CIRCNETS Final Webinar

WP2 Outputs - O.2.2: EOL Emerging Technologies model

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O.2.2: EOL Emerging Technologies model

Best practice model for technology adoption in the waste management of EOL fishing gear

Technology assessment

- ✓ Identify key emerging technologies
- ✓ **SWOT analysis:** Strengths, weakness, opportunities and threads
- ✓ **TRL analysis:** readiness level

Stakeholder analysis

- ✓ Identify key actors
- ✓ **Role/power/ interest/relationships analysis**
- ✓ **Interest-power-relation mapping**

O.2.2.

Model with recommended actions per stakeholder to implement emerging technologies

WP2 CIRCNETS-Deliverables & Activities

circnets

WP2 REPORT

D.2.1.1 Analysis of gaps and possibilities of current end-of-life fishing gear disposal systems

circnets

WP2 REPORT

D.2.1.2: Review and analysis of Life Cycle Assessments in fishing gear waste management methods

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WP2 REPORT

D.2.5.1: END-OF-LIFE (EOL) FISHING GEAR MANAGEMENT UNDER EXTENDED PRODUCER RESPONSIBILITY (EPR): READINESS AND COMPLIANCE FROM NPA COUNTRIES

circnets

WP2 REPORT

D.2.3.2 EOL Technology best practice report

Webinar (12th September 2024)

Skipper expo (21st and 22nd March 2025)

CIRCNETS Economic Potential Workshop (9th September 2025)

How the CIRCNETS activities lead to O.2.2.?

CHALLENGES & BARRIERS

Logistics

- Complexity of material → Transport and sorting is **difficult and labour-intensive**
- **Proximity** of pre-treatment facilities to the source is key
- **Limited collection points**

Optimise collection, transport and sorting logistic

EOL fishing gear materials

- Sorting requires people with **specific skills**
- **Hard to process contaminated materials**
- **Complex materials hinders recycling efforts**

Technologies capable of processing hard and contaminated materials

Data coordination and reporting

- **Manual tracking systems are used**
- **Inconsistent reporting**
- **Communication problems**
- **Trust and marketability is limited**

Digital marking and tracking systems

Economic & investment

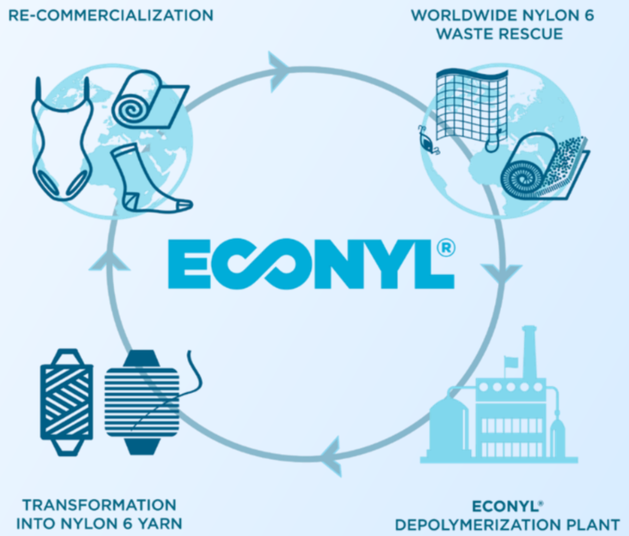
- **Recycled products more expensive** than virgin plastics
- **Lack or limited national recycling facilities for EOL fishing gear**
- Treatment procedures are **costly and energy intensive**

Recycling technologies with lower labour and energy demands + circular market development

D.2.1.1.: Analysis of gaps and possibilities of current end-of-life fishing gear disposal systems

BEST PRACTICES & OPPORTUNITES

Mobile shredding unit (Ireland): used to process mussel floats. In Ireland



Econyl process from Aquafil (Denmark): Chemical recycling of nylon from netting and other materials

NET 360 pilot (Verifact & Novelpalst- Ireland): tracking system EOL fishing nets through the recycling process back into commercial use

WP2 CIRCNETS activities- Webinars, workshops and events

Webinar / workshops and events

"Need for accurate mapping of waste volumes and composition"

"Segregation and pre-processing are critical practices"

"Knowledge gaps and communication barriers need structured interventions"

"Distinguishing stakeholder roles within EPR is essential"

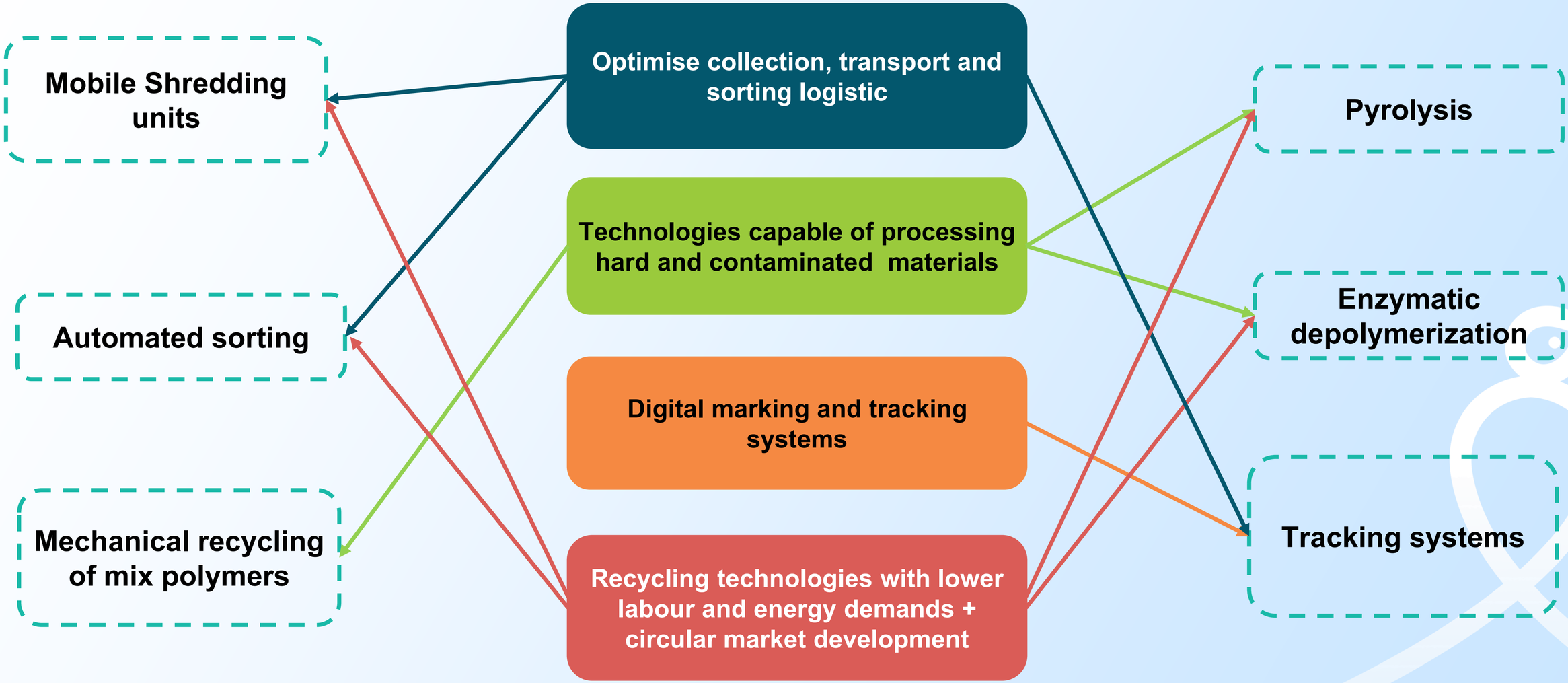
"Demonstrated market interest in recycled EOL fishing gear materials"

"Some gear types are currently untouchable for recycling"

"Traceability challenges highlight the need for digital tools"

O.2.2: EOL Emerging Technologies model

KEY EMERGING TECHNOLOGIES



O.2.2: EOL Emerging Technologies model

TECHNOLOGY ASSESSMENT

TRL 9	SYSTEM PROVEN AND OPERATIONAL
TRL 8	SYSTEM COMPLETE& QUALIFIED
TRL 7	SYSTEM PROTOTYPE DEMONSTRATION IN OPERATIONAL ENVIRONMENT
TRL 6	TECHNOLOGY DEMONSTRATED IN RELEVANT ENVIRONMENT
TRL 5	TECHNOLOGY VALIDATED IN RELEVANT ENVIRONMENT
TRL 4	TECHNOLOGY VALIDATED IN LAB
TRL 3	EXPERIMENTAL PROOF OF CONCEPT
TRL 2	TECHNOLOGY CONCEPT FORMULATED
TRL 1	BASCIC PRINCIPLES OBSERVED

SWOT ANALYSIS

	Helpful to achieving the objective	Harmful to achieving the objective
Internal origin (attributes of the organization)	Strengths	Weaknesses
External origin (attributes of the environment)	Opportunities	Threats

O.2.2: EOL Emerging Technologies model

TECHNOLOGY ASSESSMENT

Technology	TRL	STRENGHTS	WEAKNESSES	OPPORTUNITIES	THREADS
Mobile shredding unit	**6**	Good in shredding bulky volumes	Own power source	Expandable	High initial cost
Automated sorting	**6**	Enhance sorting accuracy	Operational challenges with materials with similar physical properties	Improved accuracy and efficiency with technological advancements	High investment
Mechanical recycling	**9**	Sustainable recycling option Low energy consumption	Risc of contamination	High-value application if recycled material has good quality	Downcycling Low cost-efficiency for complex plastics
Pyrolysis	**9**	Recycle mixed plastic waste	Energy intensive Technical complexity	Convert waste into flammable gases for electricity generation	High initial investment Environmental concerns
Enzymatic depolymerization	**9**	Handle a wide variety of polymers	Energy-intensive in some processes	Enable closed-loop recycling Recovers monomers to produce new plastics	Cost and complexity Toxic chemical usage
Tracking systems	**6**	Data-driven strategy Regulatory compliance	IP issues	Market differentiation Consumer empowerment Avoid greenwashing	Data collection Standardization and integration

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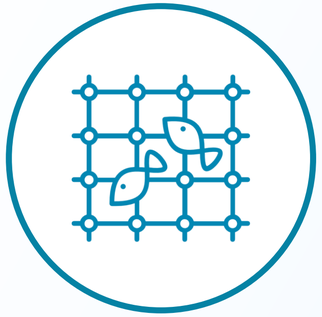
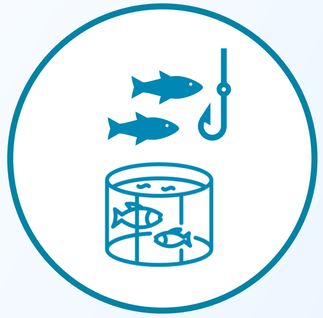
STAKEHODLER ANALYSIS



Fishing/aquaculture gear manufacturers



Fishing/ aquaculture industry

Harbour masters

Local authorities

NGOs

Recyclers

Waste management firms

Policy makers

Research institutions

Technology developers

End consumers

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STAKEHODLER ANALYSIS

Stakeholders	Role in EOL fishing gear lifecycle	Power level	Interest level	Relations with other stakeholders
Policy makers (PM)	Develop regulations, set standards, create incentives/subsidies	High	Medium-High	Influence gear manufactures and waste management firms through legislation; collaboration with research institutions for evidence
Recyclers (R)	Provide technological solutions, process EOL fishing gear into reusable materials	High	High	Collaborate with manufacturers, waste firms, NGOs; depend on authorities for licenses and incentives
Fishing/aquaculture gear manufacturers (M)	Design fishing gear (eco-friendly or recyclable), create demand for recycled materials	High	Medium-High	Key partners with recycling companies, influenced by policy/regulation and pressured by NGOs/ fishing gear consumers
Waste management firms (WM)	Collect, transport, sort, and prepare fishing gear waste for recycling/disposal	Medium	Medium	Work with local authorities, recycling companies, and fishing communities
Fishing/ aquaculture industry (FI & AI)	Primary users and disposers of fishing gear, critical for collection and responsible disposal practices	Low-medium	Medium	Work with local authorities, NGOs, and waste firms; directly affected by manufacturers thorugh prices, undirected affected by policy
Research institutions (RI)	Innovate recycling technologies, test materials, provide scientific evidence	Low	High	Advise policy makers, recycling firms, manufacturers; supported by funding from government/NGOs

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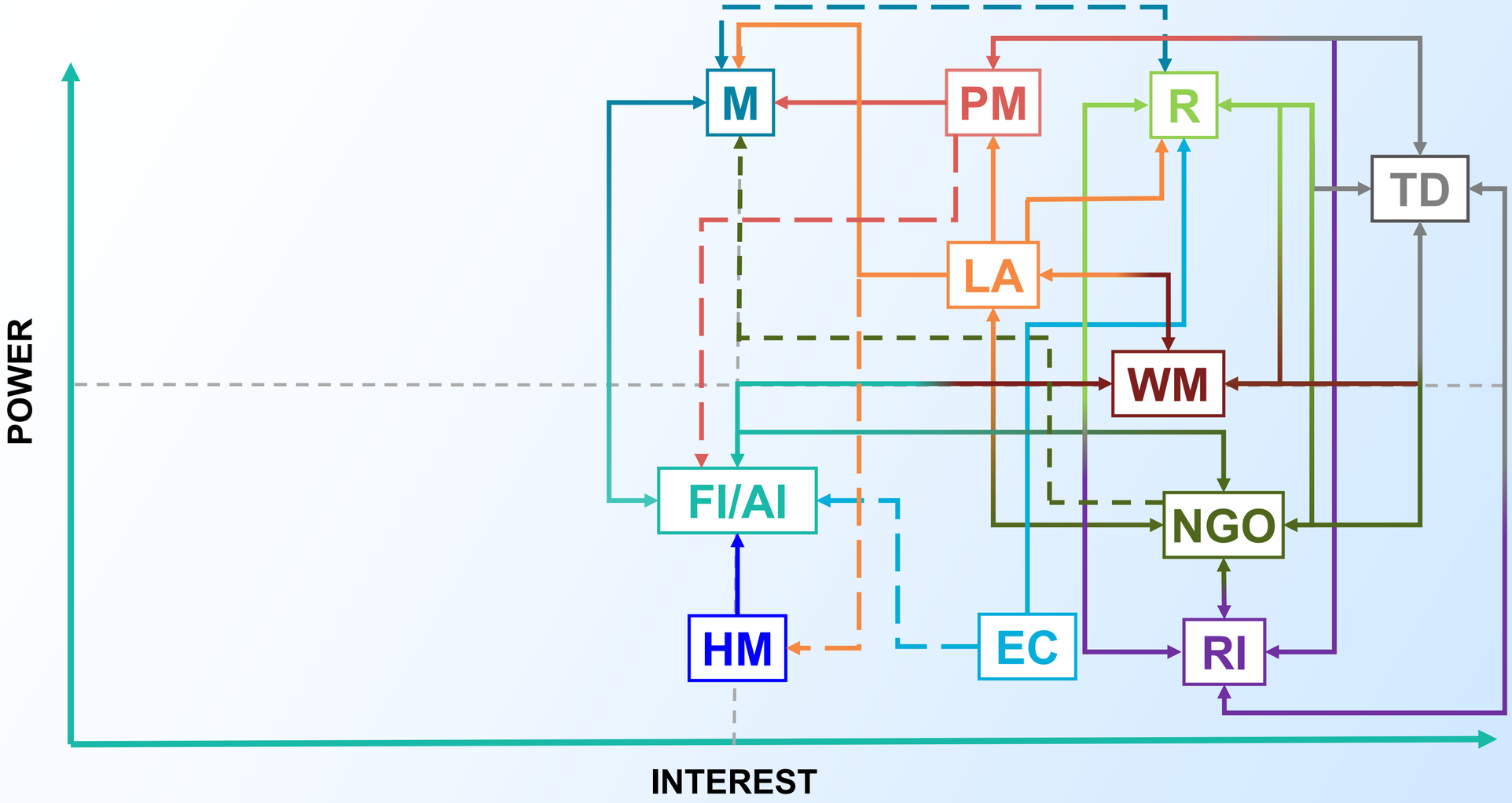
POWER-INTEREST MAPPING



M: Gear manufactures
FI: fishing industry
AI: aquaculture industry
HM: harbour master's
LA: local authorities
NGO: NGOs
R: Recyclers
WM: waste management firms
PM: policy makers
RI: Research institutions
TD: technology developers
EC: end consumers

Direct relation
Indirect relation

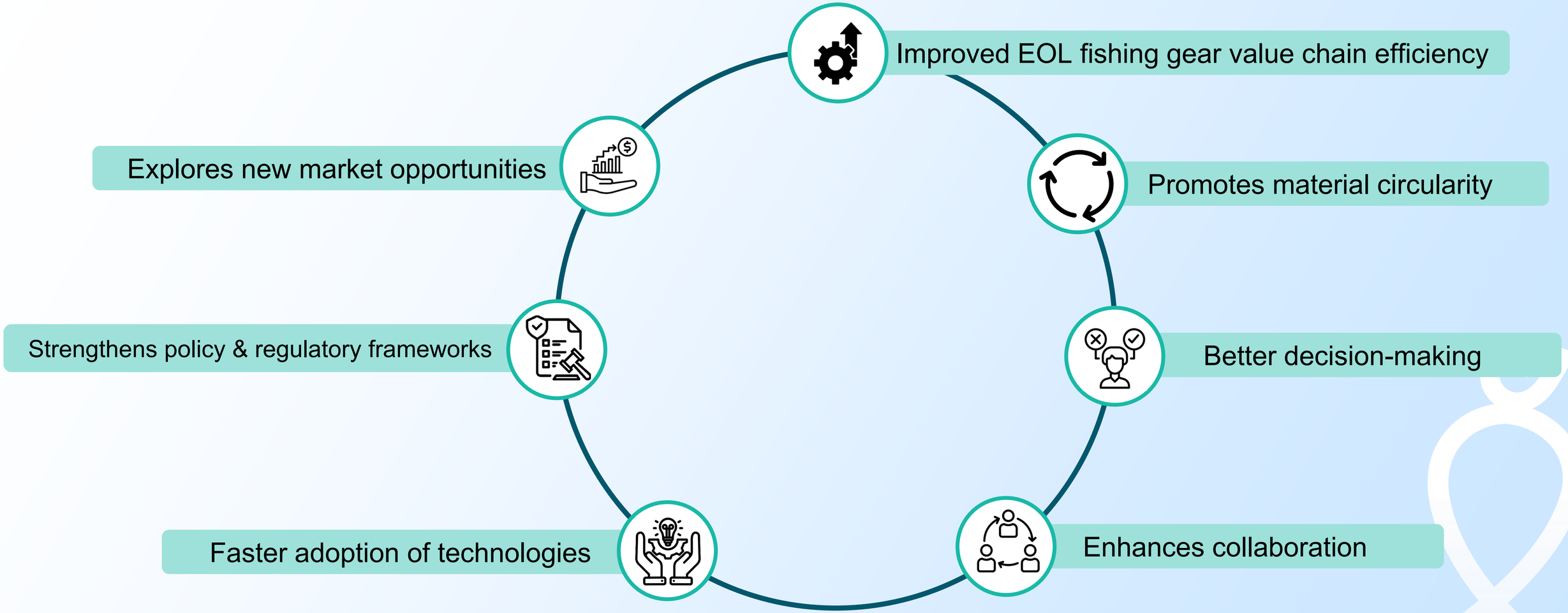
O.2.2: EOL Emerging Technologies model

BEST PRACTICE MODEL

Mobile shredding units

Stakeholder	Action	Action time-frame
Gear manufacturers	Collaborate with recyclers to test material compatibility with mobile units.	Medium-Long
Fishing/aquaculture industry	Participate in collection schemes led by waste management firms and Local authorities	Short-Medium
Harbour masters	Implement disposal protocols compatible with mobile shredders (segregation, pre-cleaning).	Short-Medium
Local authorities	Coordinate mobile shredder deployment at ports/harbours.	Short-Medium
NGOs	Raise awareness of EOL gear recycling and benefits of mobile shredders	Short-Medium
Recyclers	Integrate mobile shredders into recycling workflow for EOL gear (pre-processing).	Short-Medium
Waste management firms	Deploy mobile shredders in ports/collection hubs to reduce transport and downtime	Short-Medium
Policy makers	Provide subsidies/incentives to offset high capital and operational costs	Short-medium
Research institutions	Research how to optimize shredder technology for fishing gear (e.g., anti-wrap systems).	Medium–Long
Technology developers	Develop optimized shredder technology for fishing gear	Medium-Long
End consumers	Provide feedback that informs manufacturer design and recycling market demand	Medium–Long

What is the positive change of O.2.2?



Who will benefit from the positive change?

- Improved EOL fishing gear value chain efficiency
- Promotes material circularity
- Better decision-making
- Enhances collaboration
- Faster adoption of technologies
- Strengthens policy & regulatory frameworks
- Explores new market opportunities

TAKE HOME MESSAGE!

“While recycling EOL fishing gear seems challenging, opportunities are already out there. Progress depends on taking meaningful action at every scale”

THANK YOU!

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