PLASTIC CHALLENGE
Hackathon 2021

INNOVATION AND ENTREPRENEURSHIP FOR MARINE PLASTIC MANAGEMENT

Hanna Dijkstra

EU GREEN WEEK 2021 PARTNER EVENT

ZERO POLLUTION #EUGreenWeek
for healthier people and planet

IVM Institute for Environmental Studies

VU

CLAIM
CLEANING LITTER BY DEVELOPING & APPLYING INNOVATIVE METHODS IN EUROPEAN SEAS

Introduction

- The challenge of marine plastic pollution
- Solutions and innovations
- My research
- The CLAIM Project

- But first… a personal anecdote

Intr

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The challenge of marine plastic

- Marine plastic pollution is rising a global threat and **wicked problem**
- Plastic is a useful and **necessary material**
- However, society has become **too dependent** on plastic for **low value applications**
- Coupled with **low recovery and recycling rates** > plastic **leakage** into the environment
- Plastic in the environment can end up in rivers and **oceans**
- Plastic **harms sea life** and **affects ecosystem health** and functioning

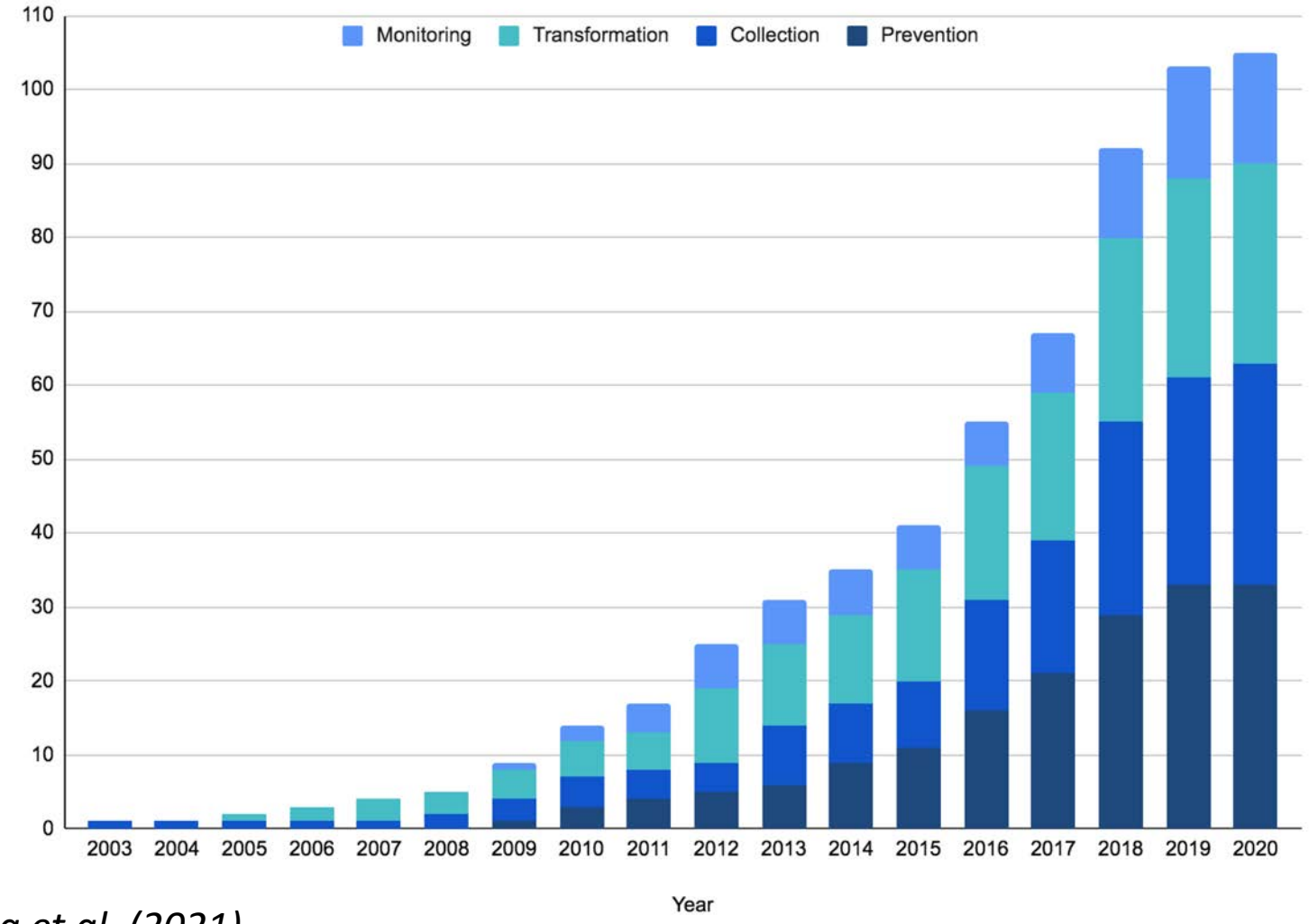
Borelle et al. (2020); Geyer et al. (2017); Landon-Lane (2018); Systemiq (2020)

Solutions for marine plastic management

- Technology, society, policy and business
- Start-ups and entrepreneurs at **the forefront of innovation**
- My research focuses on understanding **the business case for marine plastic management**, with an emphasis on entrepreneurship and innovation
- Marine plastic management is any intervention designed to minimize the damage of plastic material on the marine environment
- Led to the development of a Marine Plastic Management Start-up and SME database

Described in the article Dijkstra, H., van Beukering, P., Brouwer, R., 2021. In the business of dirty oceans: Overview of startups and entrepreneurs managing marine plastic. Marine Pollution Bulletin 162, 111880.

Marine plastic management startup database



105 companies

from 32 countries

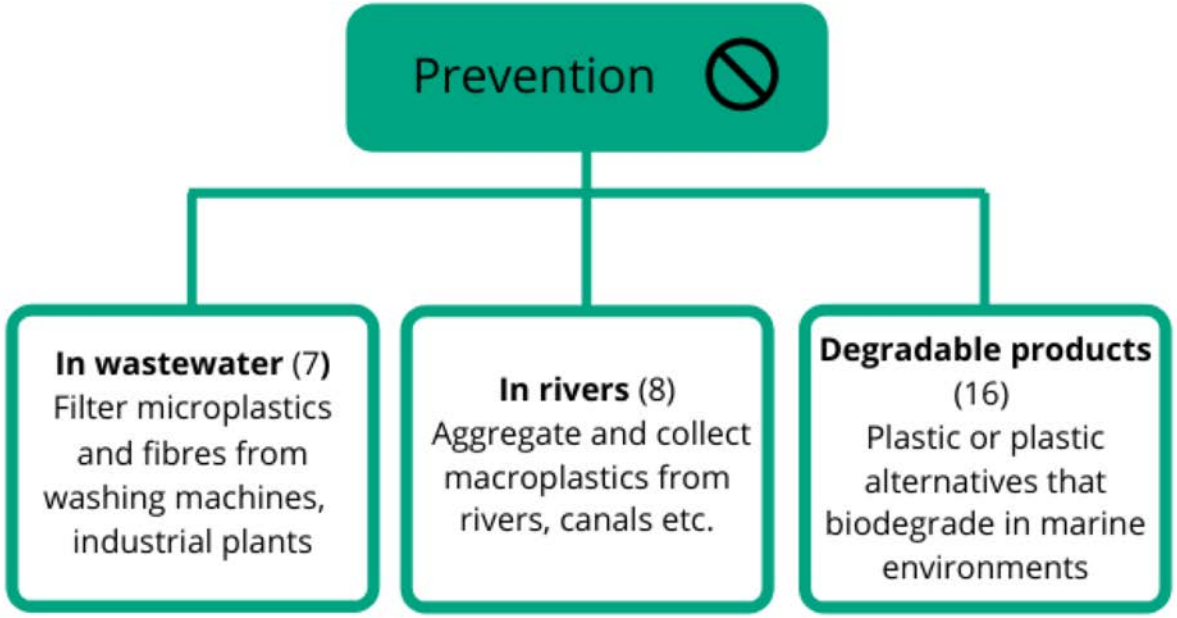
Dijkstra et al. (2021)

Marine plastic management functions

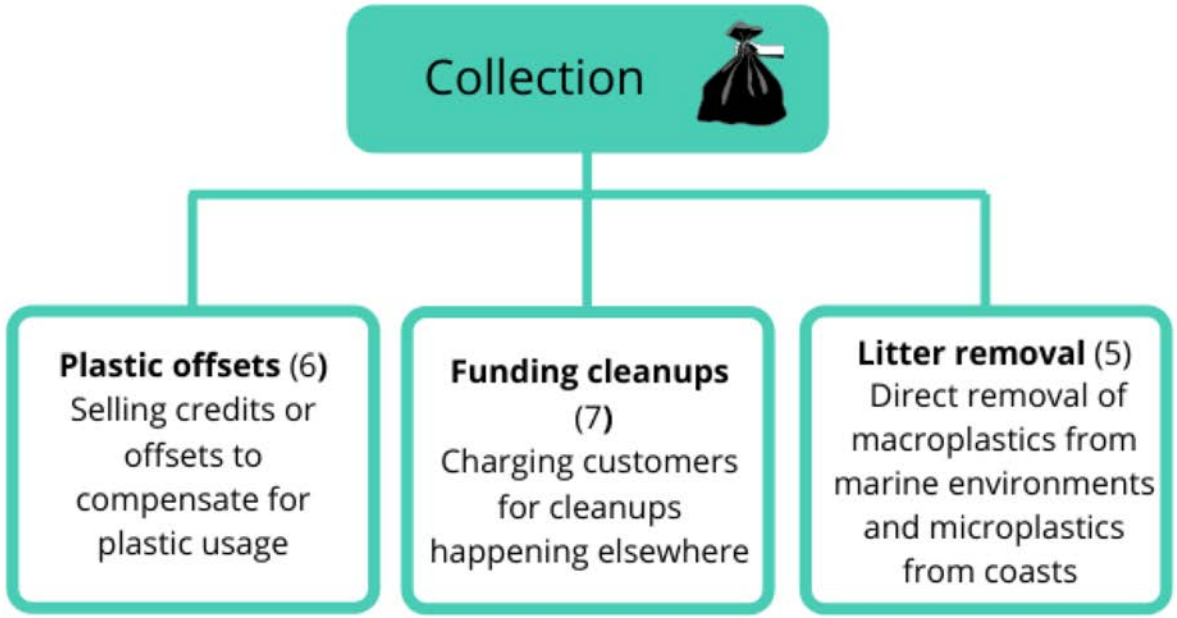
Category	Sub category	Sample size
1. **Prevention** at key leakage points (N=31)	Marine degradable products	16
	Prevention in rivers	8
	Prevention in waste water	7
	Prevention of primary microplastic sources	2
2. **Collection** from marine, beach and nearshore environments (N=30)	Marine litter removal	15
	Funding cleanups and waste management	7
	Plastic offsets	6
	Fishing nets and gear collection	2
3. **Transformation** of collected plastics into new products (N=27)	Fishing nets and gear recycling	11
	Specific polymer recycling	9
	Mixed marine plastic recycling	2
	Energy recovery	4
	Chemical recycling	1
4. **Monitoring** and knowledge development (N=15)	Monitoring services	6
	Phone applications	5
	Awareness, outreach and knowledge	4
	TOTAL	**105**

Dijkstra et al. (2021)

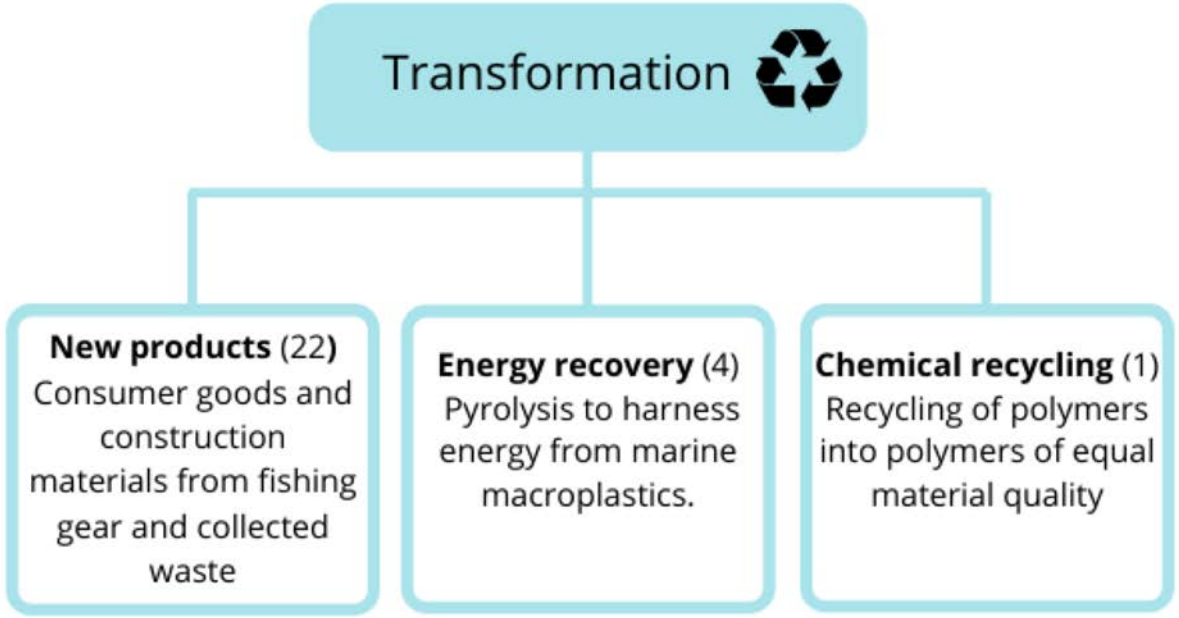
Prevention of ocean pollution at key leakage points



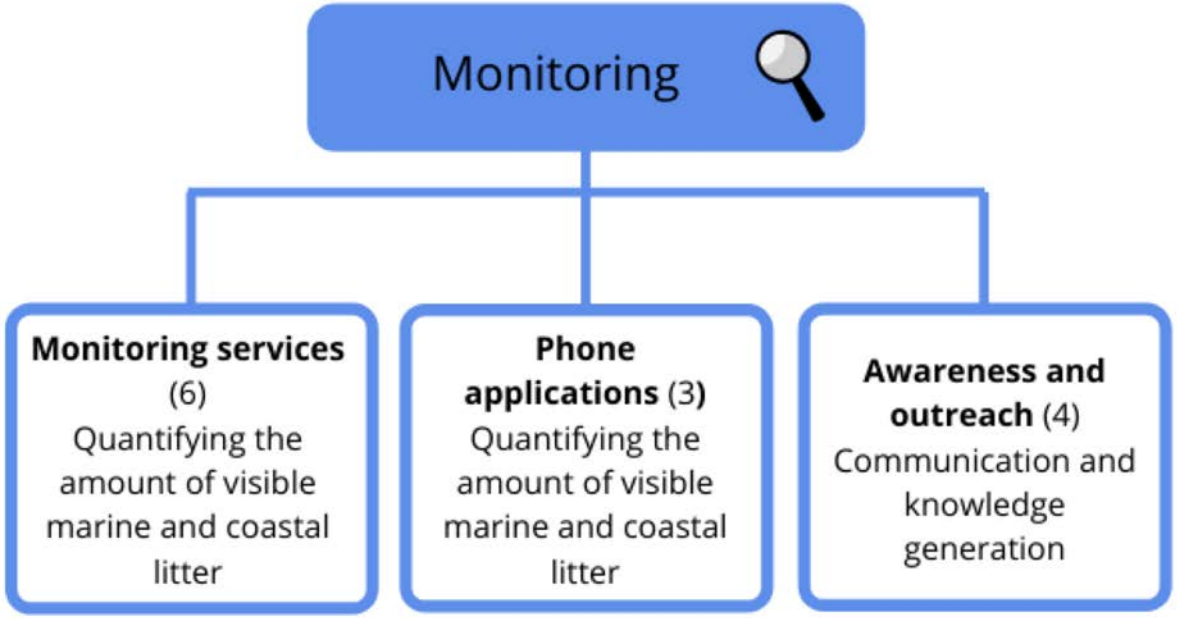
Collection from the environment



Transformation and recycling



Monitoring and knowledge development



Trends in the MPM industry

Notpla

1. Material innovation

- Developing new biodegradable or environmentally benign materials with the potential to disrupt plastics industry

- Demonstrating commercial viability of alternative materials

- Potential to impact agricultural and food socio-technical systems

Evoware

Marinatex

Trends in the MPM industry

2. Boosting infrastructures

- New technologies and processes to supplement and improve traditional waste management
- Potential for governments to adopt new processes and standards due to improved management options

EcoWorld Watamu

Planet Care

Trends in the MPM industry

3. Empowering individuals

- Engaging with citizens and users to participate in marine litter monitoring and management

- Awareness raising and education as part of the business model

- Can lead to policy change by building groundswell

Pirika

L.O.O.P

Trends in the MPM industry

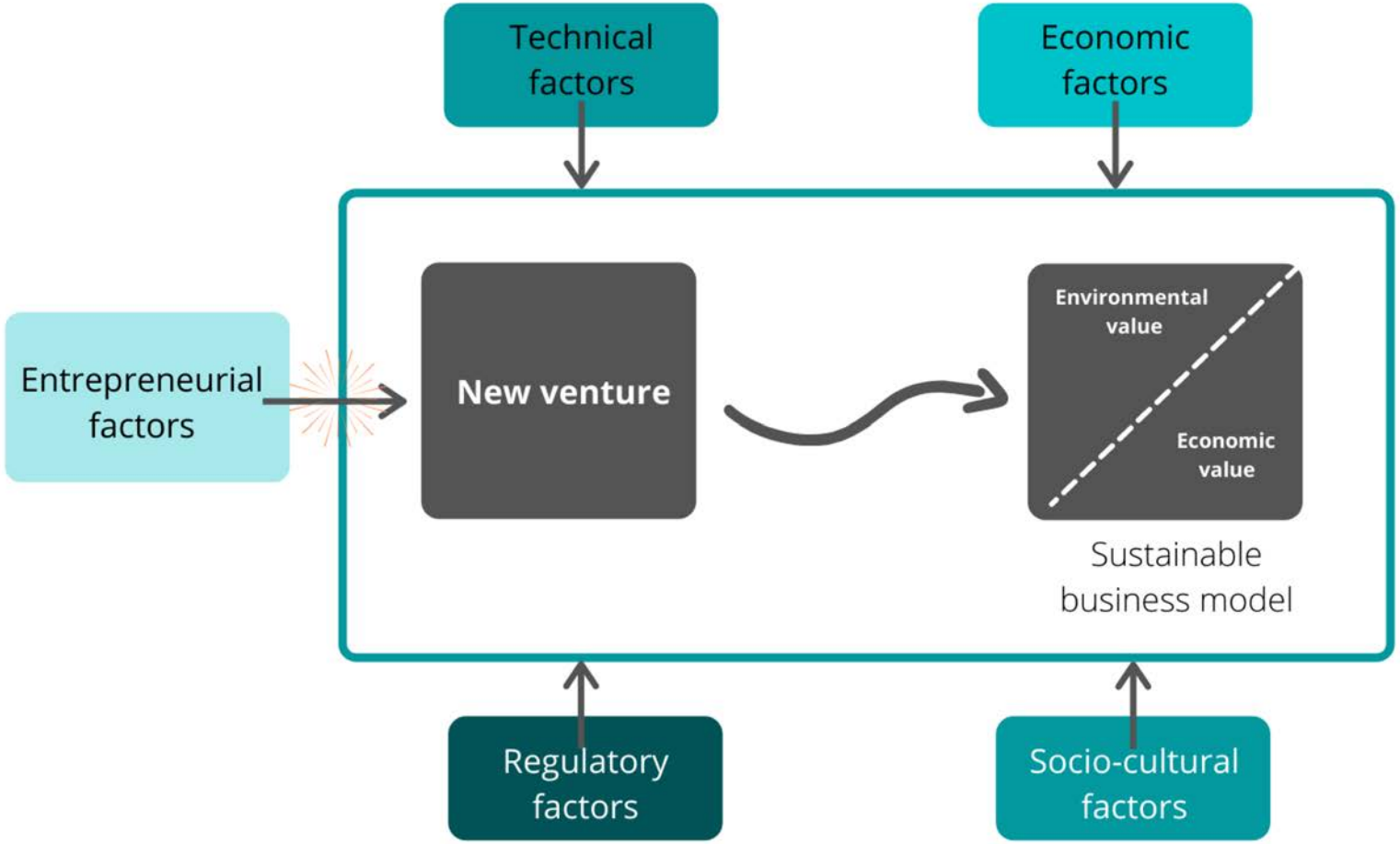
4. Strengthening value chains

- Multiplication of actors participating in recycled ocean plastic supply chains
  - Collectors, aggregators, processors, recyclers, brands
- Stability of the supply chain will make it more attractive for others to enter the market

BlueCycle

GreenSpot Upcycling

Factors influencing blue entrepreneurial journey



CLAIM – Cleaning Litter by Developing & Applying Inovative Methods in European Seas (2018 – 2022)

Developing technologies and tools focused on marine plastic management

- **Preventing –** Wastewater treatment and nanofiltration technology
- **Collecting –** River booms and harbour plastic collection
- **Transforming –** Pyrolysis of collected waste to provide energy for boats
- **Monitoring –** New transport models, Ferrybox passive monitoring

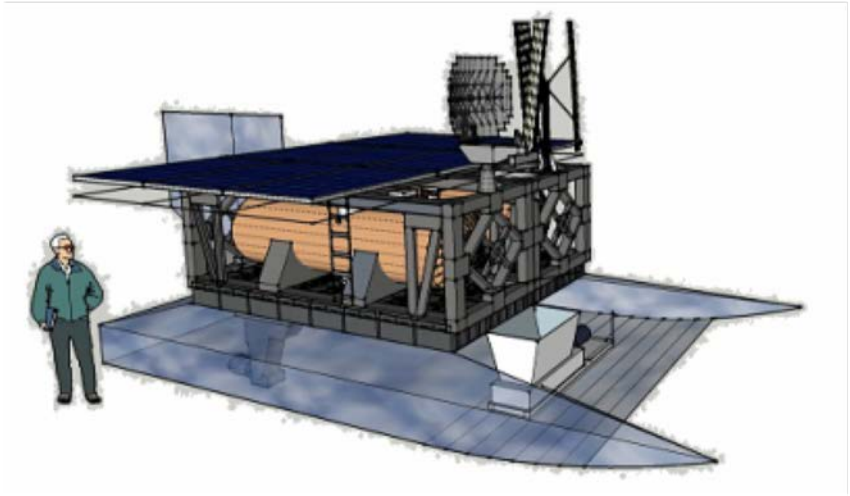
Paired with research, education and communication looking at ecosystem impacts and socio-economic feasibility.

https://www.claim-h2020project.eu/

Prevention

Collection

Transformation



Monitoring

R EVENT

ECONOMIC FEASIBILITY, SOCIAL ACCEPTANCE AND INSTITUTIONAL FRAMEWORK OF MARINE LITTER TECHNOLOGIES

CLAIM

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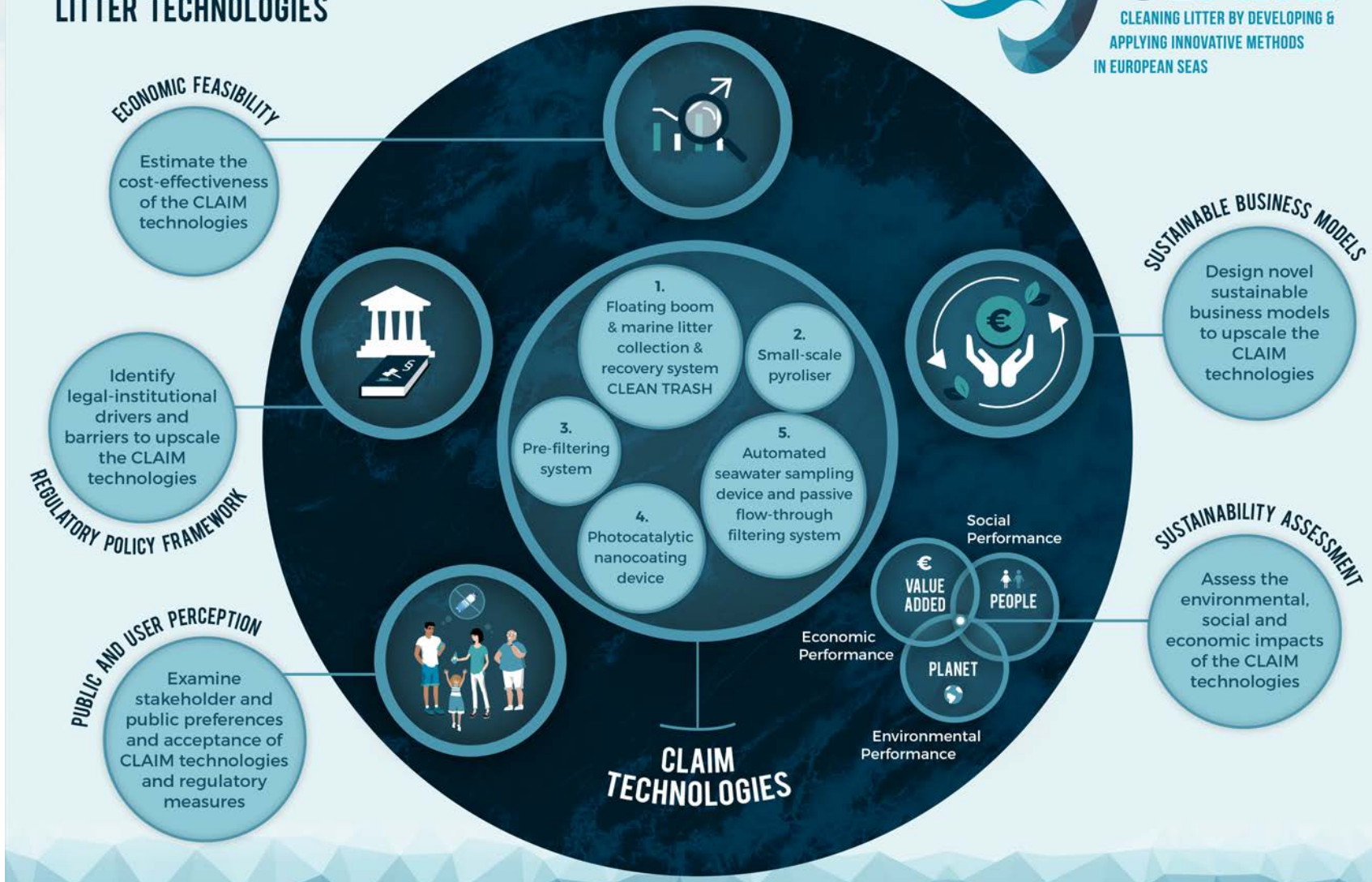

Questions?

https://www.claim-h2020project.eu/

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References and resources

https://www.claim-h2020project.eu/

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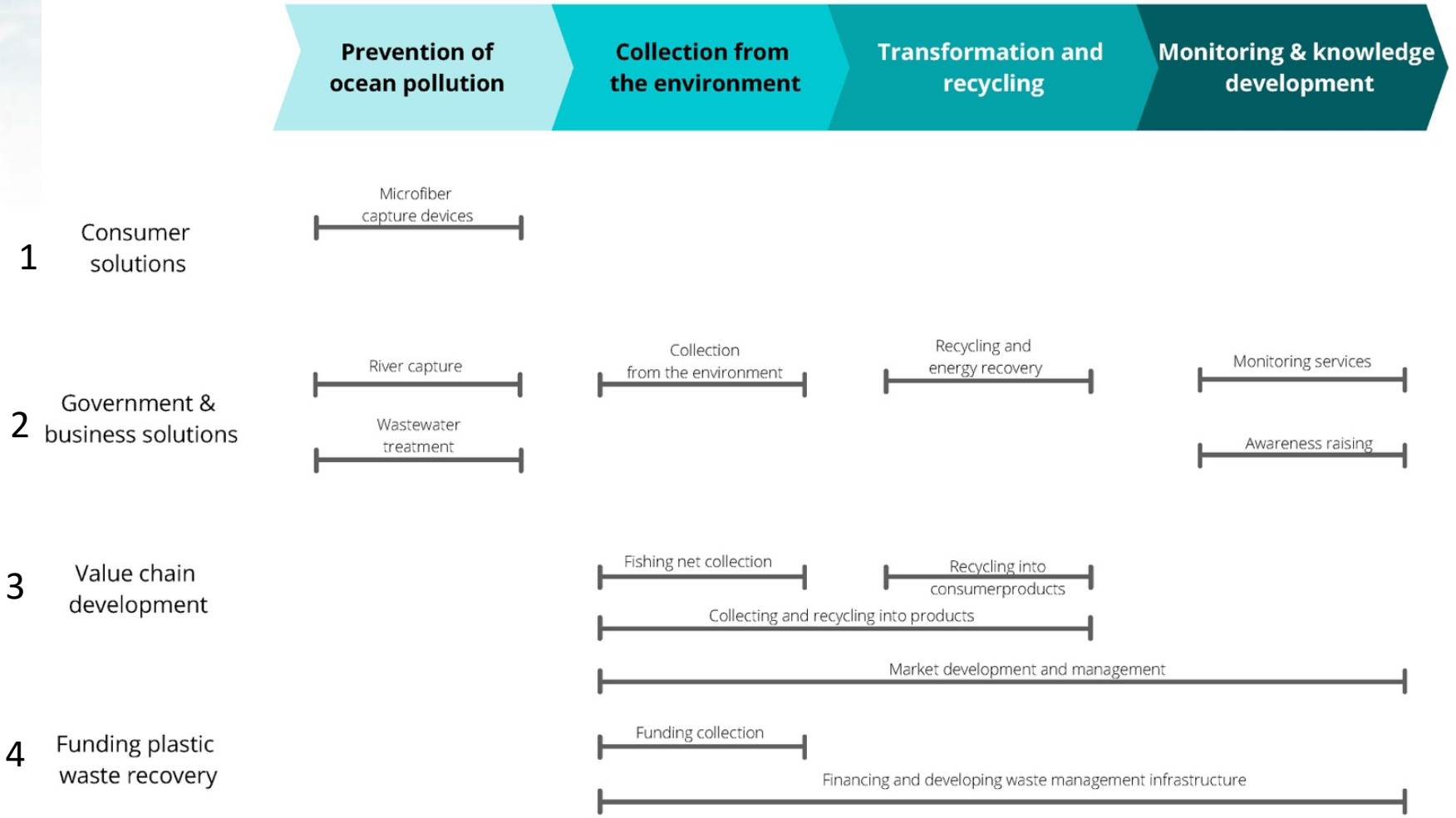
The blue entrepreneur

- **Blue entrepreneurship :** the process of creating a new, economically viable business model by catering to marine environmental challenges, and thus supporting the Blue Economy

- **Blue Economy**
  - Conservation and utilization of ocean resources
  - Economic and environmental value of the ocean

- The blue entrepreneurial journey

Entrepreneurial opportunities and business models



Drivers

	Entrepreneurial drivers	Technical drivers	Economic & market drivers	Institutional & regulatory drivers	Socio-cultural drivers
All cases	- Intrinsic motivation - Dedication to sustainability - Flexibility and innovativeness - Exploiting a gap in the market		- Financing and capital - Pioneer advantage	- Government support	- Public awareness and outcry about marine plastic pollution

Barriers

	Entrepreneurial barriers	Technical barriers	Economic & market barriers	Institutional & regulatory barriers	Socio-cultural barriers
All cases	- Limited business experience - HR and attracting talent		- Competition from cheaper, unsustainable producers or ineffective solutions	- Slow government response - Lack of standardization	- Hype leading to media competition