



# The Future of Valueless Textile Waste

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**Valueless Textile Waste is  
Non-rewearable & least profitable**

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# The Problem

- On average, 100 billion garments are produced every year. That is 14 pieces of clothing for every person on Earth!
- Less than 1% of clothing materials are recycled into new textiles and fibres even though most of the materials can be recycled.
- 1 rubbish truck of clothing (2,625kg) is burnt or landfilled every second as low-quality garments are often discarded after 7 to 8 wears.



Working towards a solution...



Wants “to raise awareness of the urgency for a solution for non-reusable used textiles and to start acting and trying out potential solutions”



# “How to implement a circular solution in the textile industry to reduce valueless textile waste in Rotterdam in which chemical recycling is used?”



## TEXTILE WASTE

"Quality & quantity of valueless textile waste in the Rotterdam area."

Visiting 4 different sorters  
Inventories different streams  
DATA-base



## CHEMICAL RECYCLERS

"Top 3 chemical recyclers"

Contacting recyclers  
4 interviews & desk research



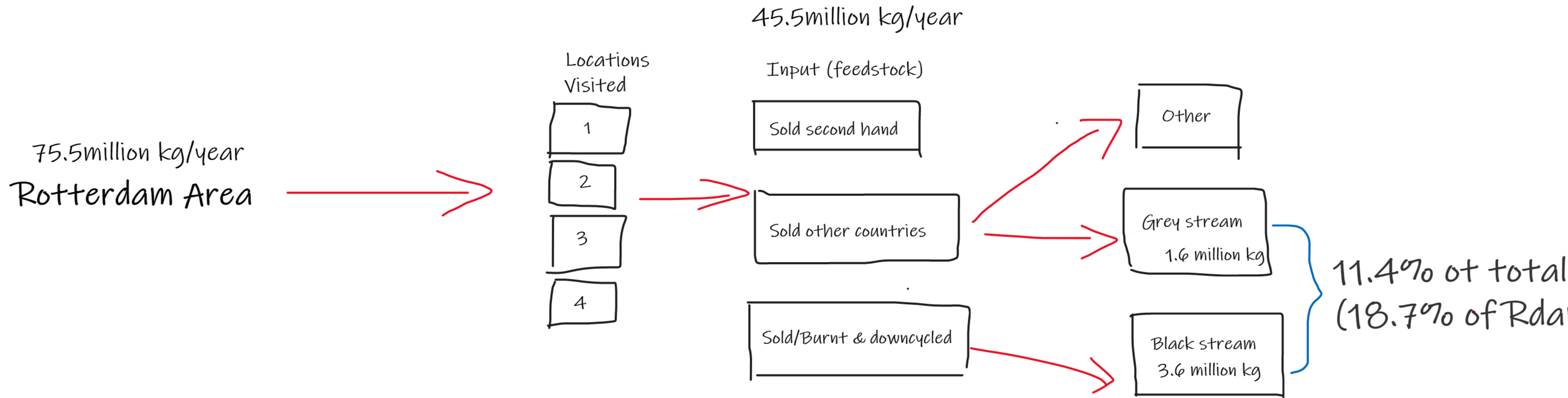
## MARKET POTENTIAL

"Market potential for establishing manufactures in the Netherlands"

Desk-research  
Contacting experts

# 1. Valueless Textile Waste

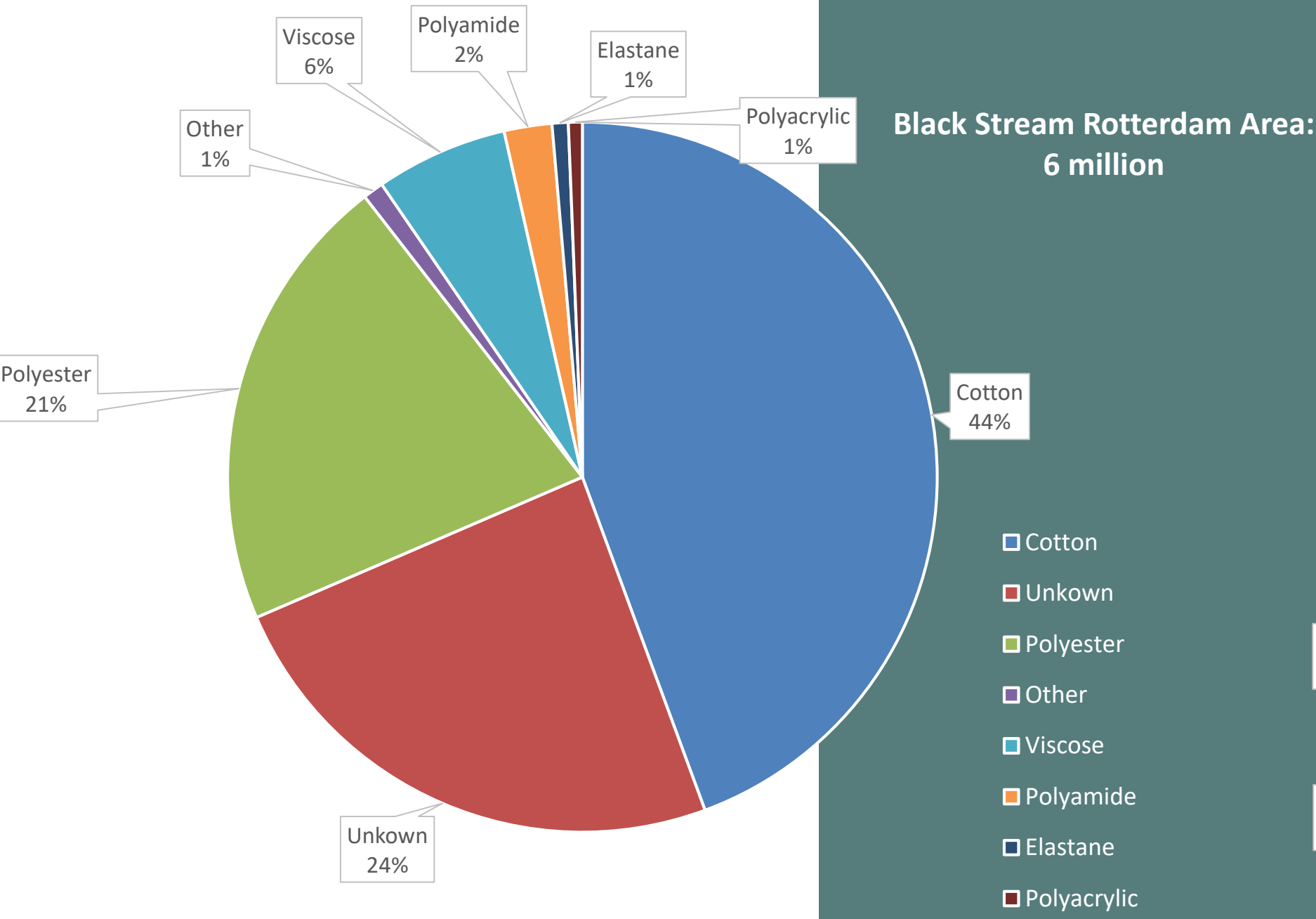
## Discarded textiles



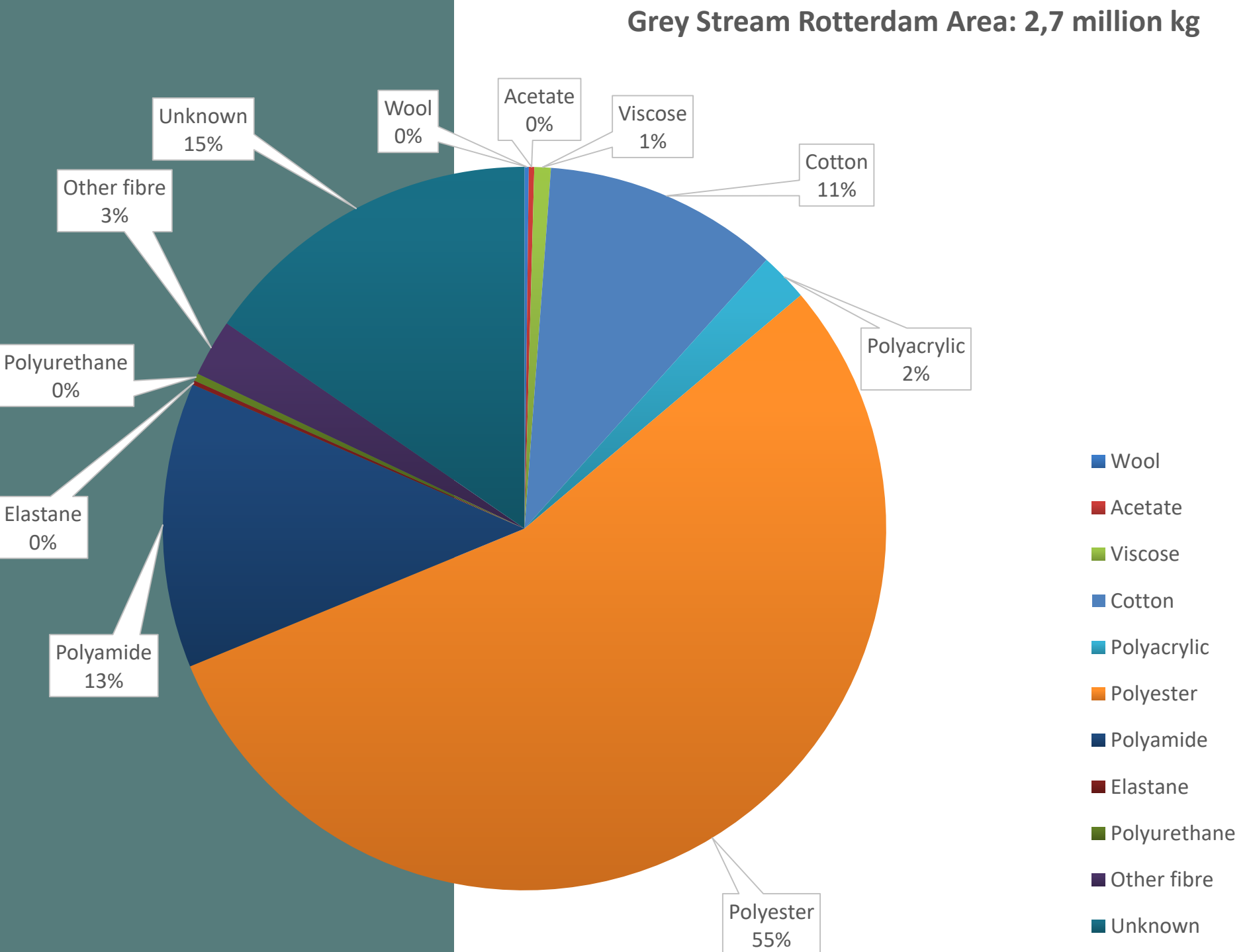
Black stream: consist of discarded textiles that are downcycled and are the most expensive for the sorters and collectors .

Grey stream: is sold, but it is hard to, and with an unknown fate. This is the "future black stream" as the amount of discarded textiles is estimated to grow by 79%.

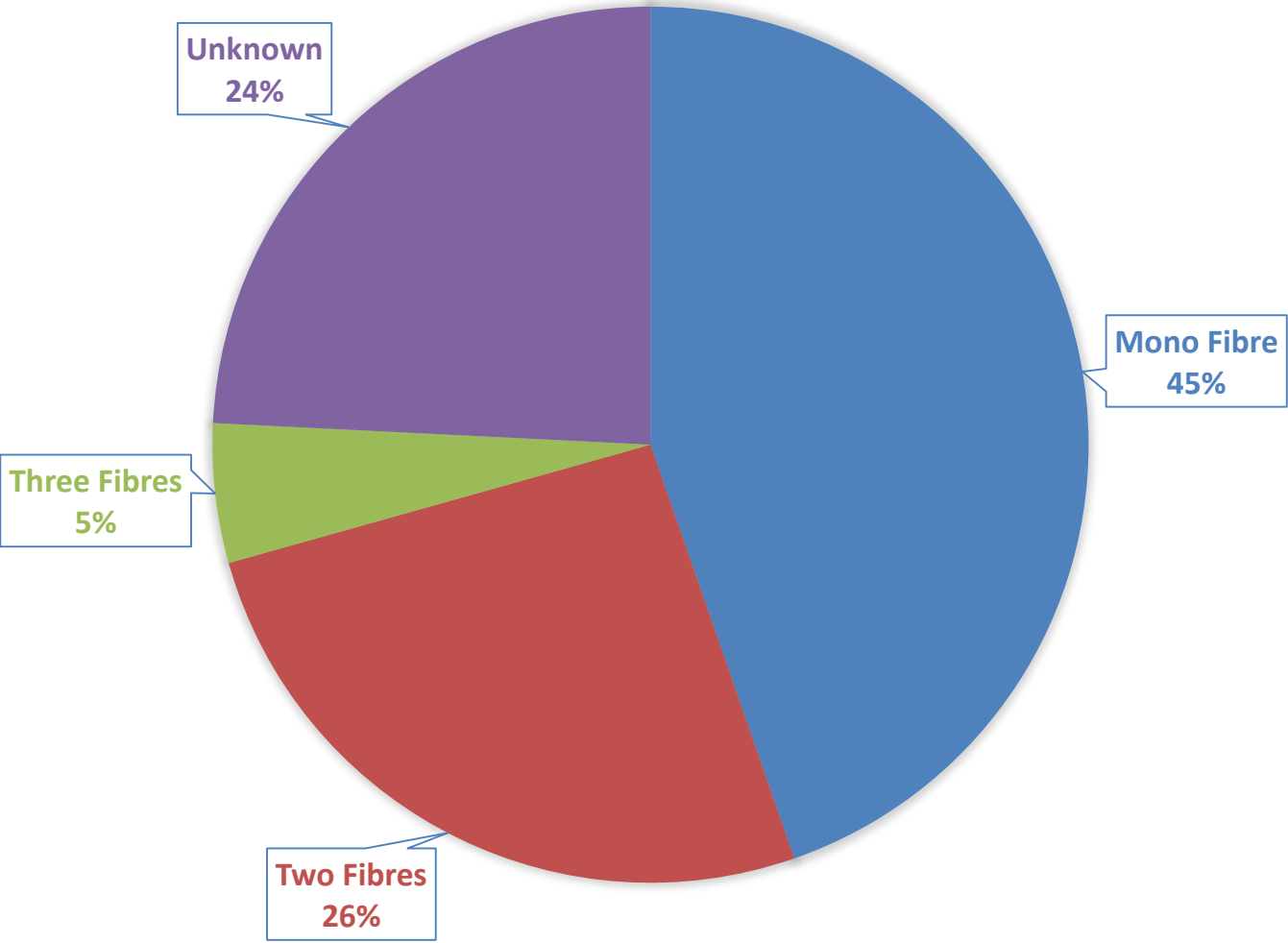
# Black Stream



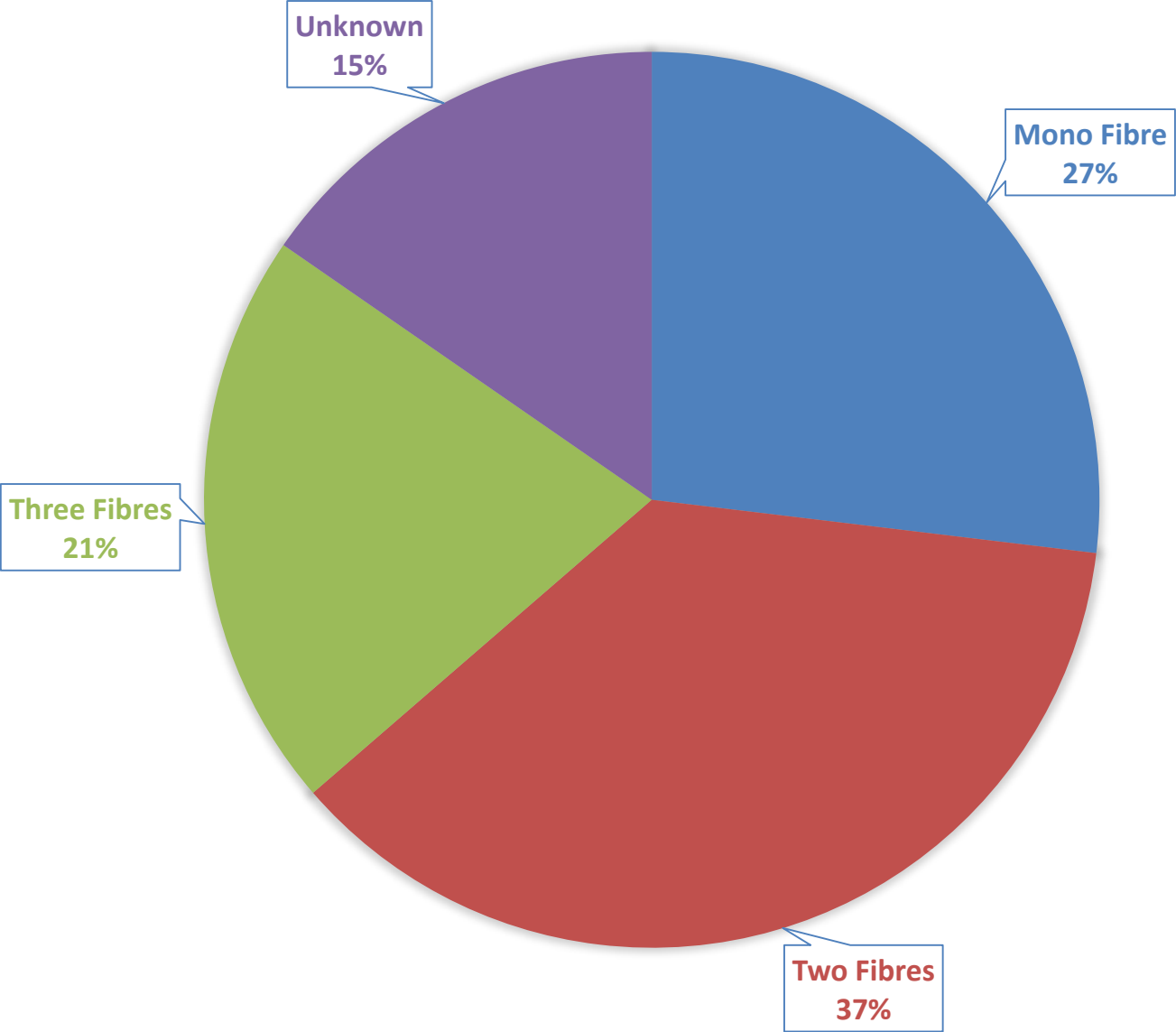
# Grey stream



BLACK STREAM BLENDS

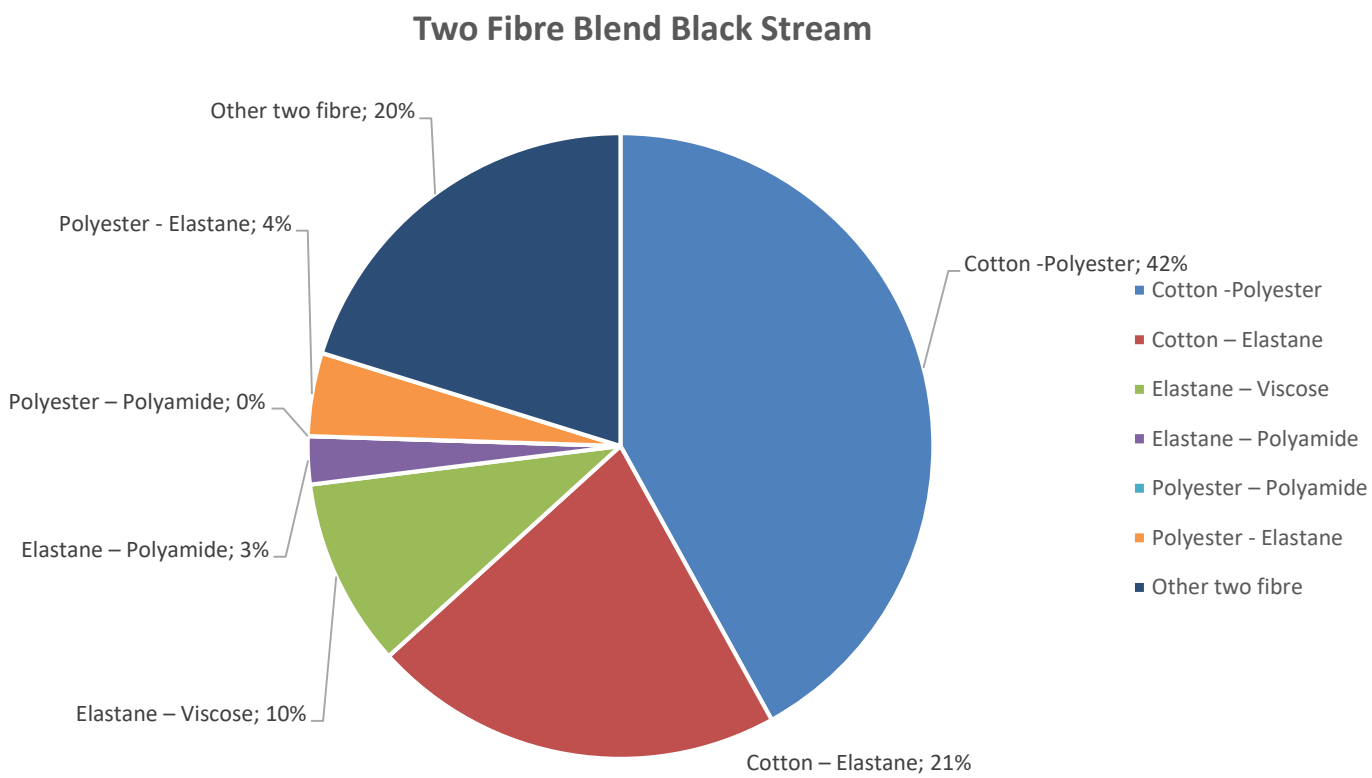
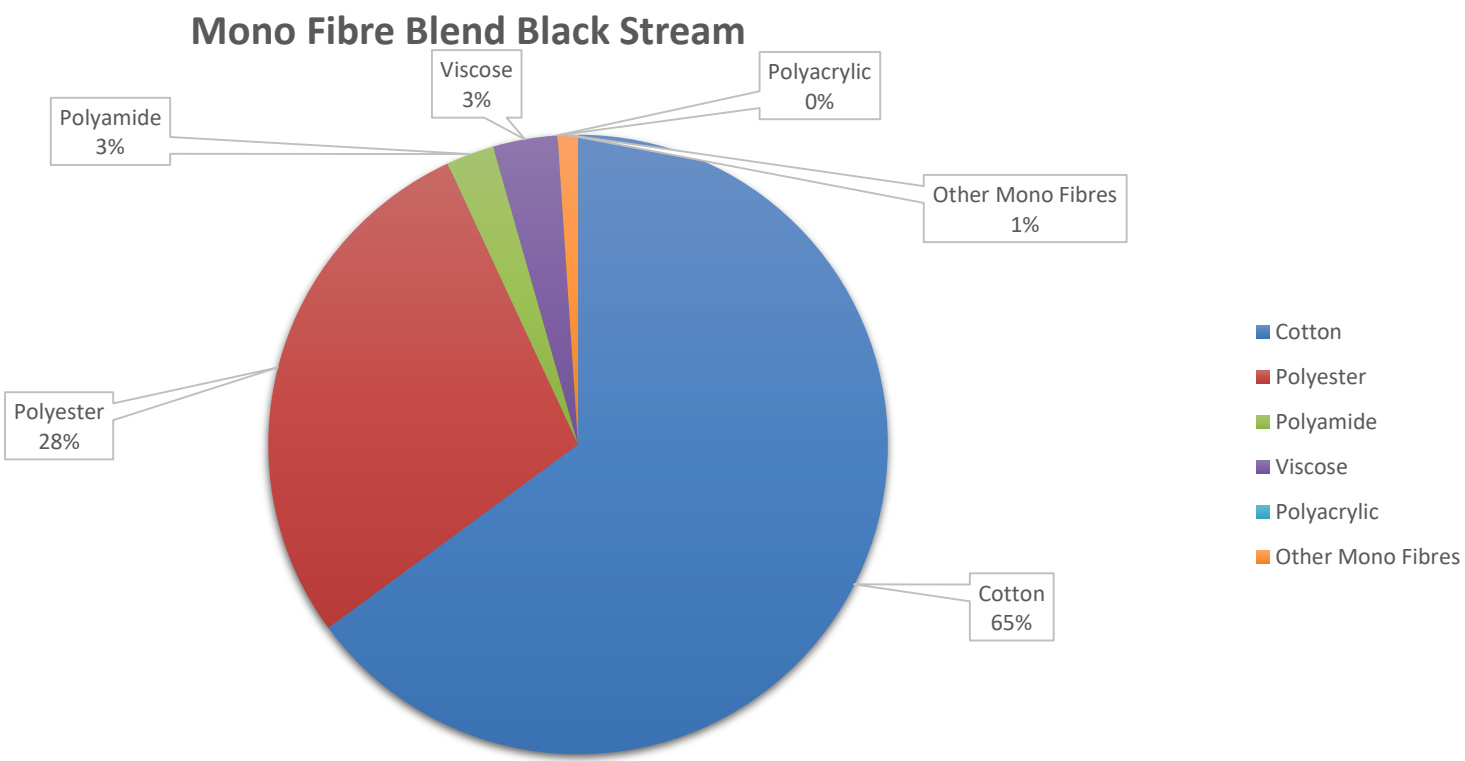


GREY STREAM BLENDS

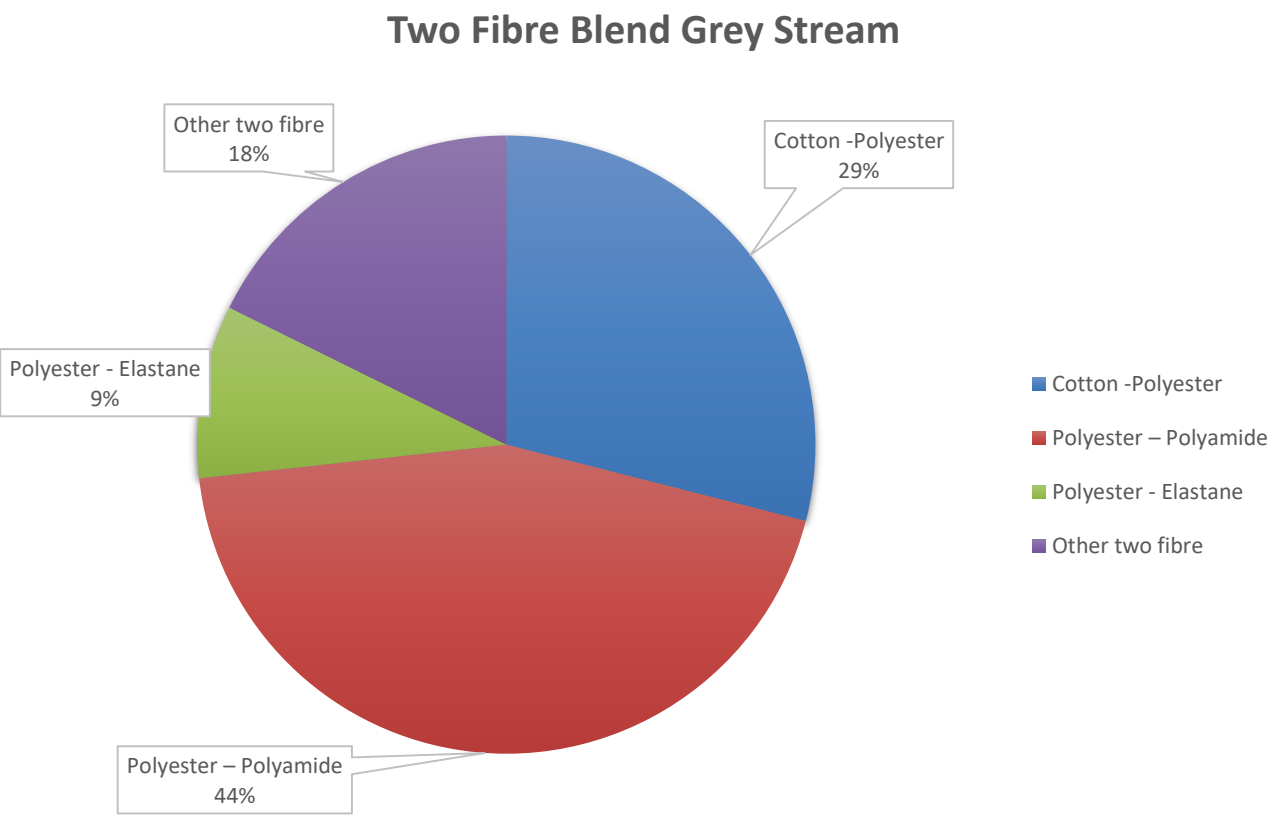
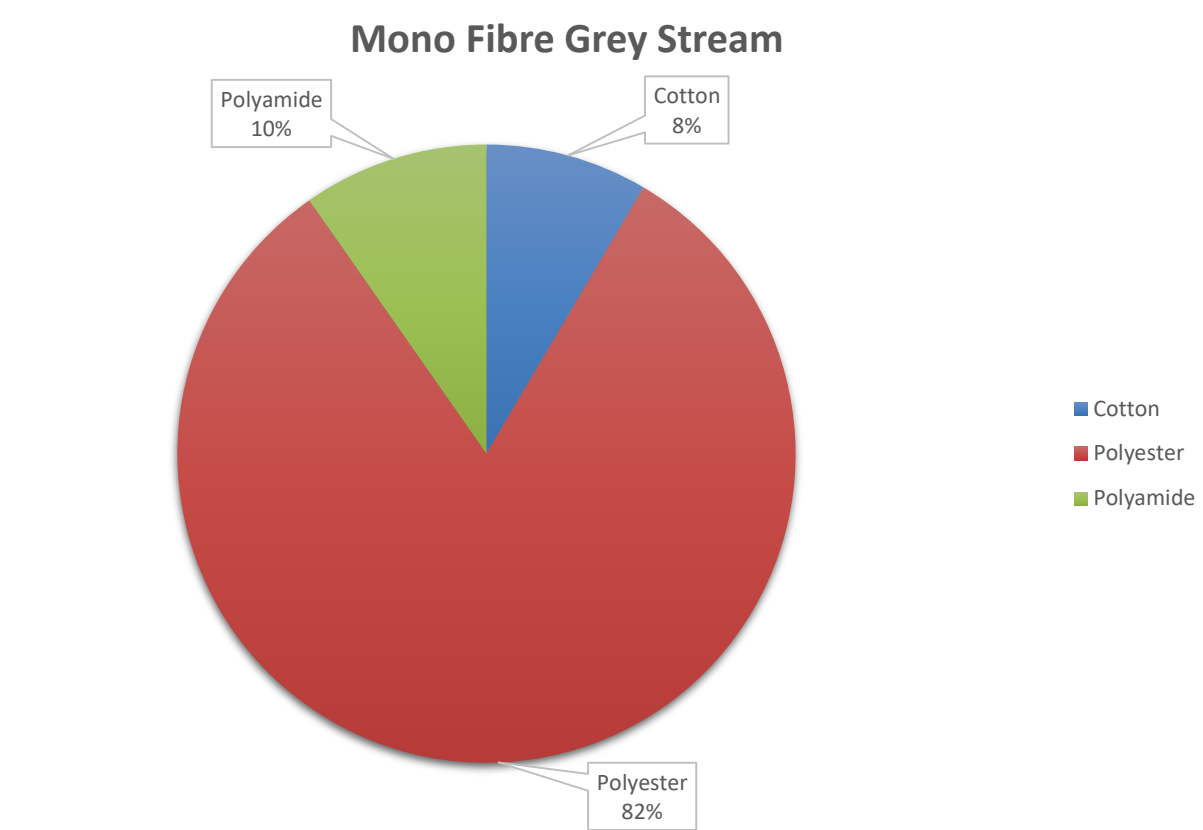




# Black Stream Blends



# Grey stream Blends







## Chemical recyclers

*1. Ioniqa*

*2. Ambercycle*

*3. Worn Again Technologies*



# Outcomes

Based on quality, TRL, capacity, financial feasibility



Recyclers	Ioniqa	Ambercycle	Worn Again	Circ	OnceMore
Input	Polycotton blends	Polyester blends	Polycotton blends	Polycotton blends	Polycotton blends
Output	PET monomers	Yarn	Cellulosic pulp + PET resin	Cellulosic pulp + PET monomers	Cellulosic pulp
TRL Technical	Validation	Validation	Prototype	Prototype	Validation
Capacity	Pre-commercial scale	Pre-commercial scale	Testing scale	Pre-commercial scale	Pre-commercial scale
Financial	Sales PET plastic Investors	Sales yarn Investors	Investors	Pilot programs + joint development work	Södra
Business/revenue	Leasing technology	Selling yarn	Leasing technology	Unknown	Unknown



# Market

Objective: To research the market potential for recycled yarn in the Netherlands.

## PESTLE Analysis

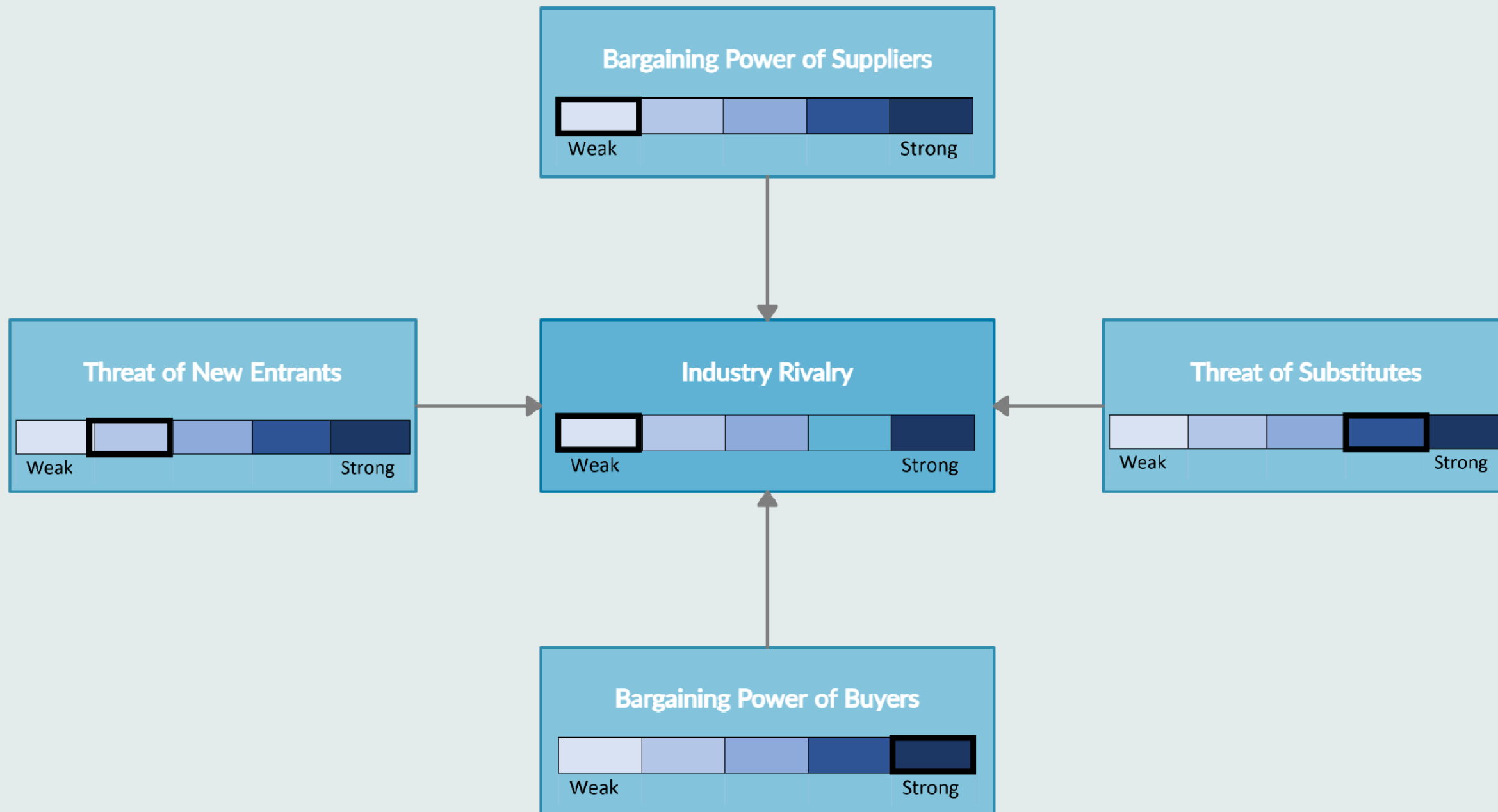
- Political
  - Subsidies
  - Versnellingshuis
  - Budgets: Dutch Government and Horizon 2020
- Economic
  - Producer and Consumer Confidence
- Social
  - Consumer Trends
  - Labour Force
- Legal
  - Permits
- Environmental
  - Laws
  - SDG Goals



**TRENDS**



# Porter's Five Forces



- **Bargaining Power of Suppliers**
  - Many suppliers with much waste
- **Bargaining Power of Buyers**
  - Yarn Manufacturers
  - Textile Manufacturers
  - Clothing Manufacturers
- **Threat of Substitutes**
  - Virgin Materials
  - Mechanically Recycled Materials
- **Threat of New Entrants**
  - Many permits, still under development
- **Intensity of Competitive Rivalry**
  - Few competitors



# Conclusion



# Discussion

## Limitations due to the pandemic

- Unable to do more field research
- Less interviews and contact with all the future parties involved
- Communication and research fully online

## Next steps

- Expanding sample (textile waste)
- Research Asia and Sweden
- Action plan



## Q&A

**“WE'RE SAYING  
GOODBYE TO FASHION  
LINES AND HELLO TO  
FASHION CIRCLES**

- CIRC.

“

Waste isn't  
waste until we  
waste it

PROJECT TEAM