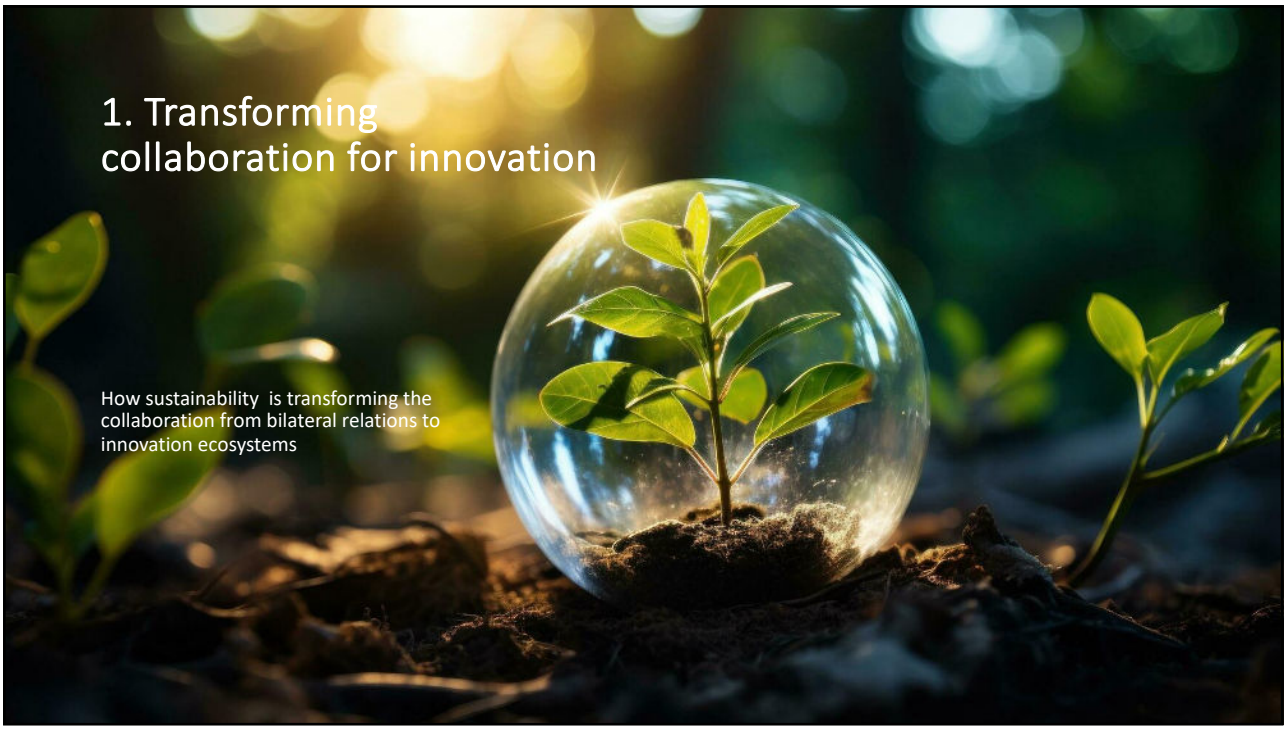
1

"Some of the most important future innovations will not come from new technologies but from new forms of collaboration"

Thomas Malone, MIT, 2015

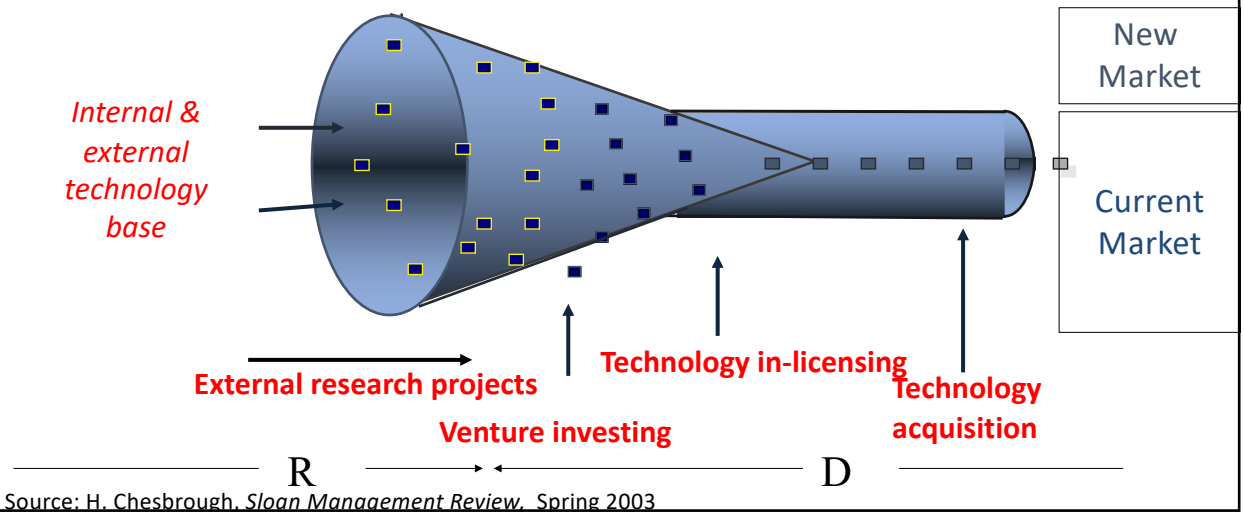
… this is even more significant in the context of digitalization and firms' transition towards a more sustainable economy

2



3

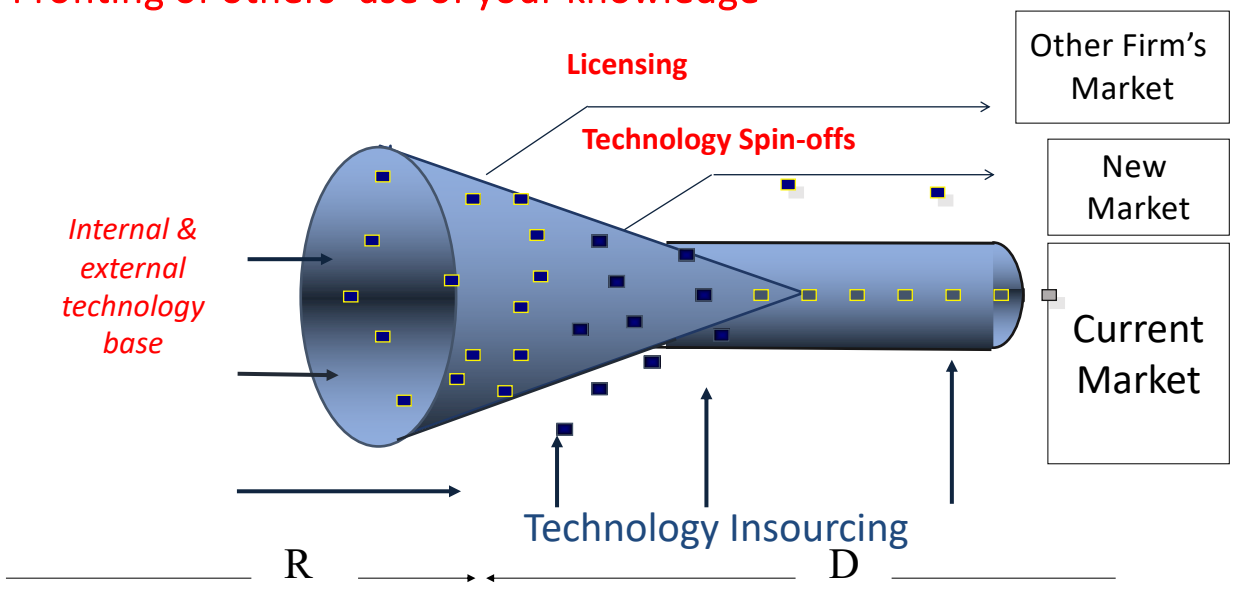
Outside in:
Filling the gaps with external technology



Source: H. Chesbrough, *Sloan Management Review*, Spring 2003

4

Inside out:
Profiting of others' use of your knowledge



Source: H. Chesbrough, *Sloan Management Review,* Spring 2003

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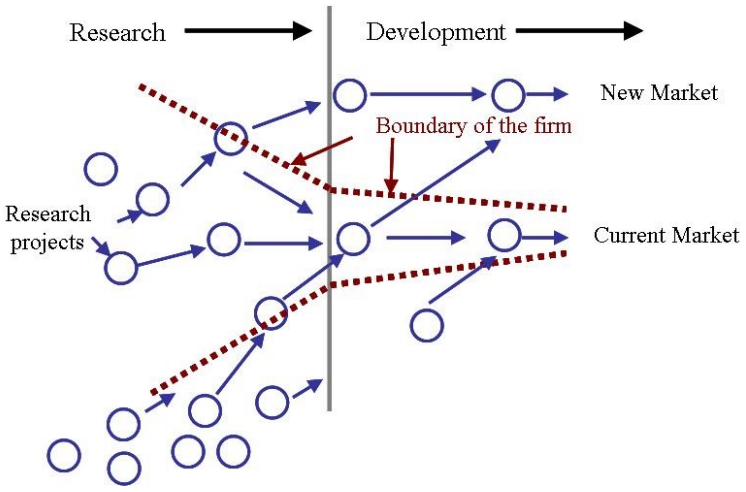
6

- KLM Royal Dutch Airlines, the North Sea Group and Spring Associates joined forces and founded ***SkyNRG*** in Nov 2009.
- Goal: to help create and accelerate development of a market for sustainable aviation fuel (safe, sustainable and affordable) & avoid large price swings in petro-based kerosene
- Creating a viable market for sustainable aviation fuels (SAF) can only be achieved *by combining expertise and experience in the fields of air transport, product knowledge, R & D, regulation and effective sustainability criteria*
- *SkyNRG is the orchestrator in the ecosystem*

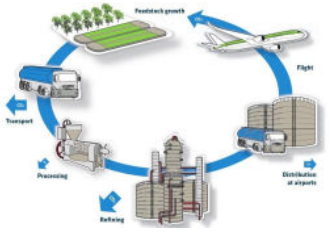
7

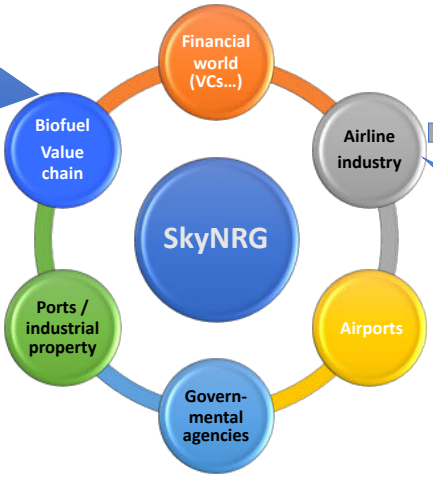


8

SKYNRG

Open innovation: SkyNRG sets up the aviation biofuel value chain and encourages joint technological innovations between partners





KLM

KLM's value driver? KLM profits as a customer of a steady supply of sustainable and affordable biofuel

9

Carlsberg's paper green bottle – 100% bio based

"We kicked off the project to develop a sustainable paper bottle in 2015 together with innovation experts **ecoXpac** and post-doctoral researchers from the Danish Technical University (DTU), supported by Innovation Fund Denmark. Soon thereafter packaging company **BillerudKorsnäs** joined the efforts, ultimately resulting in **Paboco®,** the Paper Bottle Company – a joint venture between **BillerudKorsnäs** and bottle manufacturing specialist **Alpla**.

We are now joined by more partners: The **Coca-Cola Company, The Absolut Company** and **L'Oréal** in a paper bottle community – launched by Paboco®. The community unites leading global companies and experts with the vision of advancing sustainable packaging, offering high-quality products while reducing their environmental impact."

https://www.carlsberg.com/en/green-fibre-bottle/

10

Broadening open innovation

- Past
  - The firm applies OI through NDP / NBD (New Product Development / New Business Development) initiatives
  - The firm is an innovating company (high-tech industries)
  - OI is implemented through one-on-one relationships (inside out and outside in)
- Today
  - All value drivers can serve as motivation to pursue OI
  - Being an innovator is not required, any company has the potential to initiate collaborative efforts
  - OI involves creating a network of partners within an ecosystem
  - New roles emerges as an ecosystem orchestrator, instigator and implementor
  - Co-innovator risk & technology adoption riskare factors to consider (Adner, 2012)
  - There is competition between ecosystems, but also competition within ecosystems
  - Role of regulators / governments can be significant
  - Instigators seek beneficiaries who can take effectively take ownership of the innovation (core competence)

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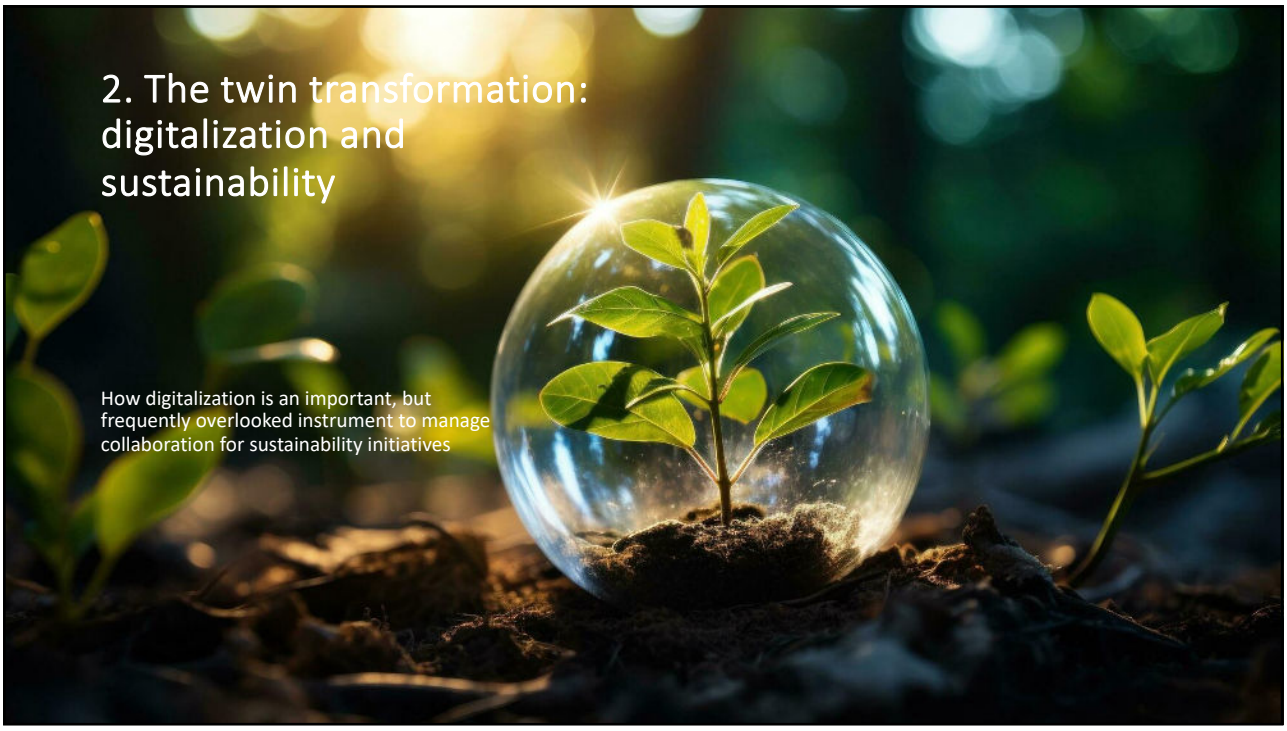
Takeaways

- **Major sustainability initiatives require complex innovation ecosystems, necessitating a holistic approach.**
- **Avoid solely focusing on technology as the solution; consider strategic imperatives of firms (e.g. sustainability) and the broader dynamics of the ecosystem.**
- **Do not only focus on the role of knowledge institutions; they are not the sole drivers of innovation for companies**
- **Explore the entire ecosystem, studying its dynamics, as exemplified by SkyNRG; get acquainted with platform and ecosystem management**
- **Pay attention to non-technical bottlenecks and market risks that usually tend to impede progress.**

12



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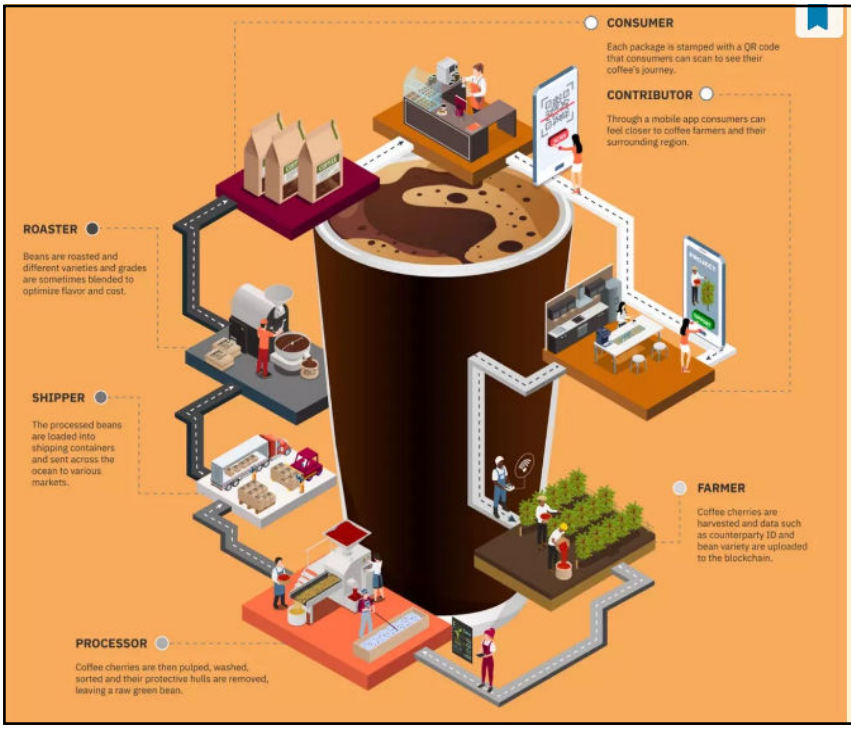

How Bext360 is bringing Transparency and Sustainability to the Coffee Industry?

Mission of Bext360

Bext360 aims to guarantee quality and bring transparency and sustainability to supply chains for global companies and consumers.

Difficulty in Tracing Origins

Global supply chains and multiple stakeholders make it challenging to trace the exact origin of products.

Corruption and power of middlemen

Inaccurate quality guarantee and origin tracing by NGOs

Photos provided by Pexels

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Bext360's Solution for Sustainability

https://youtu.be/HYmIBRHLcjo

Blockchain

Quantum improvement in traceability
Bean to coffee transparency
New business models possible
Direct payment for farmer

Machine vision

100% objective info
Each bean has been analyzed
Guarantee top quality beans – top quality roasters (not with Fairtrade)

AI

AI analyses color and brightness to detect bean and mineral quality
From this analysis a Cupping score is determined
With recent modifications, it can now also sort and separate the beans.

15

Examples in digital healthcare

- Telemonitoring (e.g. hypertension among pregnant women) – convenience, less casualties
- Radiology: Optimizing MRI schedules; reducing x-ray use; medical image analysis
- Outpatient management: convenience, reducing costs and improving long-term “health-care”
- MoveUp: digital app for revalidation after hip /knee surgery

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Takeaways

- Sustainability is not necessarily related to new product technology, but in general universities and governments still think this way (dominant paradigm)
- Digitalization is evolving at light speed and is a major driver of economic and social sustainability:
  - Reducing hospital visits
  - Reducing costs - affordable healthcare
  - Democratizing healthcare – less silled people can do the same job
  - Early and improved disease detection
  - Shift from sick care to healthcare
- Shift from new technological research to implementing applications via ecosystem orchestration
  - Digital solutions won't be adopted if one of the key players lose

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2. A conflict model for sustainability is killing collaborative innovation

At present, the integration of sustainability within society often adheres to a conflict-driven model, resulting in superfluous societal costs and hindering the timely achievement of sustainability objectives.

Furthermore, the current state of innovation policy appears compartmentalized, lacking integration within a comprehensive, long-term sustainability framework.

What are the implications for collaborative innovation and innovation policy?

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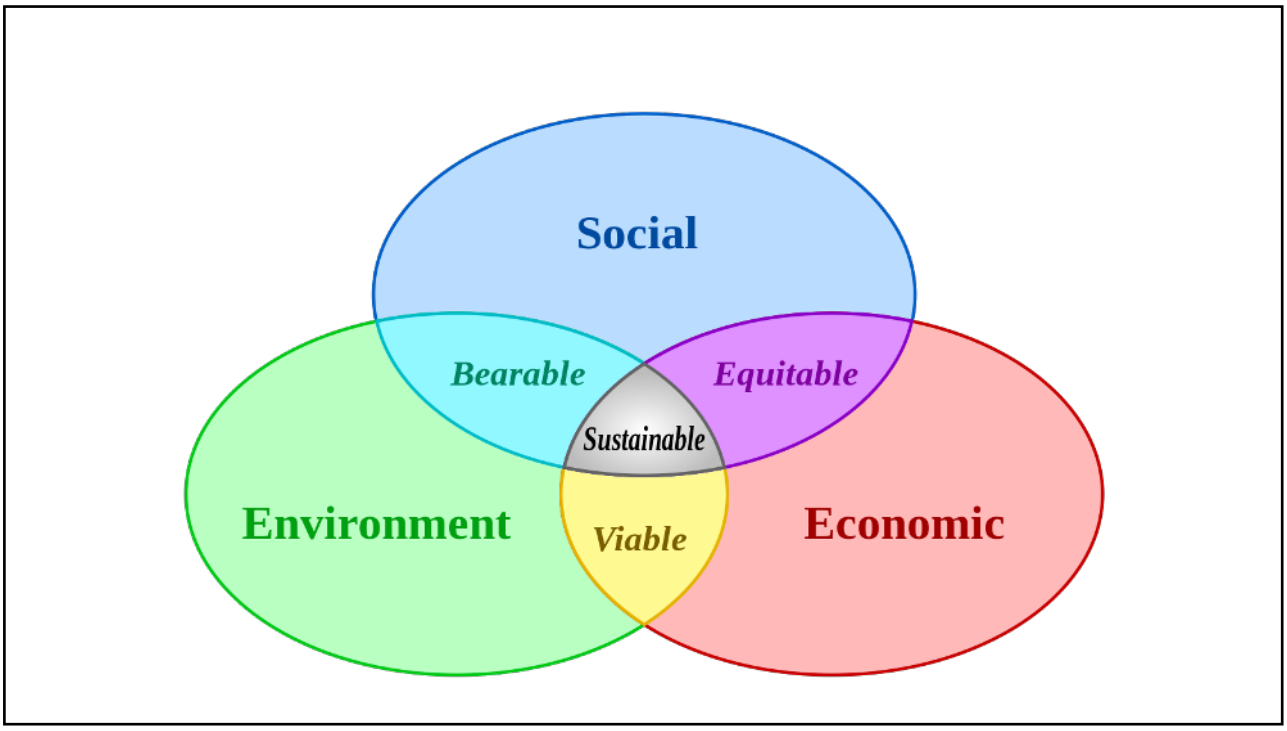
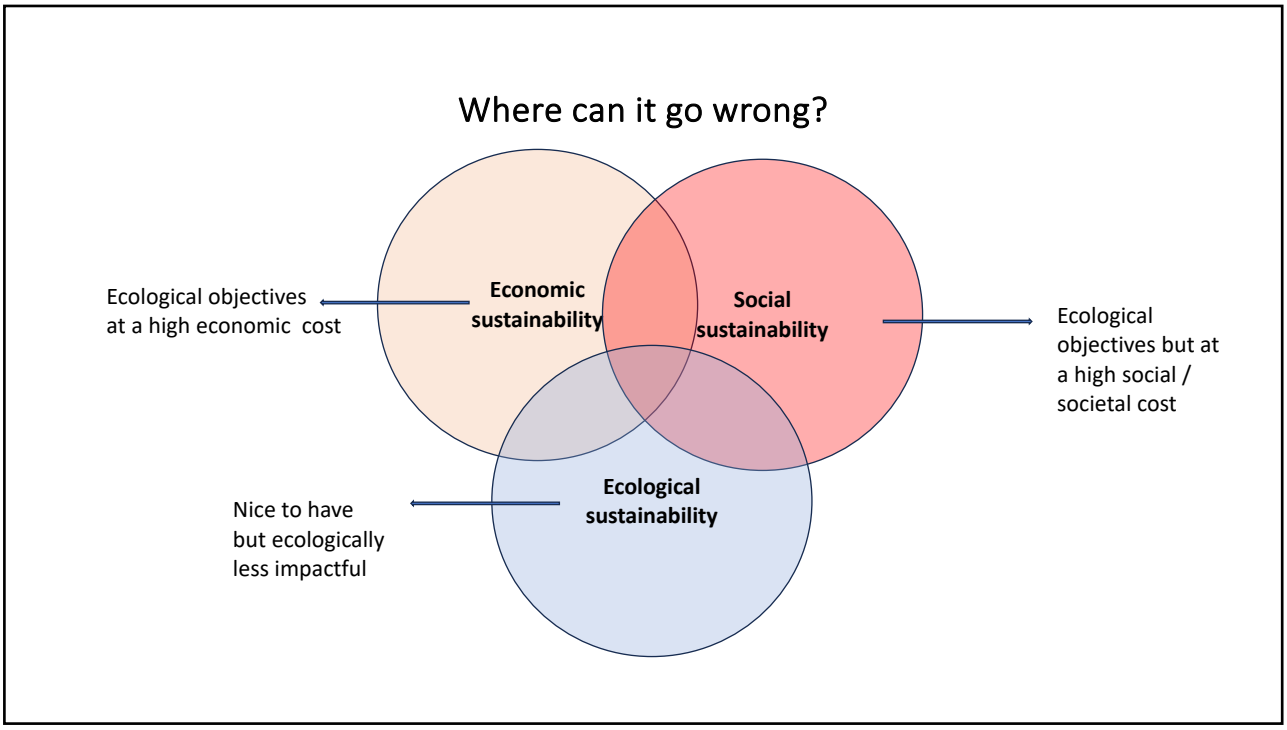
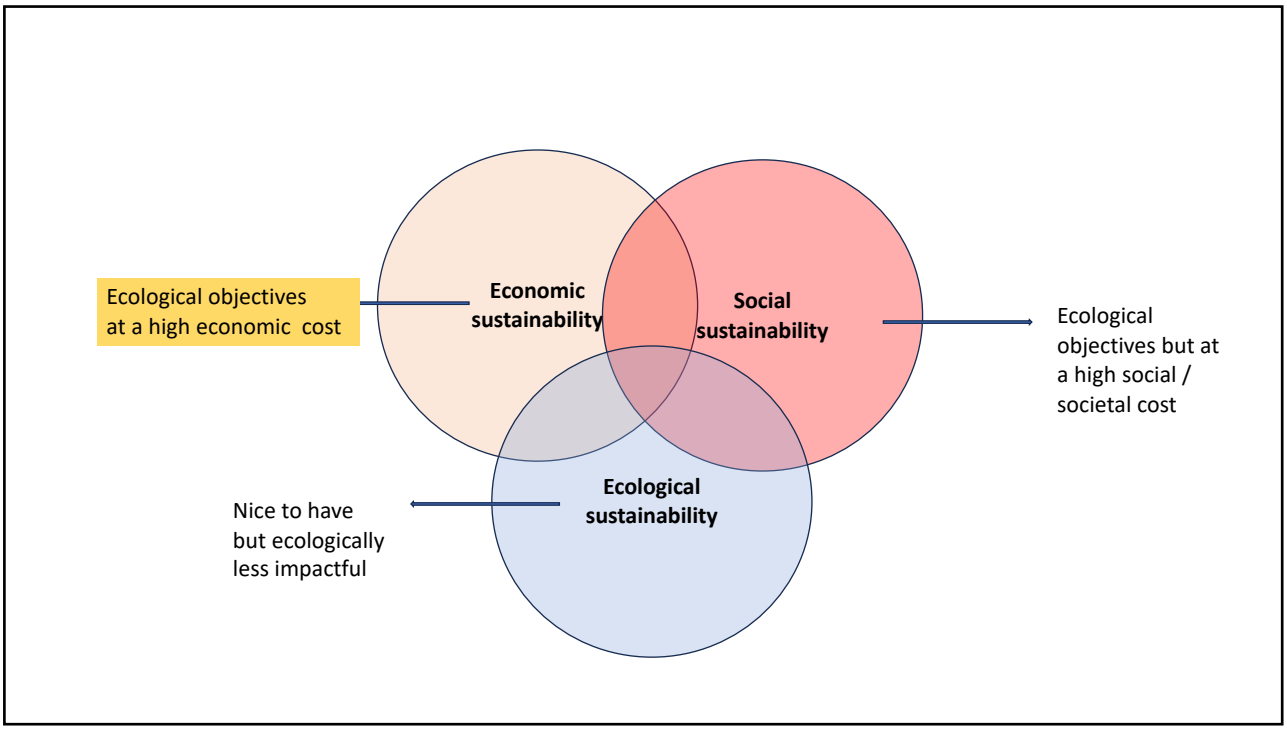

Social
Bearable
Equitable
Sustainable
Environment
Viable
Economic

19


Where can it go wrong?
Ecological objectives at a high economic cost
Economic sustainability
Social sustainability
Ecological objectives but at a high social / societal cost
Nice to have but ecologically less impactful
Ecological sustainability

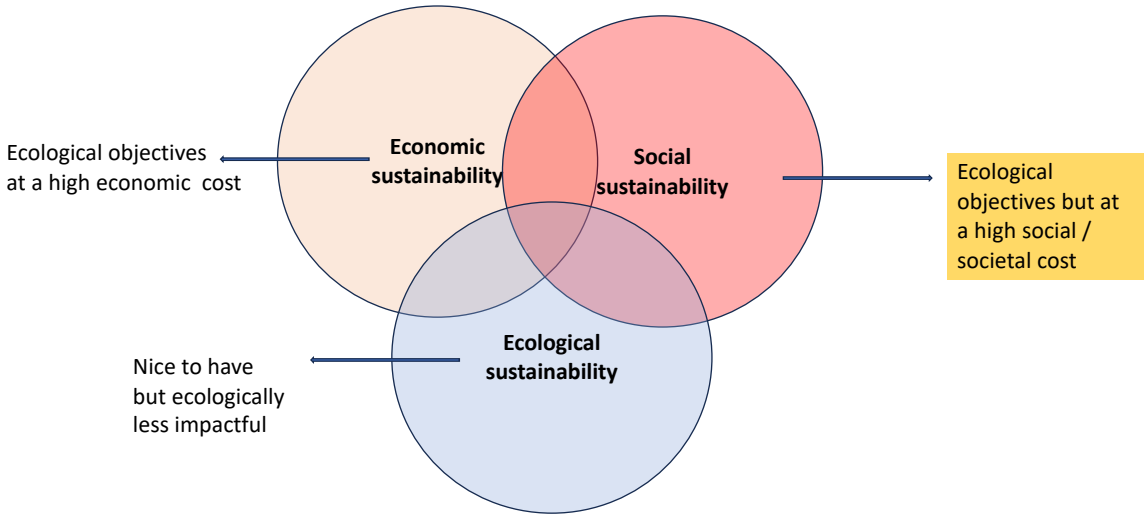
20


Ecological objectives at a high economic cost
Economic sustainability
Social sustainability
Ecological objectives but at a high social / societal cost
Ecological sustainability
Nice to have but ecologically less impactful

21


Conflict model
Continuous investments in large-scale farming without adequate consideration for environmental impact
Sudden changes in legislation without taking into account the economic viability of agriculture and the agri-industry (one of our top clusters)
Risk of economic destruction
Allocate sufficient time for collaboration on technical and business model innovations
Explore alternative farming ecosystem models, such as "korte keten"
Draw comparisons with the manufacturing industry, which makes long-term investments in reducing ecological impact.

22



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The social cost of sustainability

- Driving up prices for goods and services to reach sustainability objectives
  - Energy
  - Housing
  - Car exhausts
  - Food, etc…
- Subsidies… Matthew effect
- Are sustainability measures making products/ services more accessible too more?
- Government: We need a policy and subsidies for sustainable innovations with "democratizing" innovations

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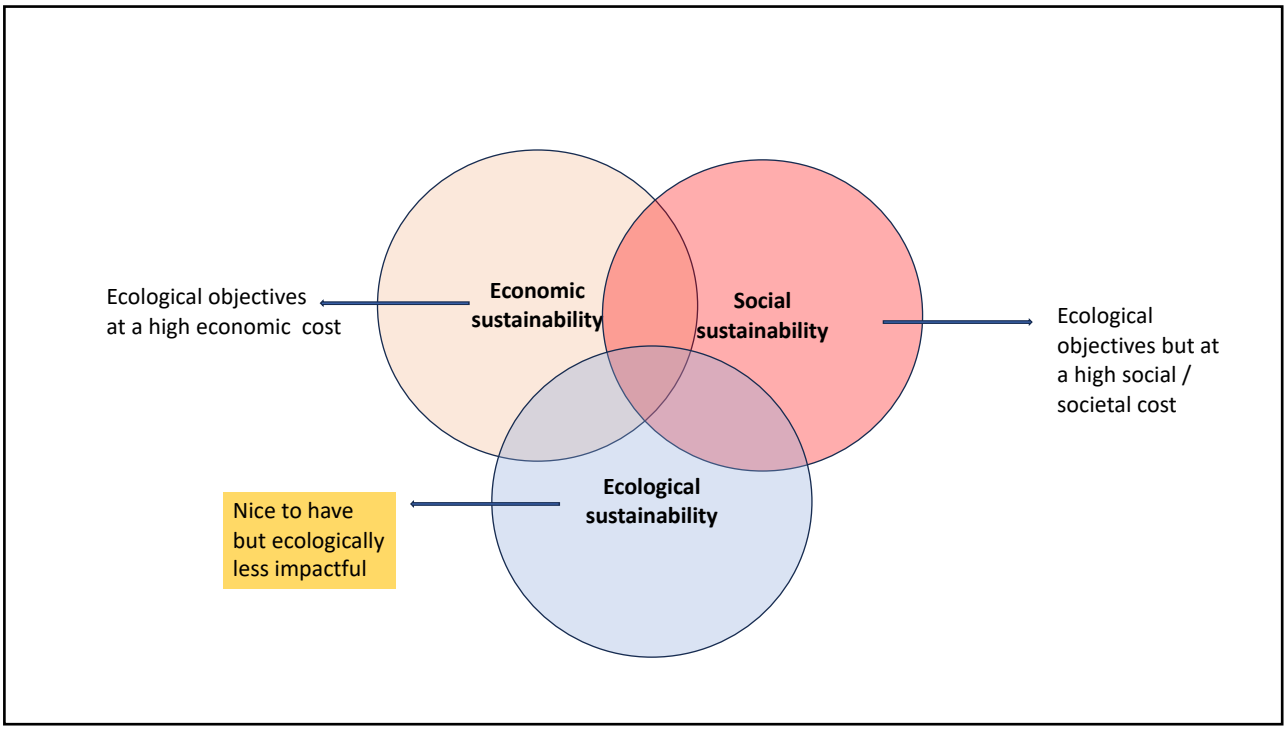
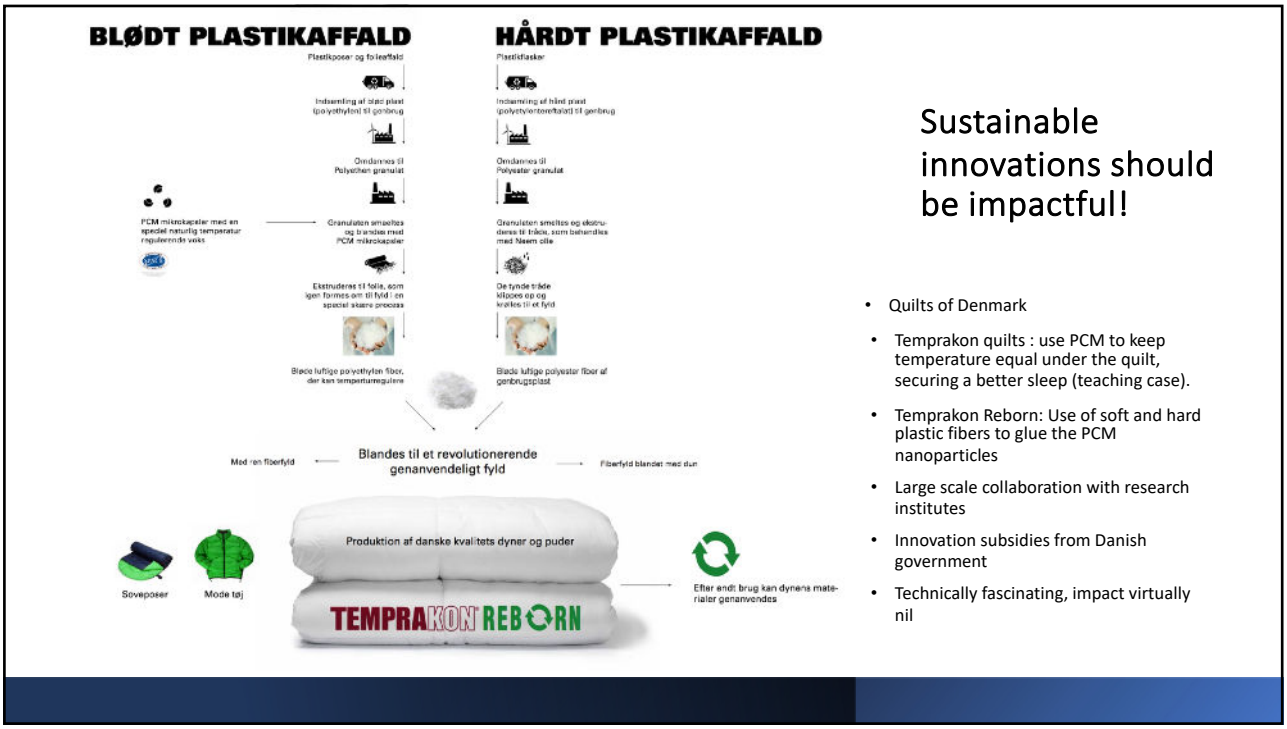

Ecological objectives
at a high economic cost
Economic
sustainability
Social
sustainability
Ecological
objectives but at
a high social /
societal cost
Nice to have
but ecologically
less impactful
Ecological
sustainability

25


BLØDT PLASTIKAFFALD
HÅRDT PLASTIKAFFALD
Blandes til et revolutionerende genanvendeligt fyld
Produktion af danske kvalitets dyner og puder
Soveposer
Mode tøj
TEMPRAKON REBORN
Sustainable innovations should be impactful!
Quilts of Denmark
Temprakon quilts : use PCM to keep temperature equal under the quilt, securing a better sleep (teaching case).
Temprakon Reborn: Use of soft and hard plastic fibers to glue the PCM nanoparticles
Large scale collaboration with research institutes
Innovation subsidies from Danish government
Technically fascinating, impact virtually nil

26

Sustainable innovations should be impactful!

- Vegan bags and shoes
- Made from plant waste (apple, mushroom, pineapple, coconut, bamboo, etc..)
- Fashionable … but what is the sustainability impact
- Are we using less natural leather (shifts in leather use) and petrol-based leather products?
- Do we use them in a "more durable" way?
- BM change: bag renting, 2nd hand markets?

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Sustainable innovations should be impactful!

- A realistic example is Ray & Jules
- In 2015 = idea (cleantech sister company CEE) to use continuous roaster powered by renewable energy at low temperature (vs. batch roaster at high temperature)
- In 2017 = roast to the level of specialty coffee.
- BM = finance by direct sales of specialty coffee
- Last 3 years = CEE expanded roasting capabilities and partnerships to include cocoa and malt. Big roaster companies (Beyers coffee) & global food players want to scale the technology
- Potential to reduce 100 million CO2 yearly – licensing? And become a world leader in sustainable roasting technology

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Takeaways
• Economic, social, and ecological sustainability should be integrated and prioritized together.
• Current innovation policy and funding primarily focus on new technologies, neglecting consideration of overall sustainability policies.
• It is essential to examine the sustainability impact of new technologies.
• Scaling these technologies must be thoroughly evaluated.
• Identifying the pathways to achieve their impact is crucial.
• The social sustainability repercussions of these technologies need to be assessed
• Adopting a conflicting approach is counter-productive.
• Time is needed to develop and implement technological and business model innovations.
• Have the audacity to create new industry frameworks that encompass all three dimensions of sustainability, such as adopting short supply chains (korte ketens)

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