



MICRO-CREDENTIAL

CIRCULAR ECONOMY FOR LAND AND WASTE MANAGEMENT

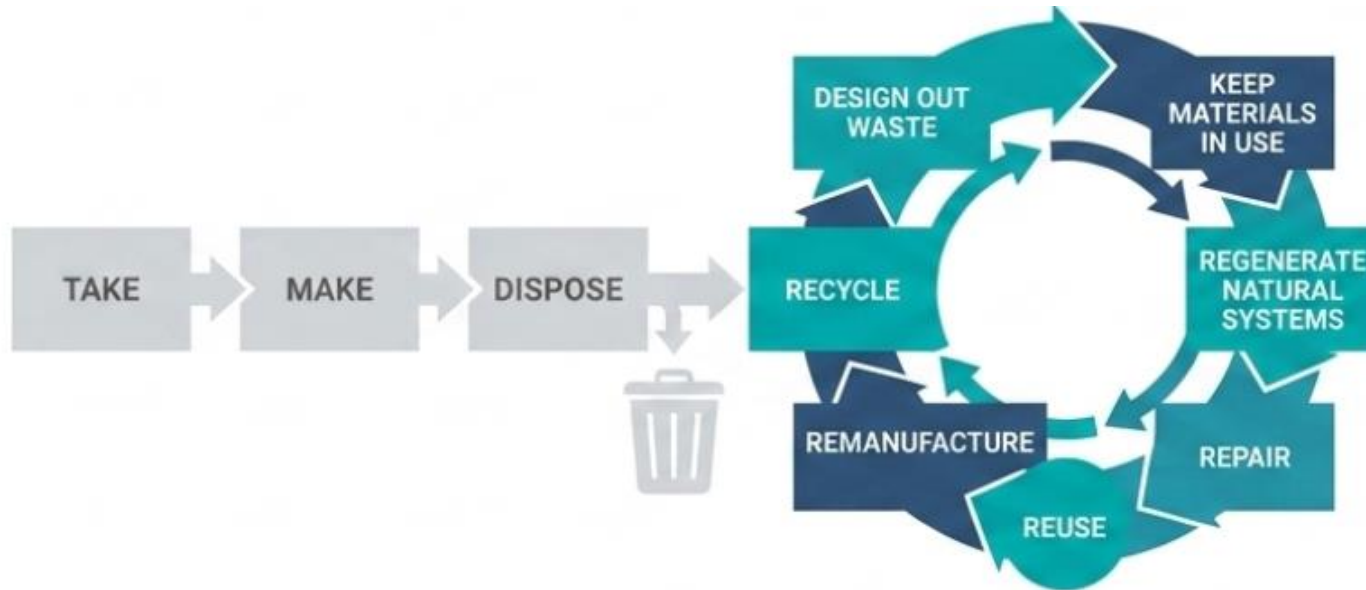
12. – Economic and Social Dimensions

Circular business models

CELWS-W12-V01



Introduction to Circular Business Models

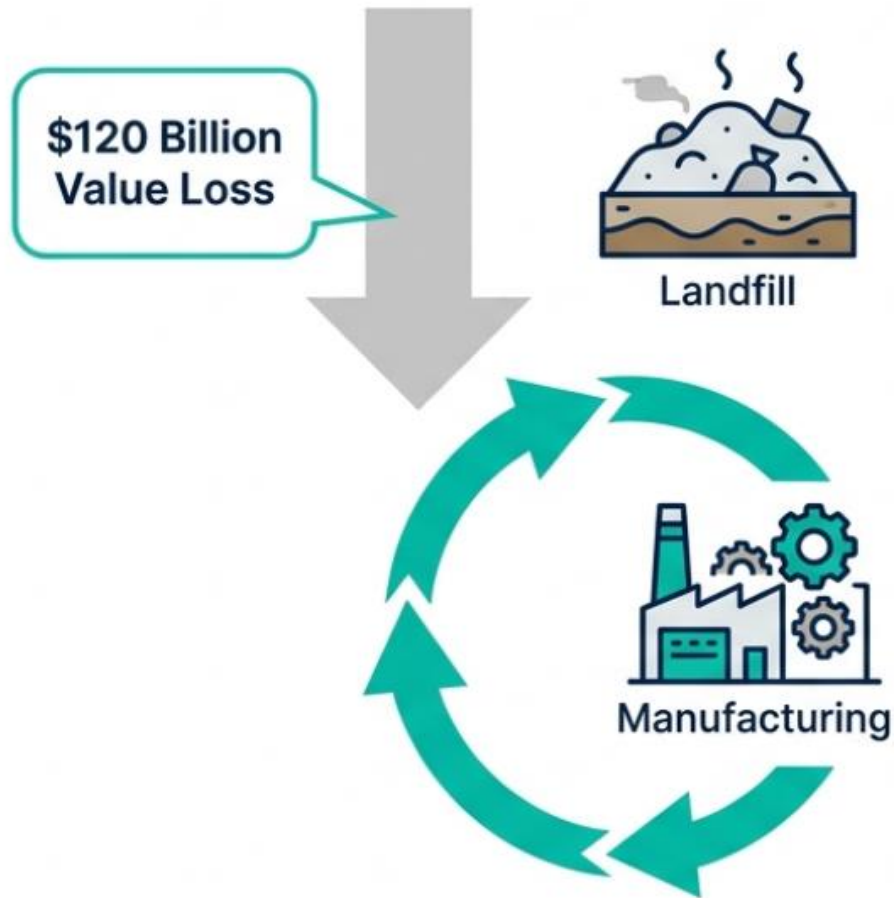


The Paradigm Shift: Moving away from traditional take-make-dispose pathways to a functional service economy.

Core Objective: Decoupling economic growth from finite resource extraction.

The Mechanism: Eliminating waste by design and keeping materials in continuous use at their highest possible value.



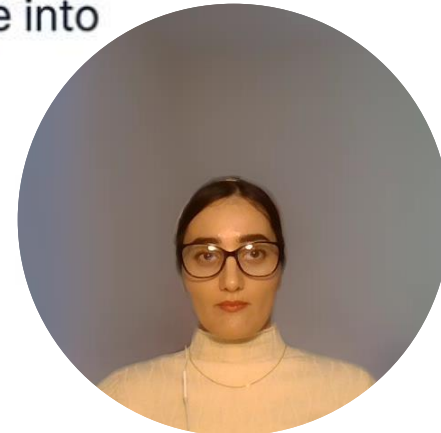


The Linear Risk

80% of manufactured products are discarded within their first six months of life, representing catastrophic economic value destruction.

The Circular Opportunity

Profitability shifts from raw extraction to value retention, transforming traditional waste into continuous operational feedstocks.





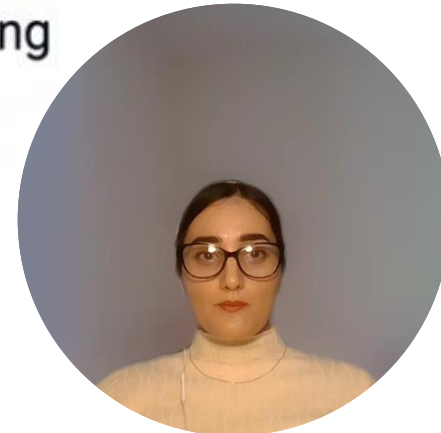
Slowing Resource Loops: Extending product lifespans through rigorous maintenance, repair, and durability design.

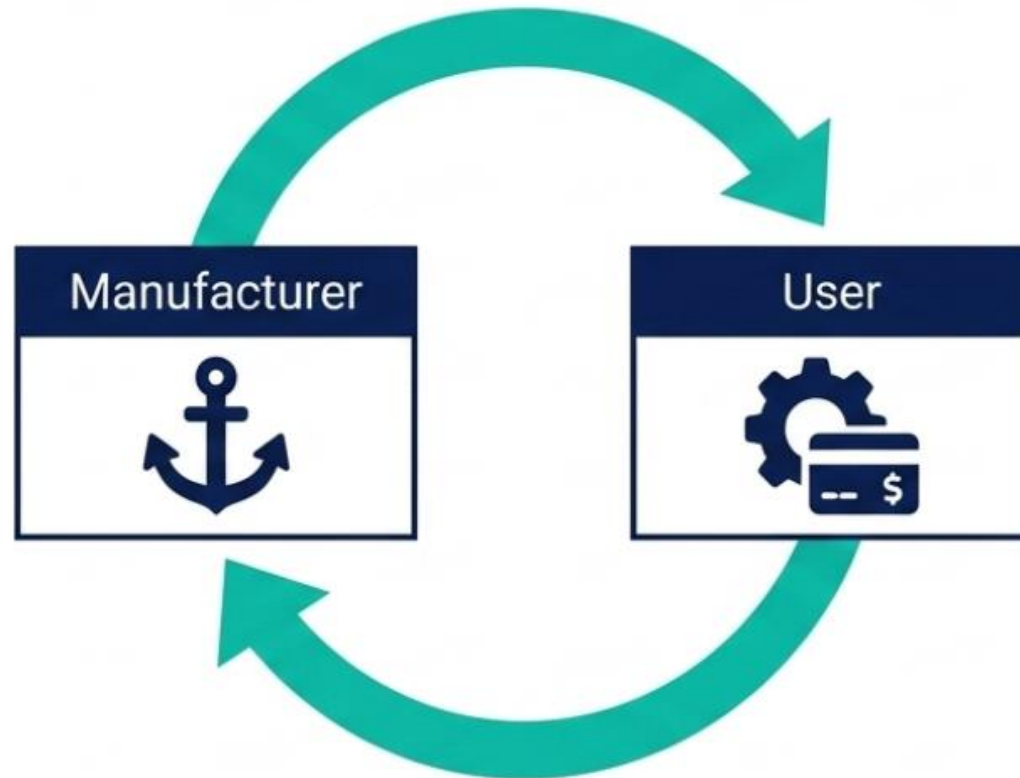


Closing Resource Loops: Capturing residual value through systematic recycling and industrial symbiosis.



Narrowing Resource Loops: Maximizing operational efficiency to aggressively reduce the material and energy inputs required per product.



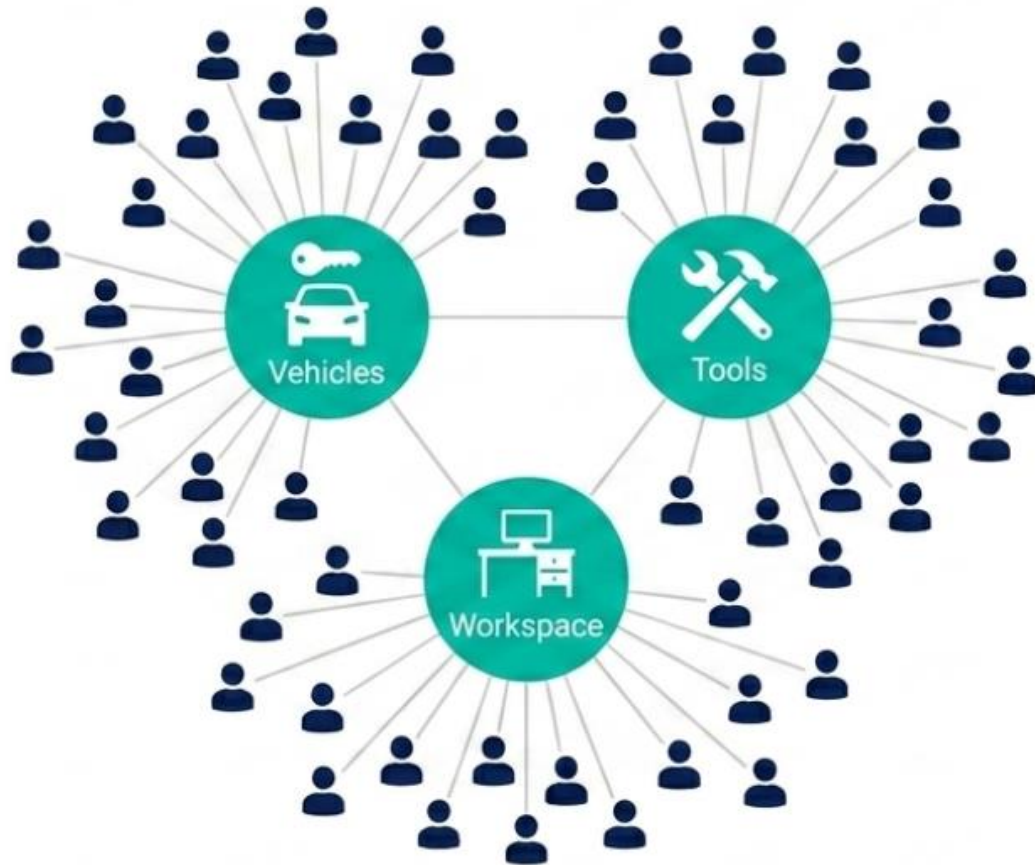


The Concept: Customers pay exclusively for utility, performance, or access rather than purchasing physical ownership.

The Incentive: Manufacturers are financially motivated to build durable, easily repairable products, eliminating planned obsolescence.

Case Application: Michelin's Tire as a Service — charging commercial fleets by the mile driven to ensure maximum asset lifespan and guaranteed end-of-life recovery.

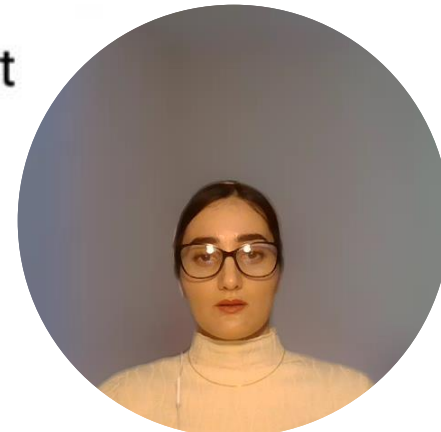




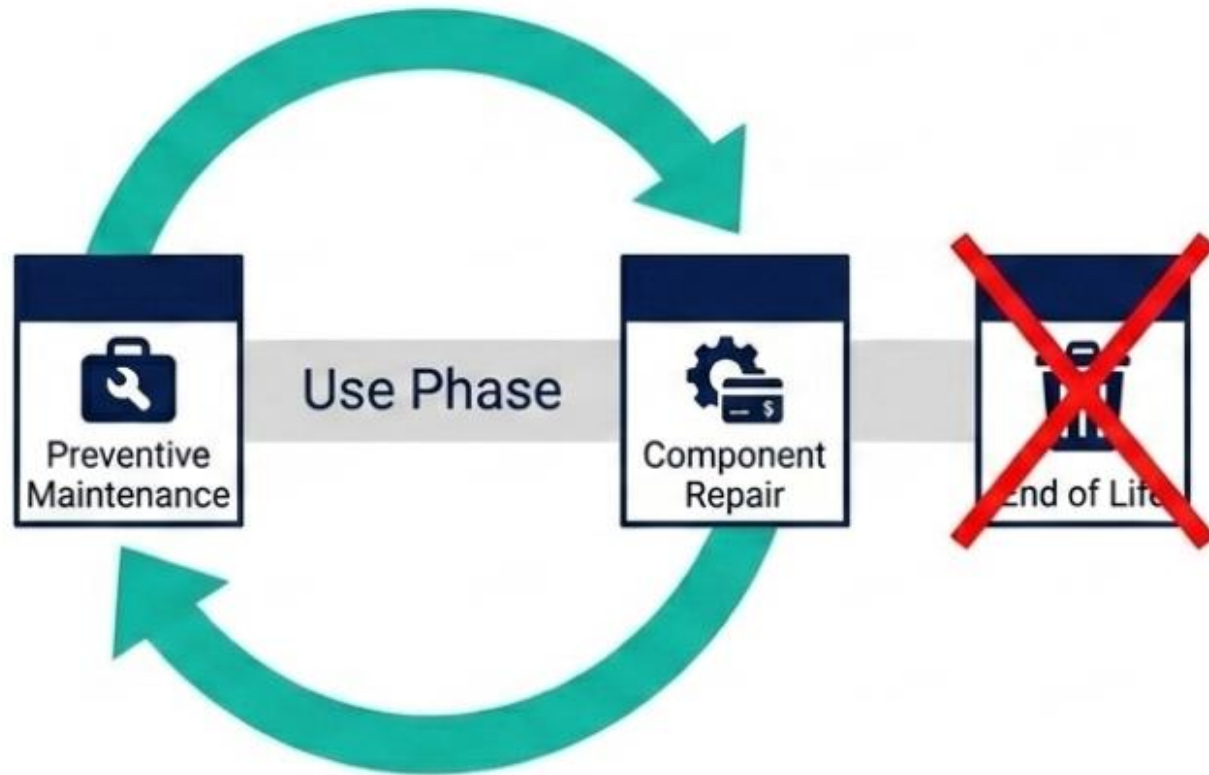
The Concept: Dramatically increasing the usage rates of typically underutilized, high-value assets through collaborative access.

The Mechanism: Digital platforms replace the need for individual ownership with shared, on-demand utility.

The Impact: Fulfills market demand with significantly fewer physical products, effectively narrowing the resource loop at scale.



Repair and Maintenance Business Models



The Concept: Intervening prior to critical product failure to maintain original utility and prevent disposal.

Value Capture: Generates ongoing service revenue pipelines while entirely avoiding the costs of new raw material extraction.

Case Application: PramShare — servicing and repairing high-value consumer goods to keep them in active circulation rather than sitting idle or degrading.



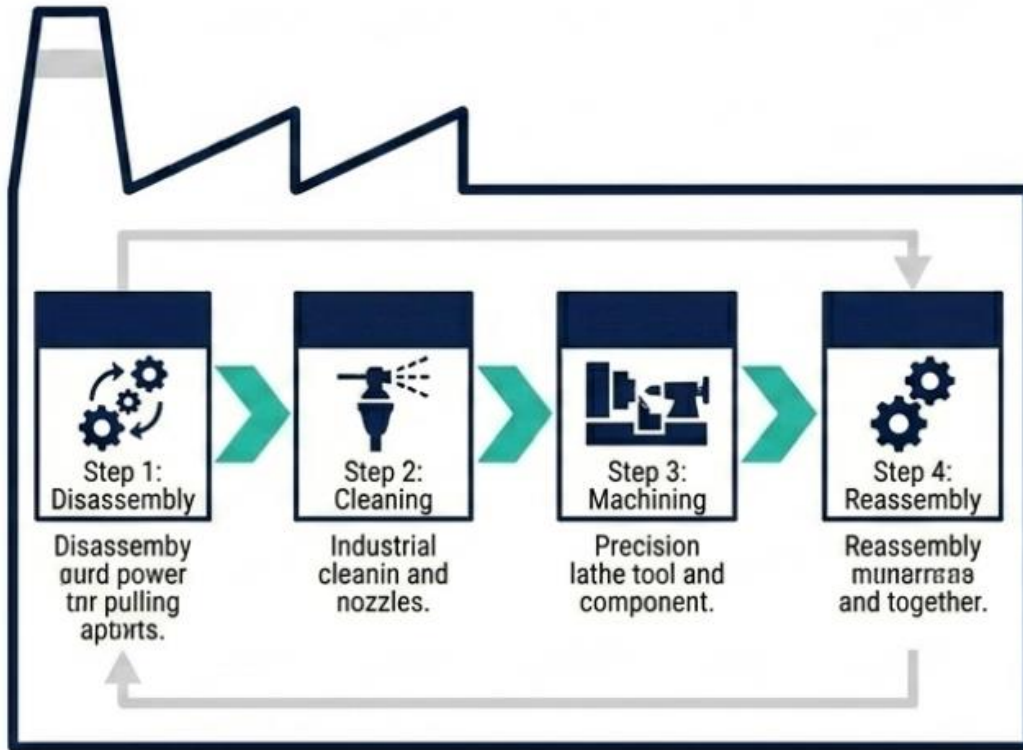


Reuse: Trading or redistributing used goods (like clothing or books) before they lose functionality or aesthetic appeal.

Refurbishment: Strategically updating critical performance components (such as device batteries) while retaining functional outer shells.

The Outcome: Restores functional value, avoids raw manufacturing, and successfully cultivates formalized secondary markets.

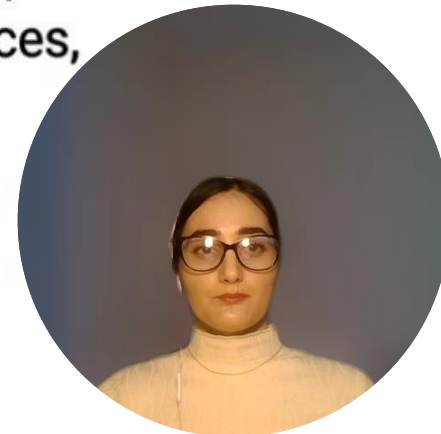


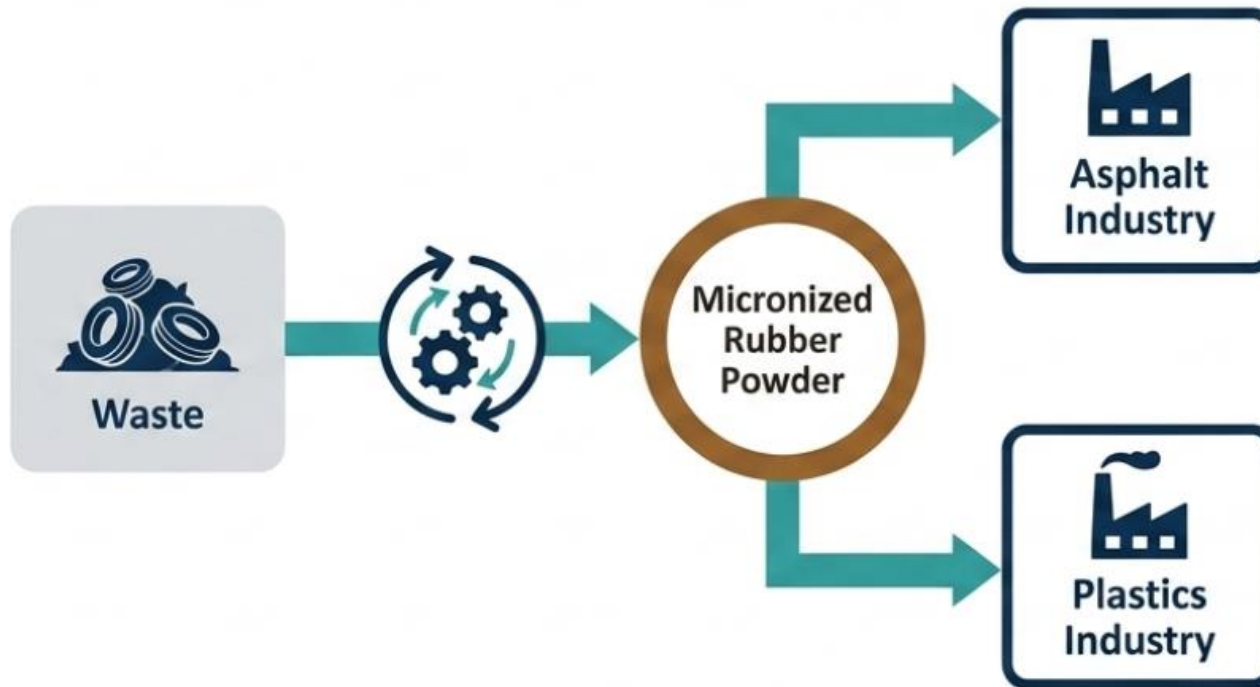


The Standard: Used products are returned to original as-new performance specifications and issued equivalent warranties.

The Process: Requires rigorous industrial disassembly and component-level machining, distinguishing it from basic localized repair.

Target Sectors: Highly applicable to high-value equipment including medical devices, automotive parts, and heavy industrial machinery.

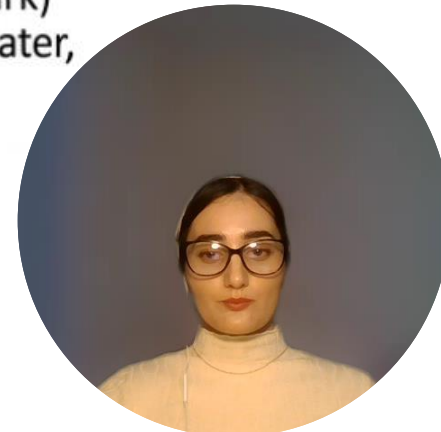


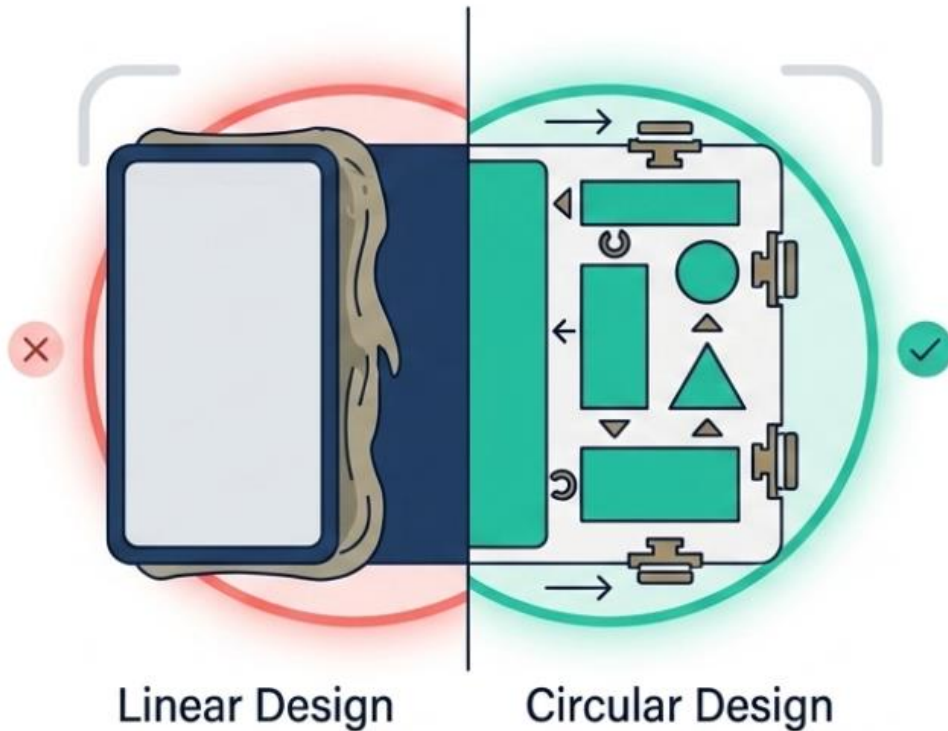


Industrial Symbiosis: A localized system where one industry's discarded waste becomes another's primary raw material.

Nutrient Recovery: Processing materials to recover technical nutrients for equal or alternative high-value uses (upcycling vs. downcycling).

Case Application: Eco-industrial parks (e.g., Kalundborg, Denmark) mapping and sharing energy, water, and material by-products.

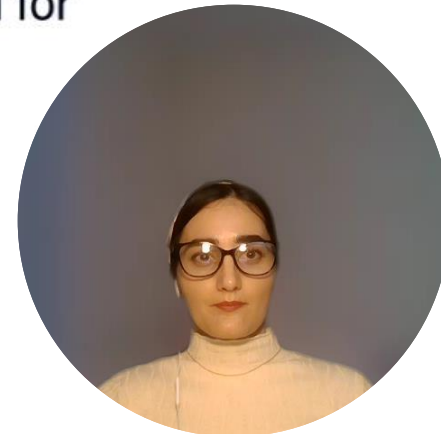


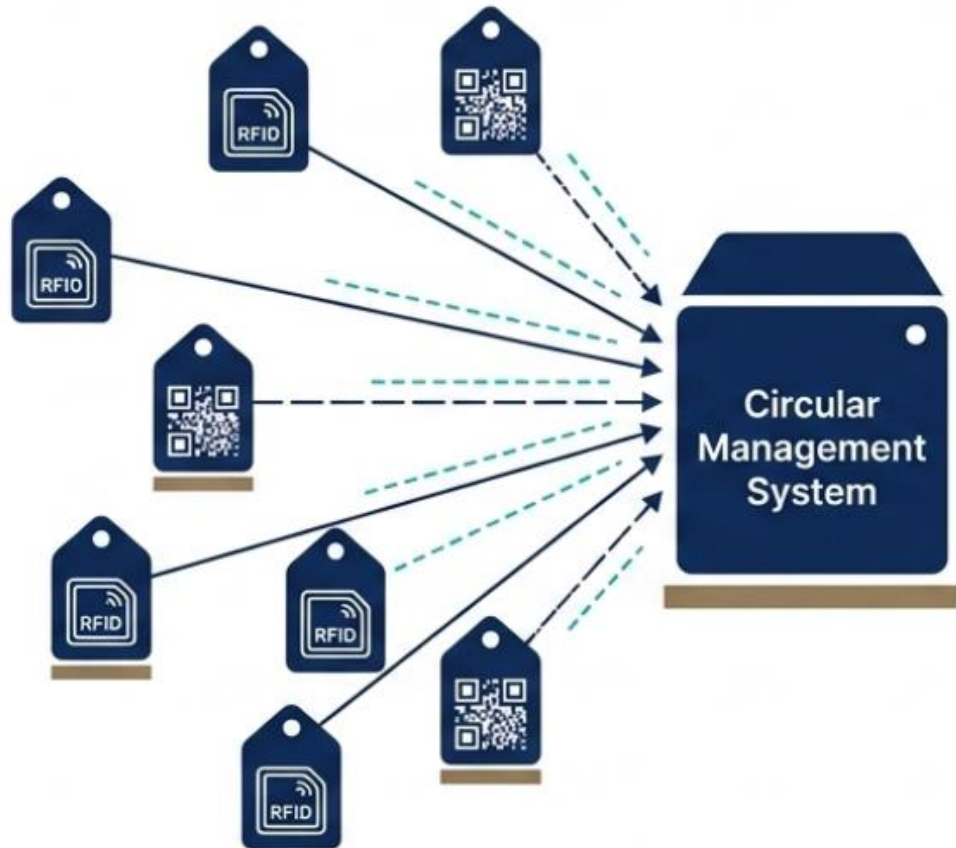


Cradle-to-Cradle: Designing products from their inception to act as safe biological or technical nutrients at end-of-life.

Modularity: Engineering devices specifically for rapid disassembly, component harvesting, and localized repair.

The Business Link: Profitable servitization completely relies on products designed for extreme longevity and serviceability.





IoT Infrastructure: RFID tags and QR codes continuously track asset condition, location, and utilization across multiple use cycles.



Data-Driven Interventions: Constant dashboard monitoring enables predictive maintenance and dramatically optimizes reverse logistics.



System Traceability: Ensures security across large-scale sharing platforms and verifies precise material compositions for downstream recyclers.



Economic Benefits	Implementation Challenges
• Mitigation of supply chain risks	• High upfront capital expenditure
• Extreme material cost savings	• Profound complexity in reverse logistics
• Opening of resilient new service revenue streams	• Severe lack of regional recovery infrastructure

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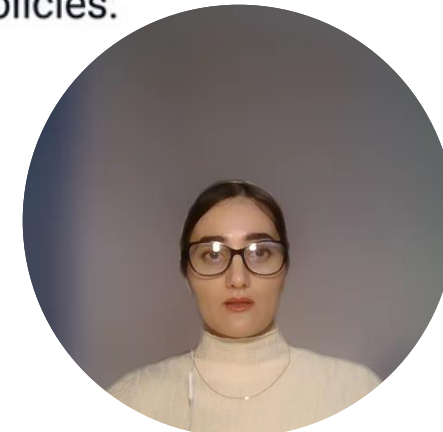
Circular Business Models in Transition Economies

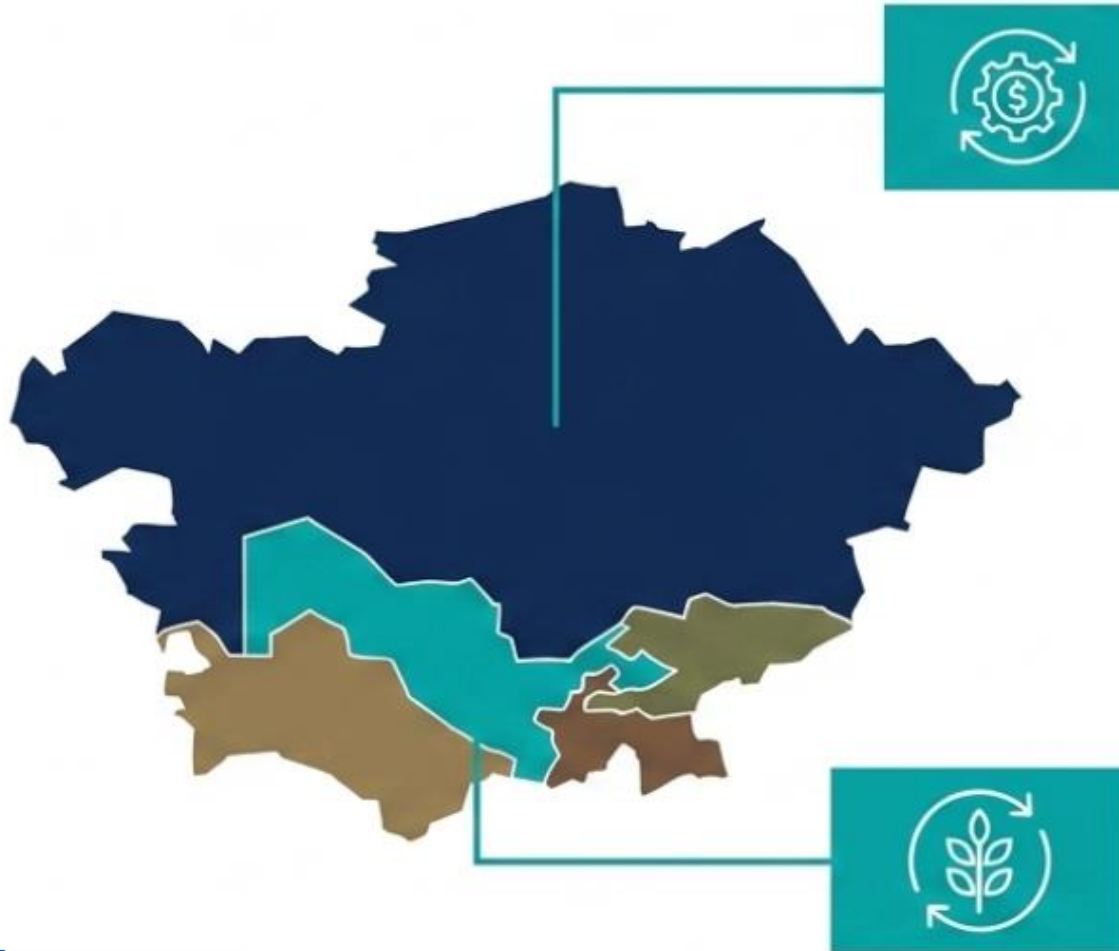


The Context: Transition economies face unique systemic waste challenges, distinct informal sector dynamics, and infrastructure gaps.

The Intervention: Integrating informal workers into formalized, legally recognized, and safe recycling cooperatives.

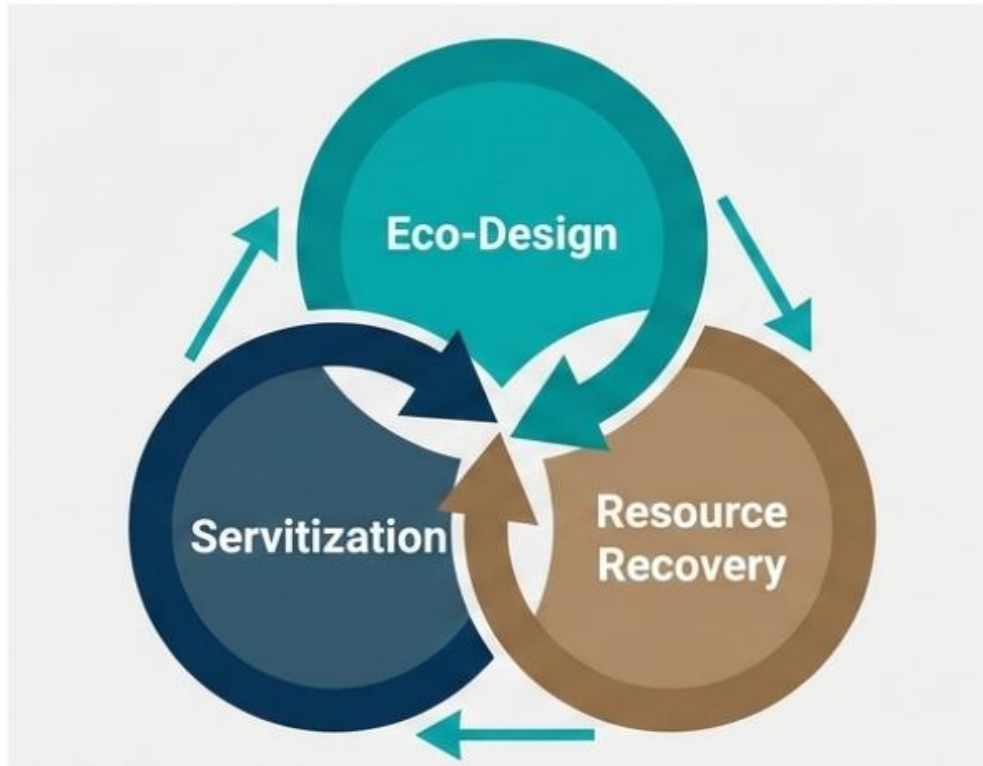
The Goal: Harmonizing socio-economic workforce development with sustainable urban metabolism and zero-waste municipal policies.





- **Kazakhstan:** Advancing Extended Producer Responsibility (EPR) frameworks and formalizing emerging secondary material markets.
- **Uzbekistan:** Deploying localized business interventions focused on agricultural biomass recovery and nature-based solutions.





The Circular Engine: Innovative business models, proactive eco-design, and supportive policy must operate in tandem to successfully decouple economic growth from resource depletion.





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