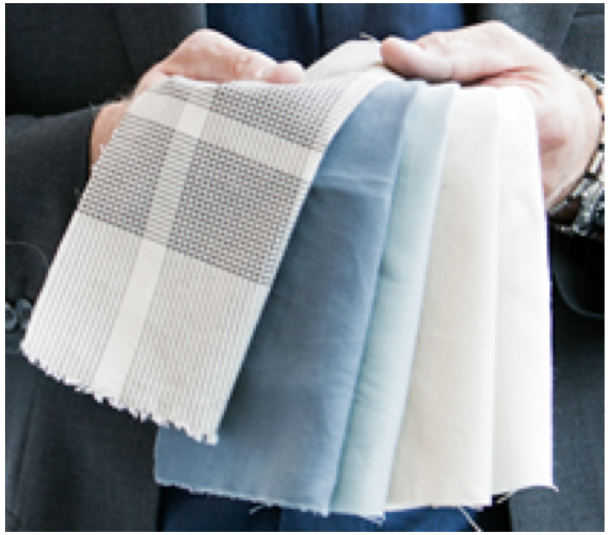

SaXcell®....

April 19th, 2018

ECAP

Ger Brinks and Gerrit Bouwhuis

Why

Growth population: + 28% in 2050

Increased prosperity: + 95% in 2050 (av. 2%)

Cotton production: stable +/- 25 mio ton

- Waterconsumption
- Pesticides and fertilizers

Geregenerated cellulose fibers: capacity increase: 50% last 10 year

- Increased collection
- Conventional raw material: woodpulp

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Approach

Government: increase collection

Retail: collection in store: we are green

Collectioners:

- Average quality decreases
- Too much not usable: cost of destruction (burning) in NL: €230/ton (LAP3)

This leads to suboptimization and causes a deficit

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Solution

Collectioners/municipalities/government

Sorters/Fiberizing companies

Mechanical recycling

Chemical recycling

take initiative, collaborate, be innovative

Make money

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Example: SaXcell®

History

Where are we now

What to do

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The SaXcell-process, an economic and sustainable process to:

- Transfer domestic and industrial waste in high quality regenerated cellulose fibers
- Large scale transfer from waste to valuable raw materials
- Produce a cellulose fiber (SaXcell) with outstanding properties compared to existing products

Status

Phase A: 2011 - 2017

- Proof of principle
- 2015: GIDRD, SAC/New York
- 2017: A+A fair
- Budget: € 700k

Phase B: 2018

- Design demonstration plant (pulping and fiberproduction)
- 5 ton fibers
- Economic/commercial validation
- Budget: € 1 mln

Phase C: 2019

- Implementation of Plan B with partners
- Scale: 10.000 ton/y

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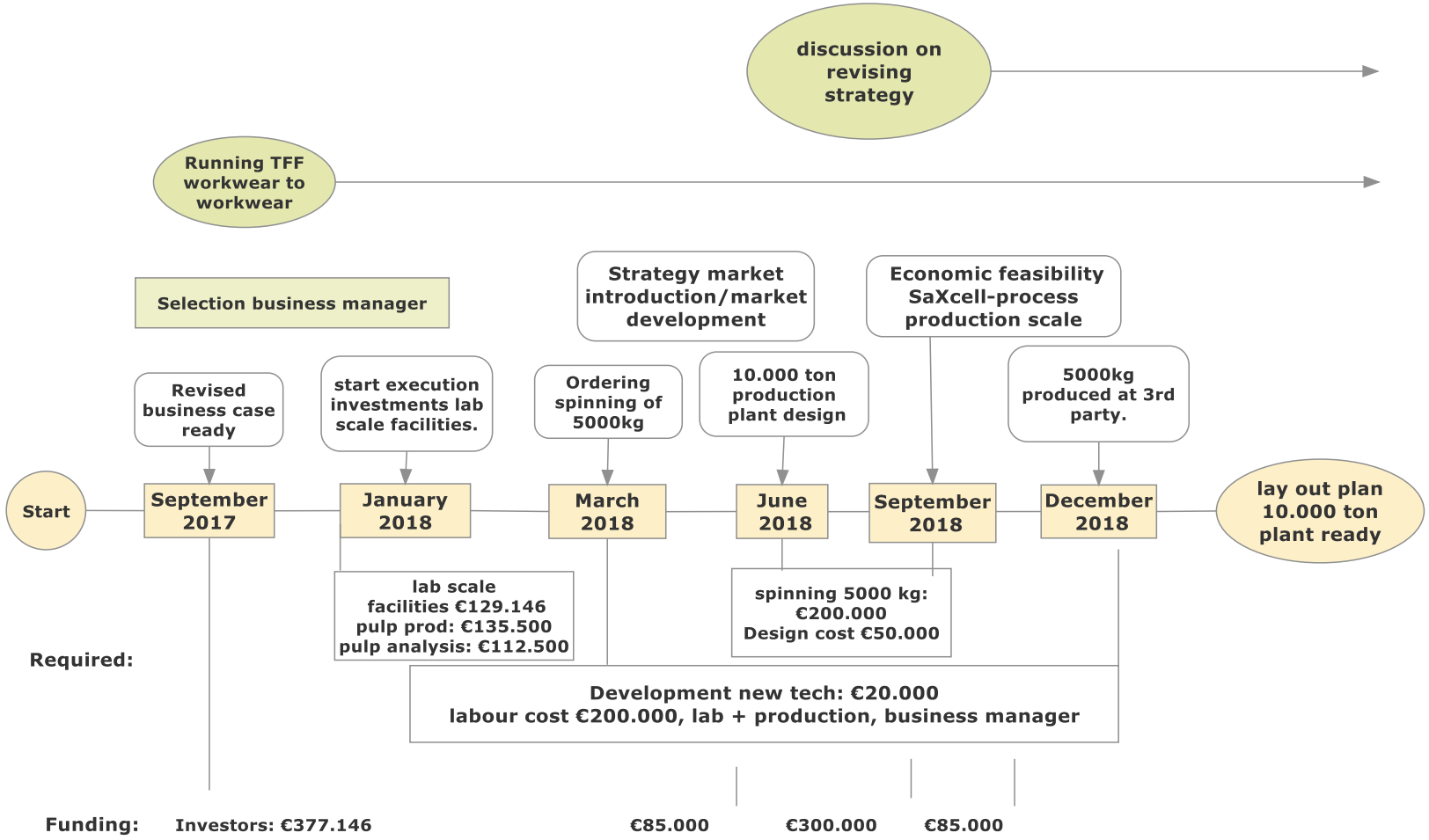
discussion on revising strategy
Running TFF workwear to workwear
Selection business manager
Strategy market introduction/market development
Economic feasibility SaXcell-process production scale
Revised business case ready
start execution investments lab scale facilities.
Ordering spinning of 5000kg
10.000 ton production plant design
5000kg produced at 3rd party.
Start
September 2017
January 2018
March 2018
June 2018
September 2018
December 2018
lay out plan 10.000 ton plant ready
lab scale facilities €129.146
pulp prod: €135.500
pulp analysis: €112.500
spinning 5000 kg: €200.000
Design cost €50.000
Required:
Development new tech: €20.000
labour cost €200.000, lab + production, business manager
Funding:
Investors: €377.146
€85.000
€300.000
€85.000

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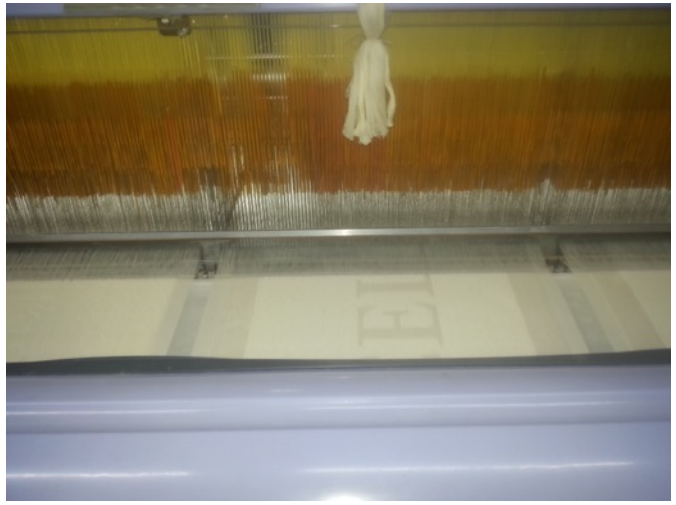
Valorisation



- Valorisatie
  - **Licencing** of process knowledge (the SaXcell-process) from waste to valuable fiber
  - Brand **SaXcell®**
  - Partner/shareholder in **demonstration-plant**
    - Dutch consortium (Havep, Lavans, Frankenhuis (Wadinko))
    - Turkish consortium (Wevotex, Ugurlular, Selim)

Concurrentie overzicht

	Advantages / issues	Disadvantages / issues
Mechanical recycling	fast / low costs / positive LCA	low efficiency /quality / limited applicability
Chemical recycling		
Lenzing	formidable competitor / benchmark fiber (Tencell® / huge capital / core fiber technology	limited % waste in fiber / Fiber properties lag behind SaXcell in many aspects
Re:Newcell	found Investors / PR	complex process / industrial waste only (light colors, 98% cotton) / no textile background
VTT (Infinity)	extensive pulping experience / PR / pilot plant available	outdated (carbamate) process / LCA / insufficient fiber properties / longer time to market
Wornagain	focus on PET and blends / PR	little technological background / unknown fiber process
Deakin University	new ionic liquid technology	requires major investments / longer time to market
Evrnu	Focus on denim / PR	little technological background / unknown fiber process

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Fiber	Strength dry	Strength wet	Elongation dry	Dying efficiency	LCA
Cotton	100% (22 cN/tex)	100% (27 cN/tex)	100% (8%)	100%	100%
Viscose	**±**	**-**	**+**	**+**	**±**
Carbamate	**-**	**-**	**+**	**+**	**±**
Tencel®	**+**	**±**	**+**	**+**	**+**
SaXcell®	**++**	**+**	**+**	**++**	**++**

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Quotes

- Ugurlular/Turkey
  - ”Unexpected wonderful fiber”
  - “Softer than cotton”
  - Yarn has “1.2 times higher strength” than cotton
- Rieter (CH):
  - “Feels like combed cotton”
  - “Better processible than similar fibers”
- TITK (D):
  - “Game changer”

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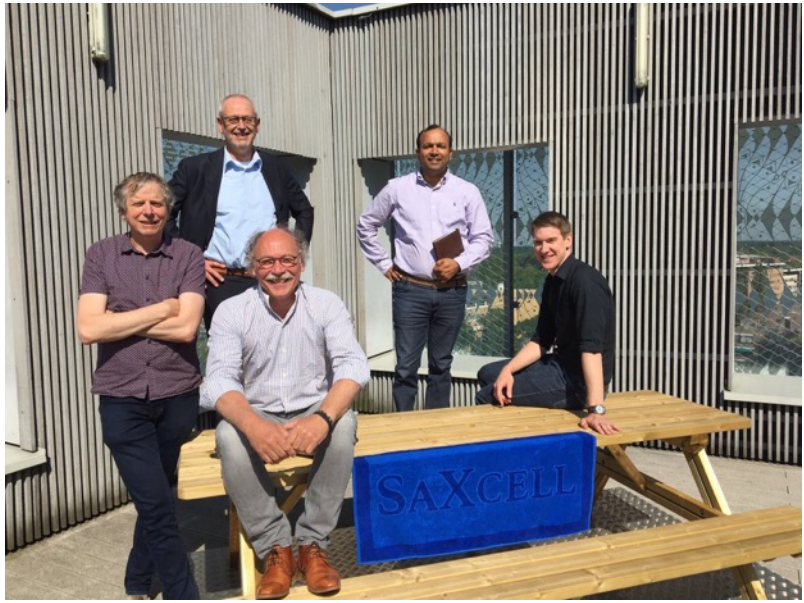
The SaXcell-team



- Dr. Ing. Gerrit Bouwhuis, textile technology
- Ir. Ger Brinks, polymer chemistry and Professor at Saxion
- Dr. Pramod Agrawal, enzyme technology
- Dr. Jens Oelerich, organic chemistry
- Dr. ir. Henk Gooijer, process technology and textielchemistry

Why SaXcell®?

- From waste to valuable textile fiber
- Unique
- Sustainable
- Economic viable
- The SaXcell-team
- Response and involvement from (end-)users
- The brand SaXcell®

Why investing in SaXcell®?

- Expected good return
- Matches perfect with circular ambitions
- Governemental effort to make textile industry greener
- East Netherlands: impressive know how in textile processing and innovations

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