Circular economy in creation of a closed loop supply chain

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Why?

- Unconstrained production and consumption is no longer feasible

- Businesses are faced with the following issues:
  - Public scrutiny of environmental credentials
  - Government Regulation.
  - Focus on Life Cycle and Total Costs.

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Definition

Closed-loop supply chains:

are designed and managed to explicitly consider the reverse and forward supply chain activities over the entire life cycle of the product.

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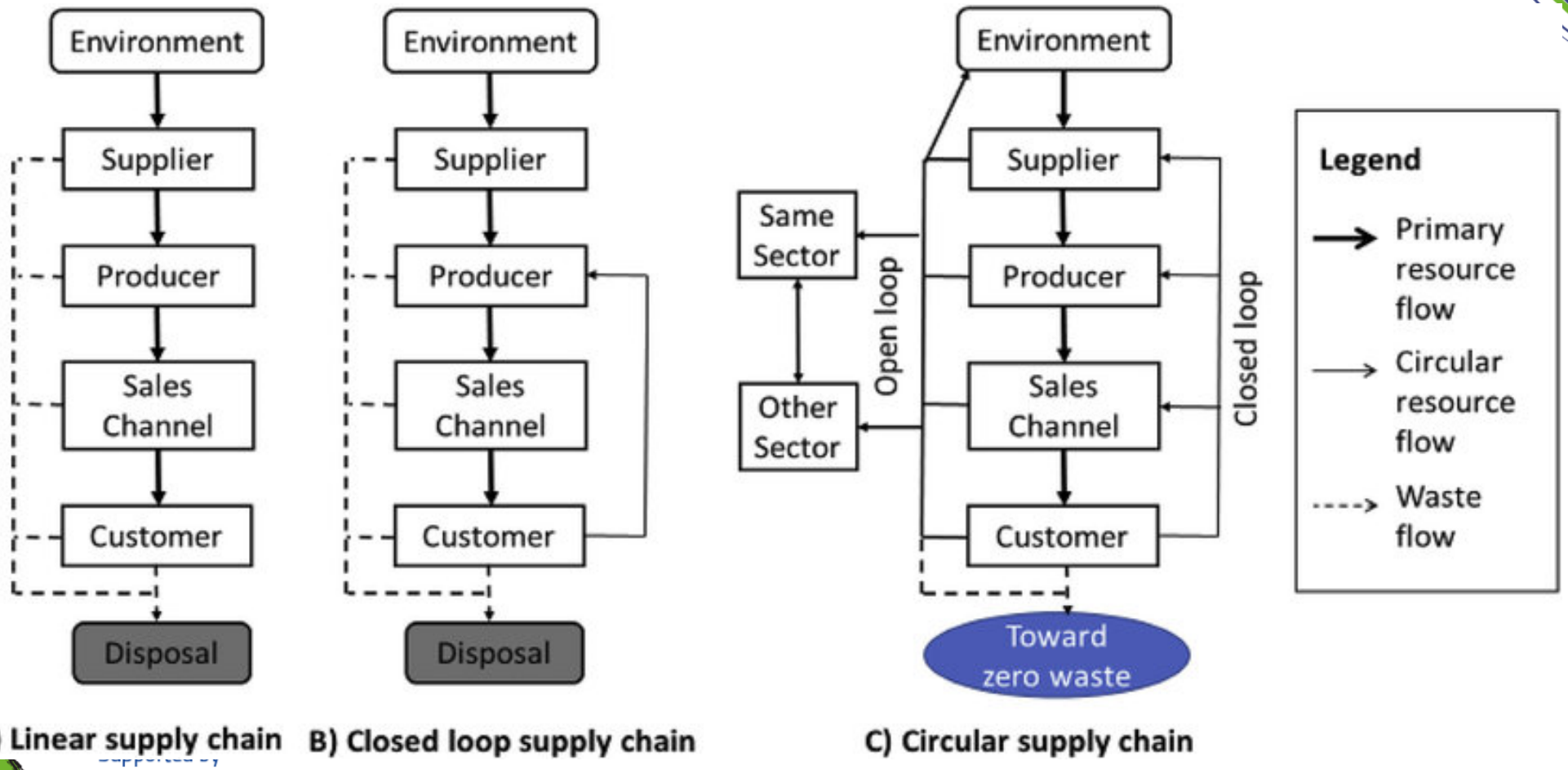
Forward vs closed loop supply chain



A) Linear supply chain **B) Closed loop supply chain** **C) Circular supply chain**

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Types of returns

- *Commercial returns*
  - 30 to 90 day free returns policy in US
  - HP: total costs: 2% of gross $ sales annually
- *Repair / warranty returns*
- *Leasing*
- *End-of-use returns*
  - Cell phones: 80% replaced after first year of use
- *End-of-life returns*
  - Mandatory take-back in EU (WEEE)

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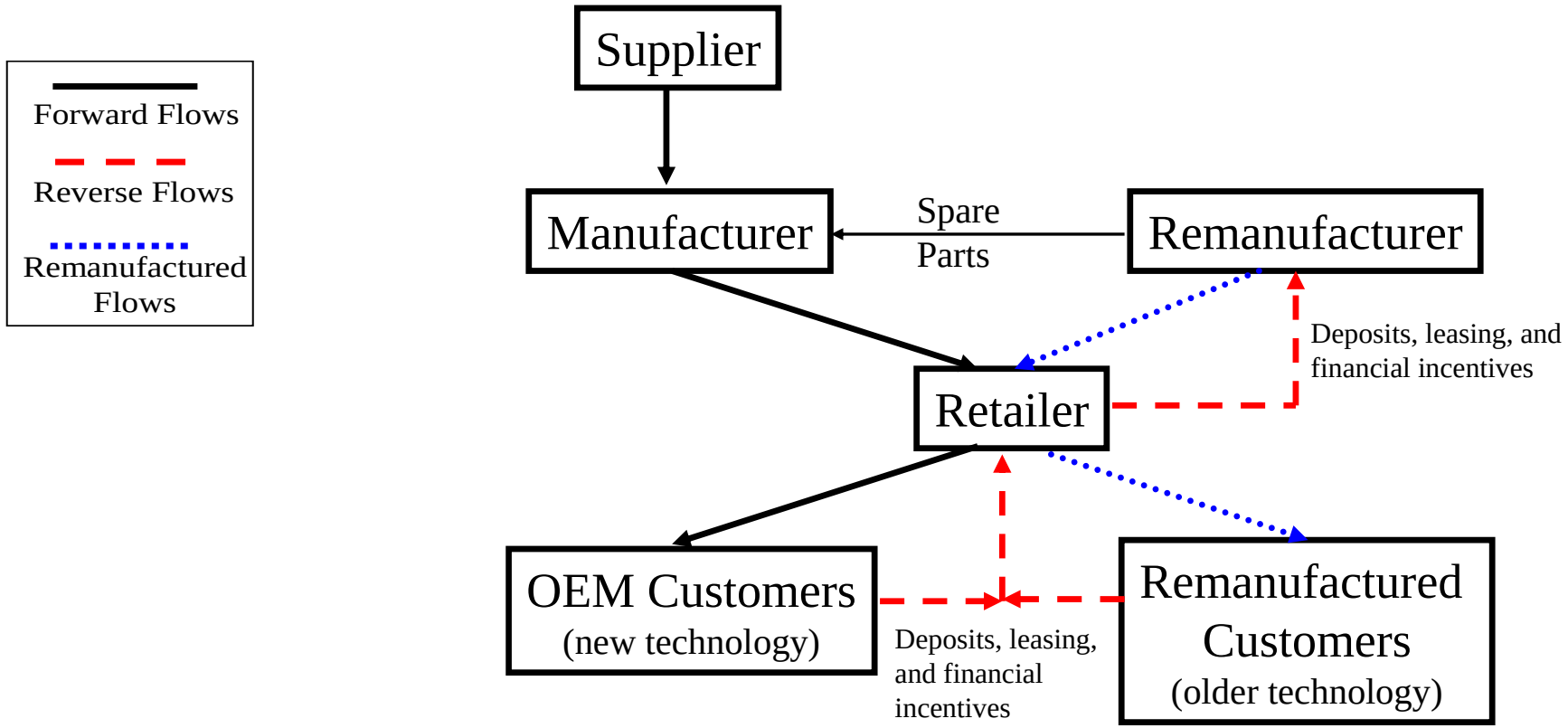
A closed-loop supply chain for photocopiers



Characteristics: high variances, stable production technology, limited volumes, modular design, imbalances in supply and demand, cannibalization

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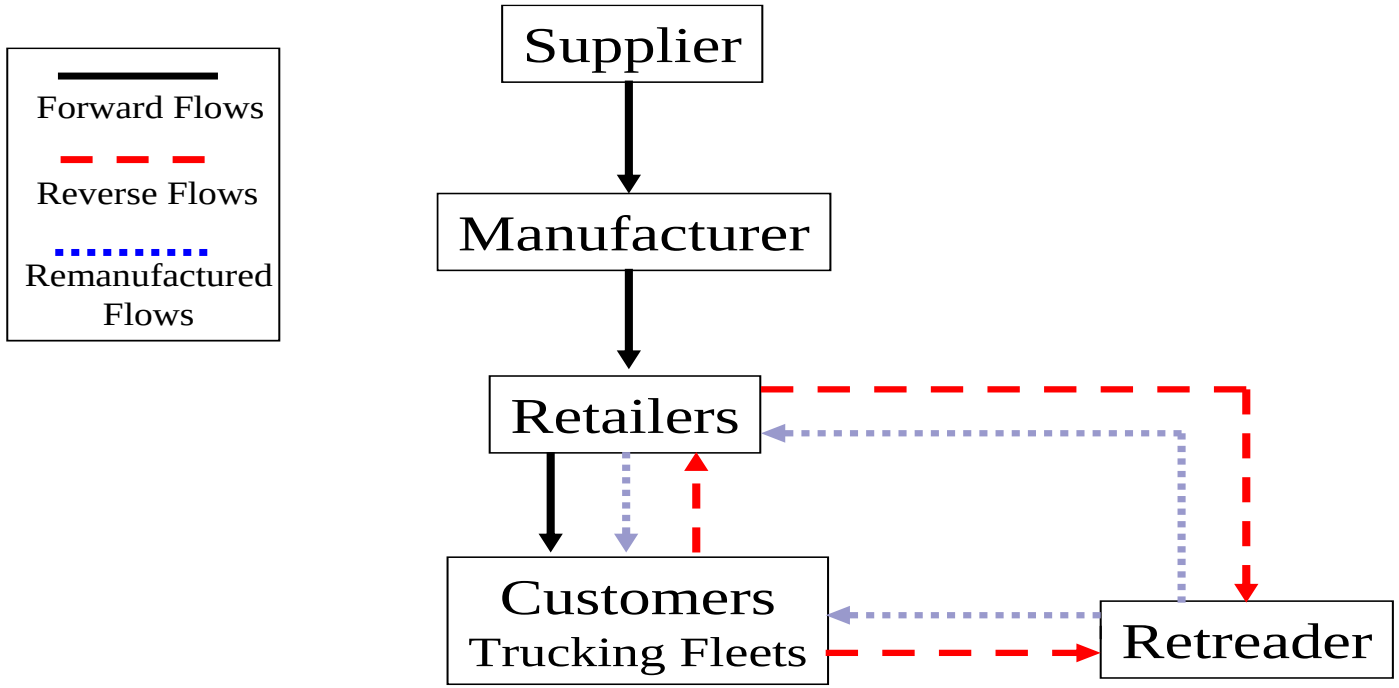
A closed-loop supply chain for commercial tire retreading



Characteristics: low variance in returns timing, low variance in quality, easy to sell, intermediate logistics costs

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Key activities

- Product returns management
  - Product acquisition
  - Reverse logistics
  - Test, sort, grade, and disposition
- Remanufacturing/reconditioning operational issues
  - Repair
  - Remanufacture
  - Recycle
- Remarketing
  - Distribution
  - Sales
  - Reuse

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How hard are these key activities?

	Product Acquisition	Reverse Logistics	Test Sort Grade	Remanufacture/ refurbish	Remarketing
Product Life Extension ⇒ Jet engines	Easy	Easy	Hard	Hard	Easy
Refillable Containers ⇒ Toner cartridges	Easy	Easy	Easy	Easy	Easy
Tire Retreading ⇒ Commercial	Easy	Intermediate	Intermediate	Intermediate	Easy
Consumer Electronics Reuse ⇒ Cellular Phones	Hard	Easy	Easy	Easy	Intermediate
Industrial Remanufacturing ⇒ Copiers	Intermediate	Intermediate	Hard	Hard	Hard
Tire Retreading ⇒ Passenger	Easy	Hard	Intermediate	Intermediate	Hard

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Final remarks

Logistic can help accelerate the adoption and optimization of the circular economy system by sharing the lessons learned by companies handling returns and waste associated with:

- collection and aggregation of products,
- analysis and triage of returned products to determine whether they should be cascaded for another use or broken down into component parts,
- maximizing the recovery and value of component parts,
- seeking and maximizing the value of cascaded products,
- marketing and messaging the value of refurbished and remanufactured products.

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