

Environmental Entrepreneurship

Prof. Dr. Claudia Doblinger

TUM Campus Straubing for Biotechnology and Sustainability

Assistant Professorship of Innovation and Technology Management

TUMCS

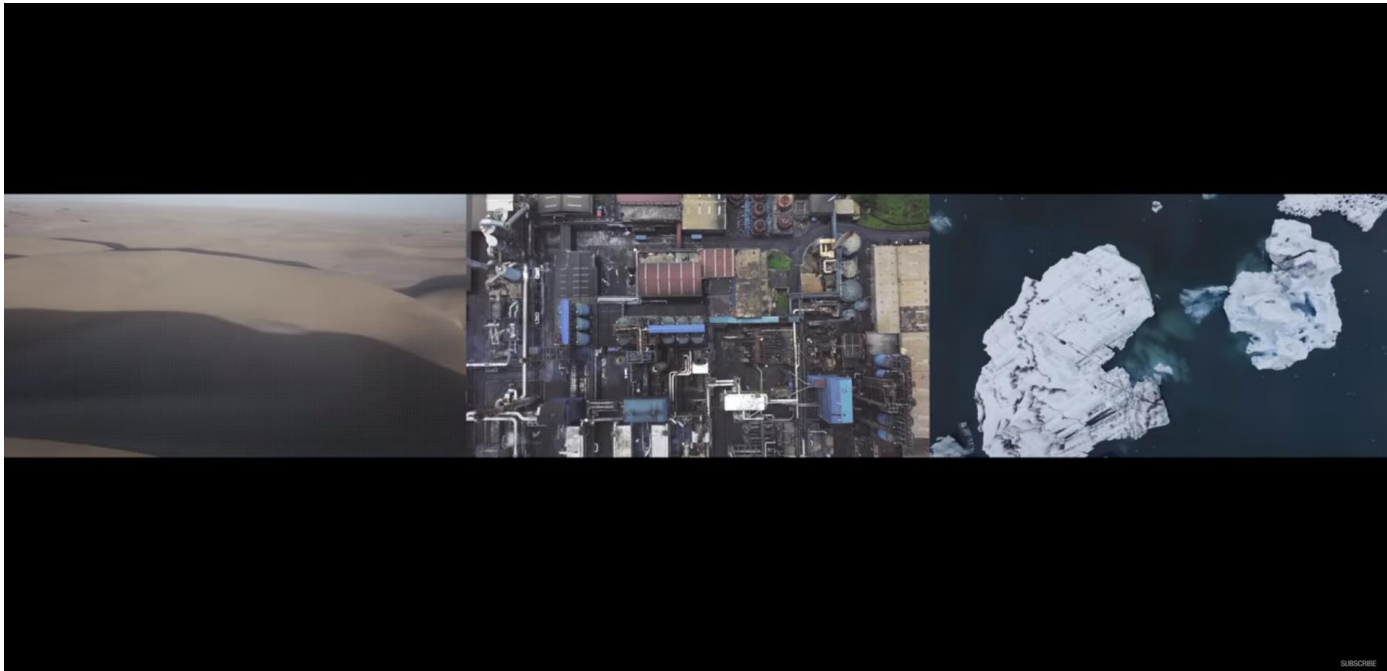
TUM



In this video you will learn:

- Why entrepreneurship is relevant for addressing climate change
- How sustainability and entrepreneurship are related
- How market failures can be sources of (environmental) entrepreneurial opportunities

Sustainable Development Impact Summit



Title: Sustainable Development Impact Summit: Your Platform for Action

Link: <https://youtu.be/aqDAaCKYjNc>

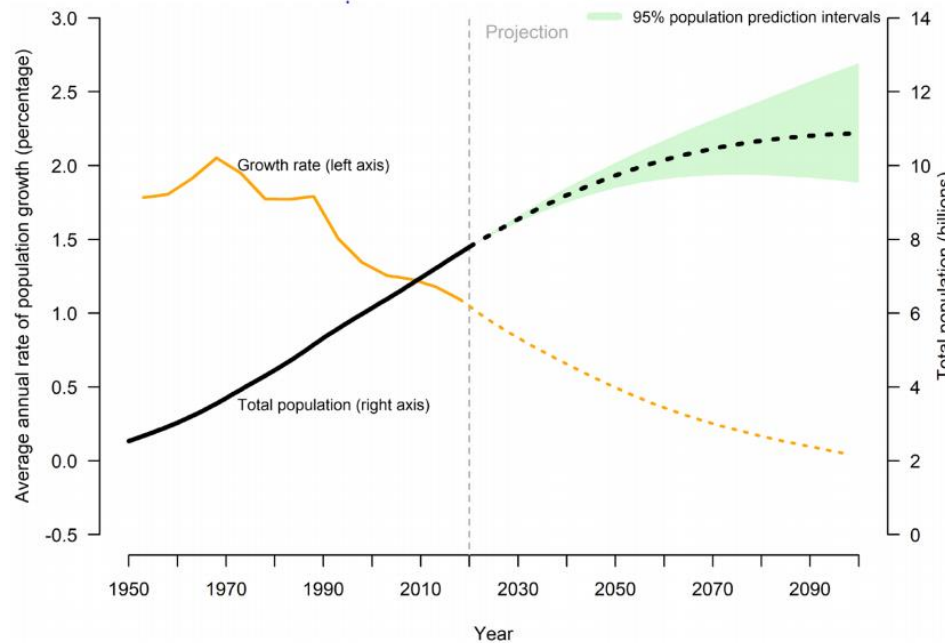
Challenges for the 21st century

$$\text{Impact} = \begin{matrix} \text{Population} \\ \times \\ \text{Affluence} \\ \times \\ \text{Technology} \end{matrix}$$



Population: Steady demographic increase

Population size and annual growth rate for the world



Source: https://population.un.org/wpp/Publications/Files/WPP2019_Highlights.pdf

Affluence

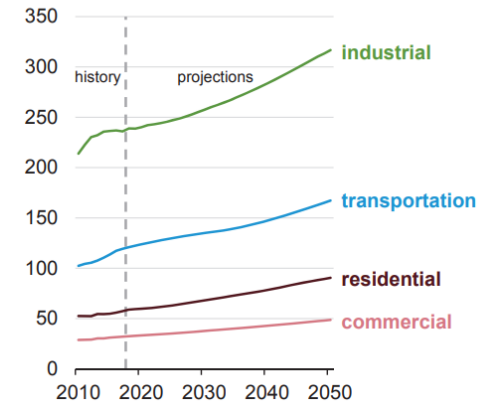
Waste and system failure



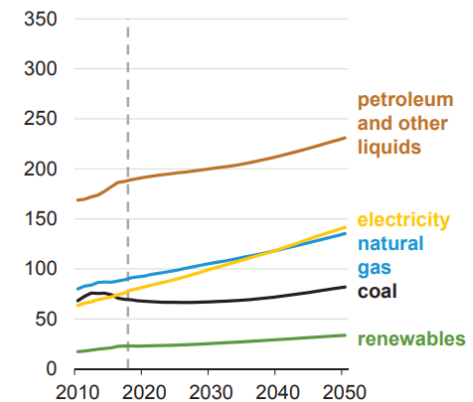
Source: <https://lamptonshield.com/nova-invest-initiative-intended-reduce-plastic-pollution-oceans/>

Increasing energy consumption

End-use energy consumption by sector, world
quadrillion British thermal units



End-use energy consumption by fuel, world
quadrillion British thermal units



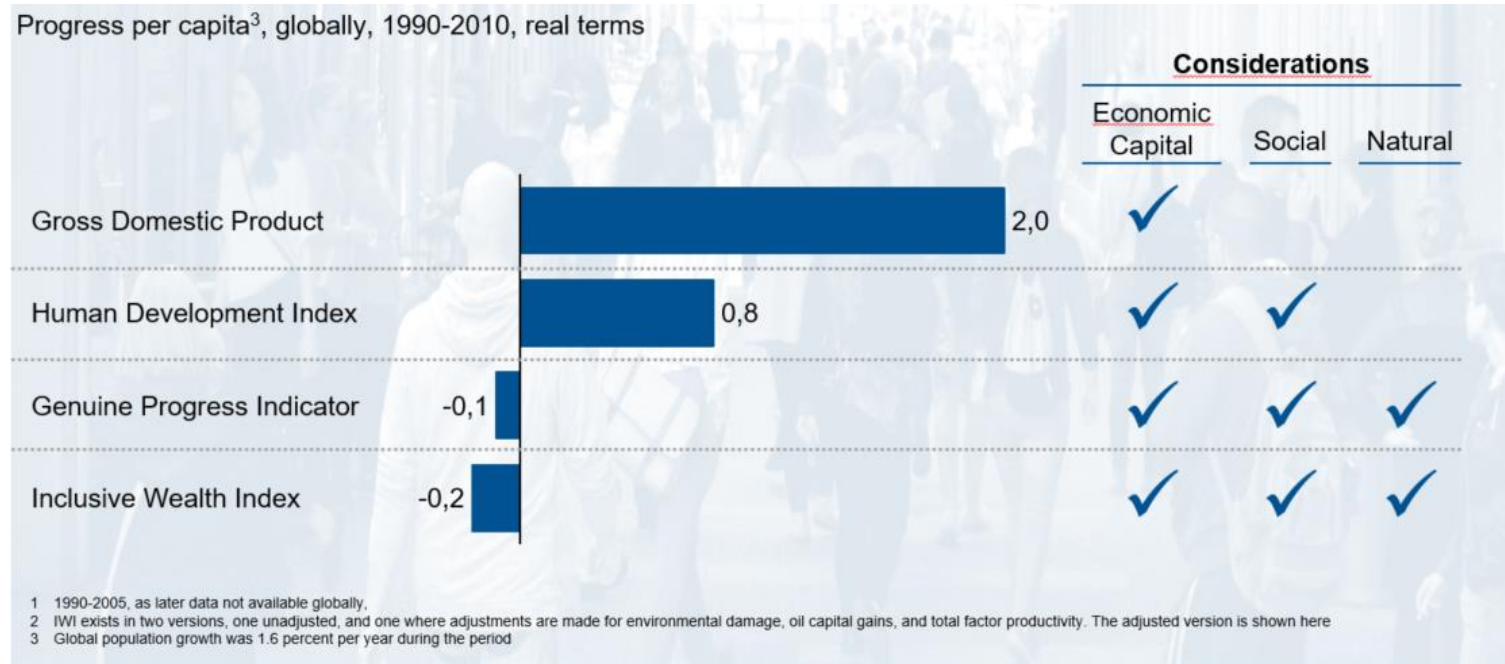
Source: <https://www.eia.gov/outlooks/ieo/pdf/ieo2019.pdf>

Technology: System inefficiency



Sources: <https://unsplash.com/photos/LIMP8mmZbLQ>
<https://unsplash.com/photos/tm9Rt6BTMys>
<https://unsplash.com/photos/kARZuSYMfrA>
<https://www.pinterest.de/pin/483362972505979018/>

Impact: Resource-intensive and inefficient growth



Source: Kubiszewski et al. (2013); http://wedocs.unep.org/bitstream/handle/20.500.11822/9420/-UNEP_2014_Annual_Report-2015UNEP_Annual_Report_2014_Production_LQ.pdf?sequence=3&isAllowed=y

Towards sustainable concepts: The origin



Source: Chrismon – Das evangelische Magazin 06.2014, S.42

- Forestry
 - Introduced by Hans Carl von Carlowitz in 1713
 - Saxonian chief mining official
- Background
 - Tremendous population growth (in Europe: 140 M to 266 M between 1750 and 1850 (estimates))
 - Wood in particular demand as a raw material
- Sylvicultura oeconomica
 - Prudent management of forest resources
 - Only harvest as much wood as could regrow

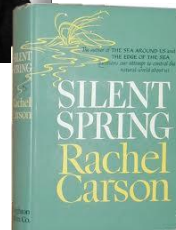
Towards sustainable concepts: Sustainability beyond forestry

The Telegraph



1952

The Great Smog of London



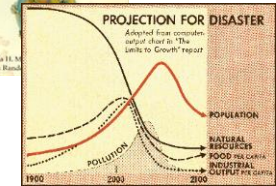
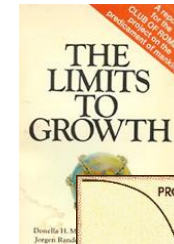
1962

Silent Spring by Rachel Carson



1972

United Nations conference on the human environment



Limits to growth by the "Club of Rome"

Sources: <https://www.telegraph.co.uk/news/earth/countryside/9727128/The-Great-Smog-of-London-the-air-was-thick-with-apathy.html>
<http://www.rachelcarson.org/mRachelCarson.aspx>
<https://www.zvab.com/buch-suchen/textsuche/carson-silent-spring/erstaussage/>
<https://syskool.com/stockholm-declaration-1972-india/>
<https://legal.un.org/av/ha/dunche/dunche.html>
<https://www.amazon.com/Limits-Growth-Project-Predicament-Mankind/dp/0330241699>
<https://cassandralegacy.blogspot.com/2012/11/limits-to-growth-alternative-history.html>

Defining sustainability



THE WORLD COMMISSION
ON ENVIRONMENT
AND DEVELOPMENT

World Commission on Environment and Development, 1987 :

Sustainability is meeting “the needs of the present without compromising the ability of future generations to meet their own needs.”

- Companies should operate in ways that secure long-term economic performance by avoiding short-term behavior that is socially detrimental or environmentally wasteful.

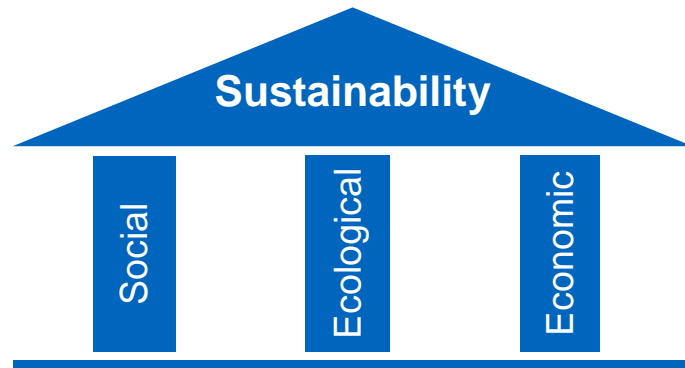
Example Gulf oil spill:



Acting in an unsustainable manner with a short-term focus on profit can have significant long-term negative impact for society, the environment, and the economy - including BP, which was seeking to maximize its profit.

Triple-bottom-line approach

- Concept coined by John Elkington (1994)
- Economic, ecological, and social dimensions (also referred to as the “3Ps”: profit – planet – people) exist side by side on an equal footing



Sustaining

Nature
Life support
Community



Developing

People
Society
Economy

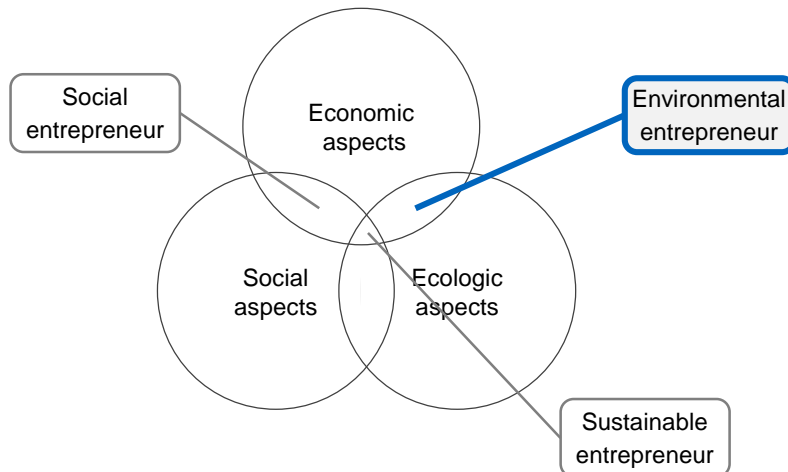


Sources: https://www.flaticon.com/free-icon/ecological_3047812
<https://www.un.org/sustainabledevelopment/news/communications-material/>

Sustainable entrepreneurship

“Sustainable entrepreneurship is the preservation of nature, life support, and community in the pursuit of opportunities to bring into existence future products and services for profit, where profit is broadly construed to include gains to people, the economy, and society.”

(Shepherd & Patzelt, 2011)



Prototypical form of environmental entrepreneurship

Core motivation	Contribute to solving environmental problems and create economic value
Main goal	Earn money by solving environmental problems
Role of economic goals	Ends
Role of non-market goals	Environmental issues as integrated core element
Organizational development challenge	From focus on environmental issues to integrating economic issues

Source: Schaltegger and Wagner (2011)

Understanding market failure: Welfare economics based on Pigou (1932)



Market failure

- Departure from Pareto efficiency and perfect competition



Distinguish

- Private costs of production vs. social costs of production



Private costs of production

- Costs incurred only by the private firm or individual producing a good or service



Social costs of production

- Private costs of production + costs incurred by society at large, but not the private producer

→ Whenever social costs (or benefits) of production vary from private costs (or benefits), a socially optimal allocation of resources will not result!

Market failure from two perspectives

Environmental economics perspective

- Various types of market failures create environmental damage
- Environmental assets (e.g., atmosphere) have characteristics which make them less amenable to market allocations
- Eradicating market failure leads to reduced environmental degradation and enhances economic and ecological sustainability



**Environmental degradation
results from market failures.**

Entrepreneurial opportunity perspective

- Imperfect competitive markets as sources of opportunities for entrepreneurial action and economic profit
- Two sources of opportunities
 - **Exogenous shocks:** altered demand (i.e., taste or preference) or supply (i.e., new product or process technologies)
 - **Asymmetries in awareness:** different individual preferences (e.g., knowledge or alertness)



**Opportunities are inherent
in market failures.**

Towards a definition on environmental entrepreneurship

- Synthesizing the environmental economics and entrepreneurial opportunity perspective
- Some market failures which result in environmental damage provide entrepreneurial opportunities whose exploitation reveal profit and social welfare improvements



“Environmental entrepreneurship is [...] the process of discovering, evaluating, and exploiting economic opportunities that are present in environmentally relevant market failures.”

(Dean and McMullen, 2007: 58)

Example for environmental entrepreneurship




rezemo

Coffee in
sustainable capsules