analysis is underpinned by full transparency on recovered products' market share and secondary markets.

How to apply the RLMM

- **Assess your reverse logistics' maturity…**

1. Select a product/ product group to assess
2. Identify archetype
3. Consider all involved functions and stakeholders
4. Map RL components
5. Map decision making
6. Assess maturity by selecting respective levels
7. Identify and select focus areas for improvement

Workshop part 1

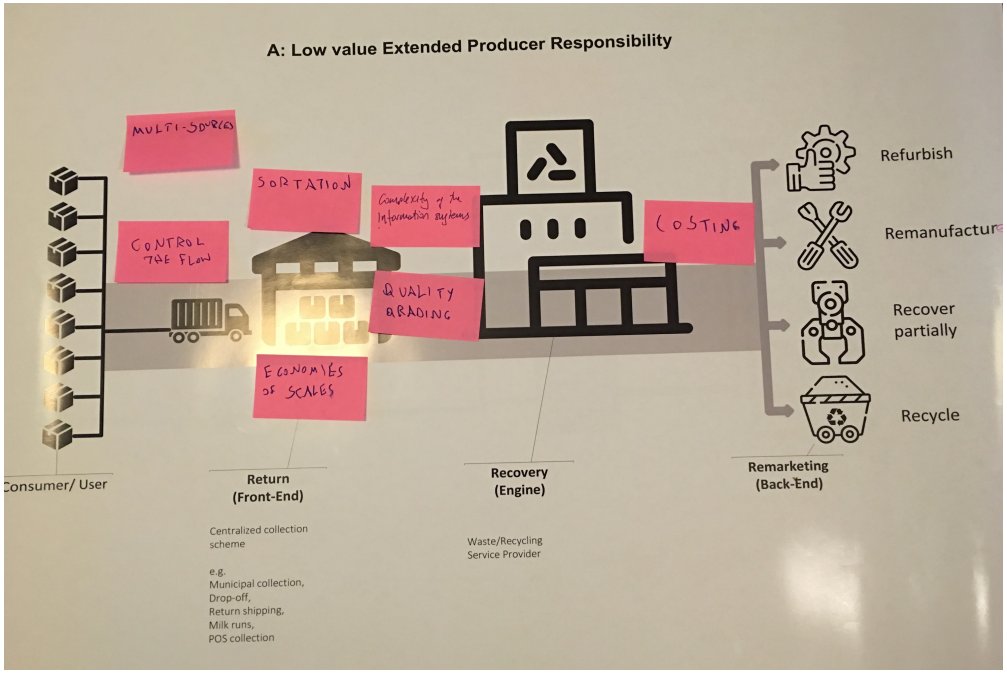
RL Archetype definition:

- Gather into groups based on what Archetype fits your business
- Discuss the challenges in different RL components 10 mins.
- Collect ideas on the poster
- Choose one member of your group to present your group's ideas in 2 minutes
- Present:
  - Why you picked this model to fir your business?
  - What are the key challenges for this model?

Archetype 1 Group:

The 1 st Group discussed various theme of challenges to businesses in this Archetype:

- In the Front End
  - Multi sourced
  - Control of the flow
  - Sortation
  - Economic of scale
  - Complexity of information system.
- In the recovery
  - Quality grading
- In the back end
  - Costing

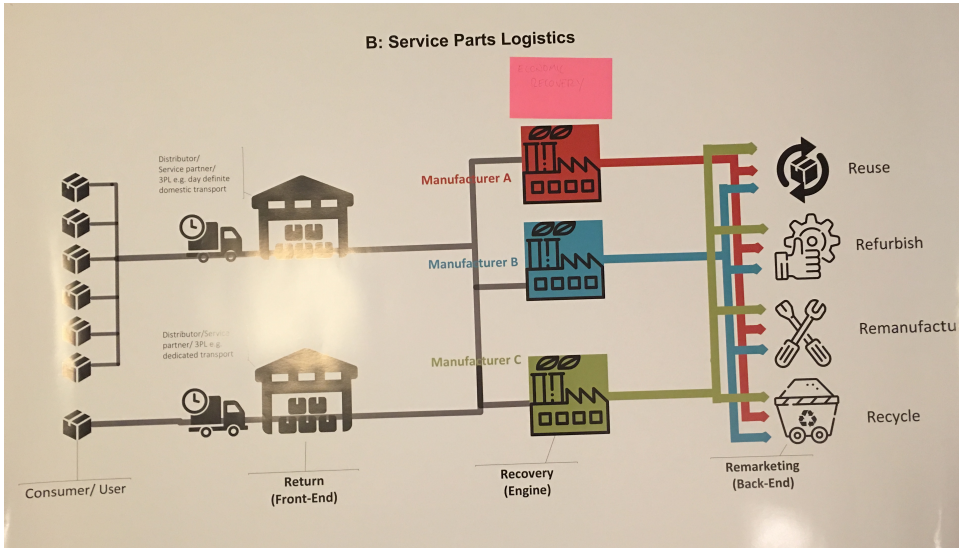


Archetype 2 Group :

The 2nd Group nominated one business (OEM for machinery parts) to discuss its challenges and to present their RL journey

Mainly the economic feasibility was the themed discussed, as the business do Reuse, and refurbish but looking also to include remanufacturing operation.

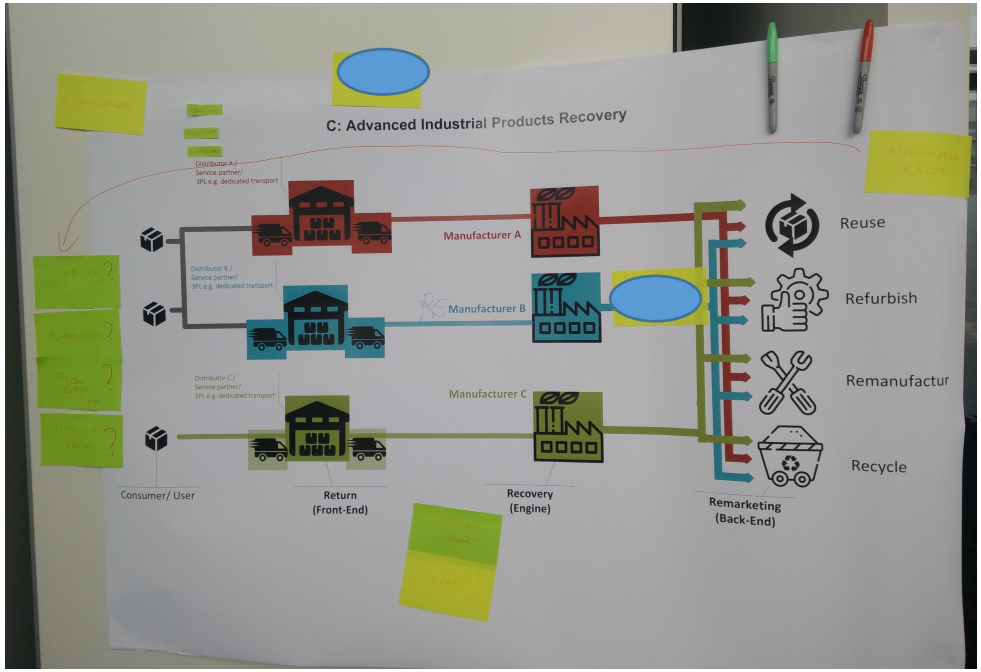
It is noted that the Front end part was not part of the challenge yet as the economic of recovery is associated with the viability of the whole process.



Archetype 3 Group :

The 3rd group discussed the important of :

- Visibility
- Flow back
- Awareness
- Value maximization
- Maximizing reuse through partnership.



Note from session facilitator:
The 1st and 3rd Archetype discussed with breadth the RL journey while 2nd archetype group focused on the Recovery area as main driver for the process development.

Reasoning for workshop part 1

- Bringing businesses into common ground of how similar businesses operate in different product portfolio.
- Allowing high level discussion on challenges in the same group.
- Insure the practitioners have the breadth needed in understanding the reverse logistics processes.

Workshop part 2

Apply the Reverse Logistics Maturity Model to identify future reverse logistics solutions (30 mins):

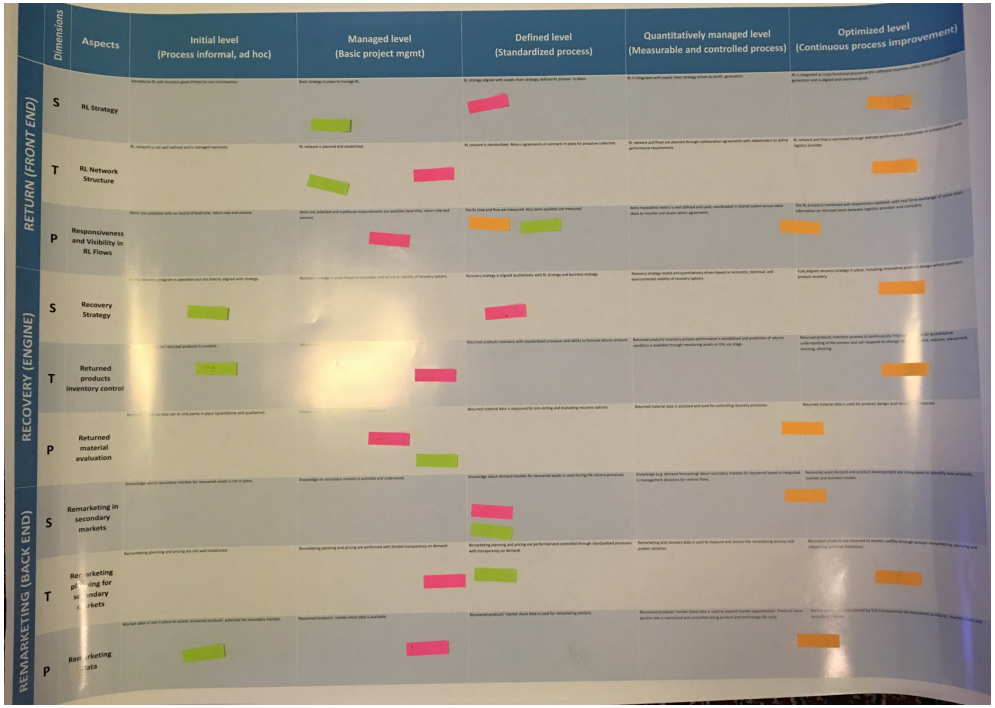
- Now that you realized the different component of RL
- Map RLMM components (front end, engine, back end)
- Map decision making levels (strategic, tactical, performance)
- Assess maturity by matching the respective current level of maturity across each RL component and within each dimension
- Identify and select focus areas for improvement
- Present (3 mins):
  - What are the key capabilities that you have?
  - What are the needed capabilities to move to the next level

Archetype 1 maturity model exercise

In this part, three companies were assessed using the RLMM:
The green and pink companies are both start ups, and the company represented by orange poster is 100+ year old business

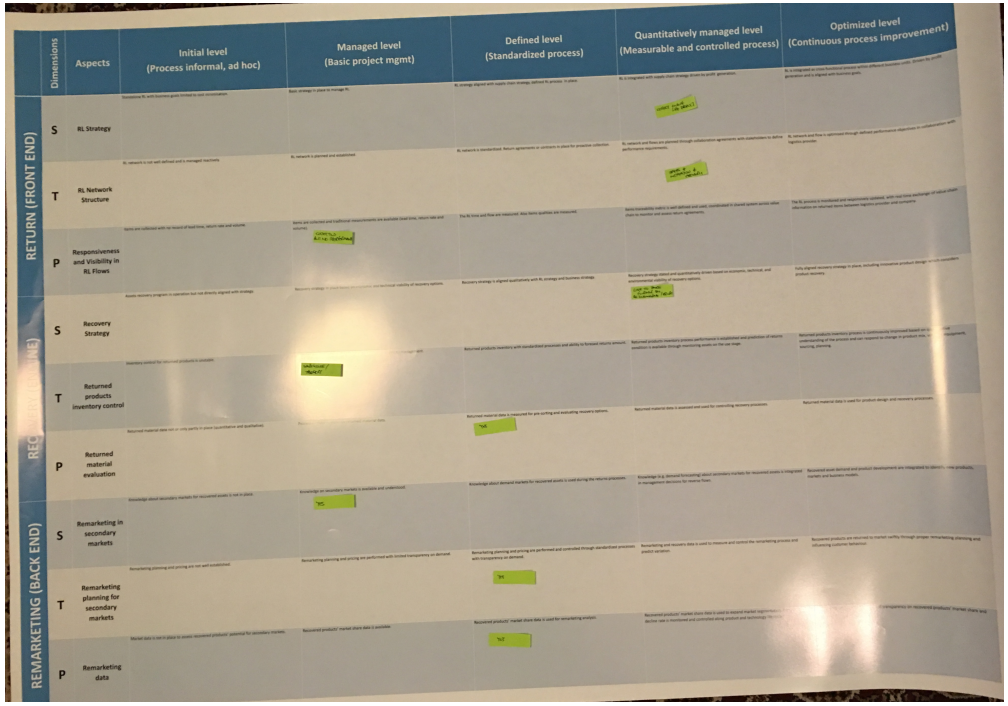
Although the business represented by pink poster is a new start up, yet they had a head start by tapping in existing capabilities which enables them to advance quite fast.

Interestingly for the Pink business we can see that Strategy is leading in all RL components.

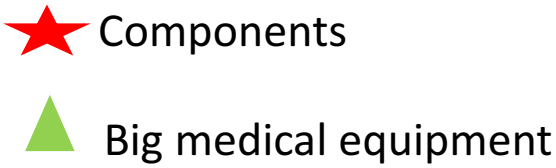


Archetype 2 maturity model exercise

In this exercise one business discussed their maturity journey which align also with the challenges they presented in the 1st part of the workshop.



Example of testing Reverse Logistics Maturity Model on two products in same manufacturer in Archetype 3



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Reasoning for workshop part 2

- Companies build up on other businesses best practices in RL.
- Allow business to visualize where are the potential area of improvement.
- Show the importance of advancing by building up the needed capability to respective level, thus integrate it in company's strategy.
- Provide practitioners with practical tool to compare the return process of different product group also compare with different leading companies across different sector.

Key finding and propositions

- Different RL requirements are needed for different products attributes.
- Reverse logistics planning requires broader approach beyond process management perspective, to include comprehensive business model perspective.
- Collaboration is key to scale up and stimulate circular economy.
- Logistics plays key role in collaboration for the path to circularity, and could increase value chain transparency.

Key finding and propositions

Network optimization required for economical reverse logistics

- Lack of consolidation and network design limits cost effective collection from large geographical areas
- Identifying how forward logistics networks can be effectively leveraged to enable recovery of returned goods and waste such as packaging (requires collaboration between producer and service provider), unlock under-used network capacities
- RL solutions need to be adapted for different geographic areas, local conditions (market, regulations, cultural aspects) and other factors to be effective

Economies of scale crucial to return of low residual value items

- For low residual value items it is key to build capability to recover not only other brands' products but also similar product types to achieve economies of scale
- To increase volumes, collaboration programs are needed, but key challenge is how to incentivize participation
- Non-/monetary incentives for consumers to return products need to be in place (incl. ease of access, transparency on drop points)

Transparency as an key enabler for reverse logistics design

- Transparency across functions (product design, manufacturing, marketing, sales and logistics) within producer companies is required
- For high value products transparency of (future) reverse products inventory is required to enable fast redeployment/resale

Key finding and propositions

- **Robust sorting and next lifecycle support capabilities required**
- In the case of municipal and construction site waste recycling, pre-sorting is required to limit the reverse logistics flow to usable materials only (downstream sorting cost prohibitive)
- Capable recycling providers needed (both for high and low value products) to outsource the processing of returned products and leverage specialization
- Transport to be expanded by additional logistics services such as de-/installation or packaging
- **Partnerships are key to RL**
- Companies to partner with their logistics providers to optimize return logistics (e.g. combined delivery of new goods and pick-up of to be returned goods and/ or packaging)
- Companies to partner within and across sectors to fully leverage next lifecycle potential of products and materials

Thank you

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The RLMM provides and guides companies in:

- Understanding requirements for return management and reverse logistics according to product archetypes
- Assessing the maturity of planned or existing return management processes
- Improving reverse logistics to increase efficiency and enable optimized recovery and remarketing
- Establishing integrated logistics and increasing supply chain resilience as a result
- Increasing transparency on returned products and related secondary markets demand
- Strengthening and scaling-up a company's circular approach to leverage market potential