

ES 115

Design, Innovation and prototyping

10 Responsible design



Design and
Innovation
Centre

IIT
Gandhinagar

Manasi Kanetkar
November 2024

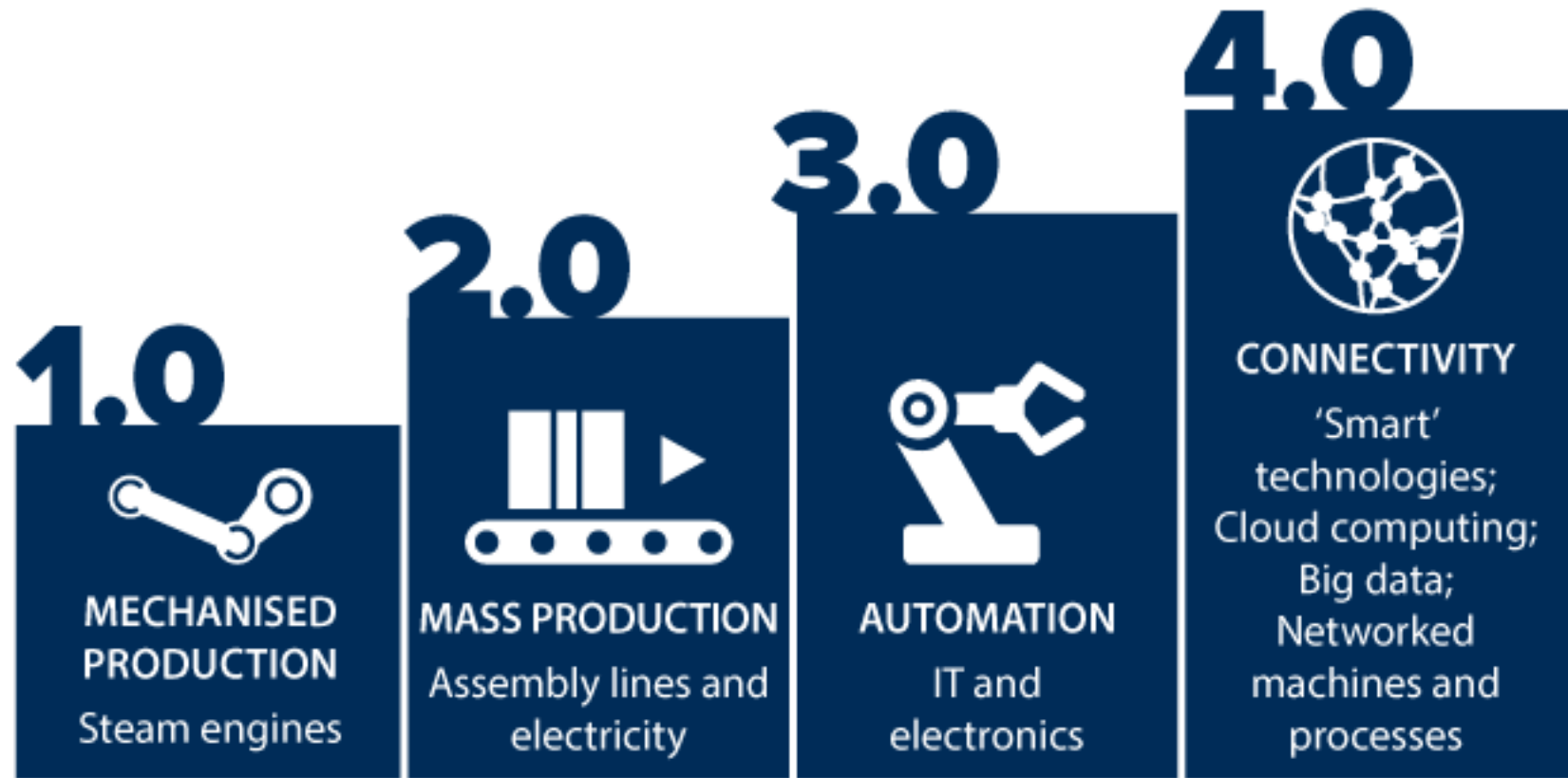
Today : Responsible Design

- Frugal innovation
- Design for special / social needs
- System design

Design for business

- Intersections of design and business
- Product innovation for business diversification/
expansions
- Possibilities for businesses and product innovations
- Branding and packaging

Industrial revolution



The stages of industrial development

Source: Oxford Analytica

Let's look at the bigger picture

- Capitalism and economics
- Social aspects
- Side-effects of industrialization
- Ecological aspects

Capitalism

An economic and political system in which a country's trade and industry are ***controlled by private owners*** for profit, rather than by the state...

Oxford dictionary

Read: <https://www.britannica.com/topic/capitalism>

Rise of capitalism

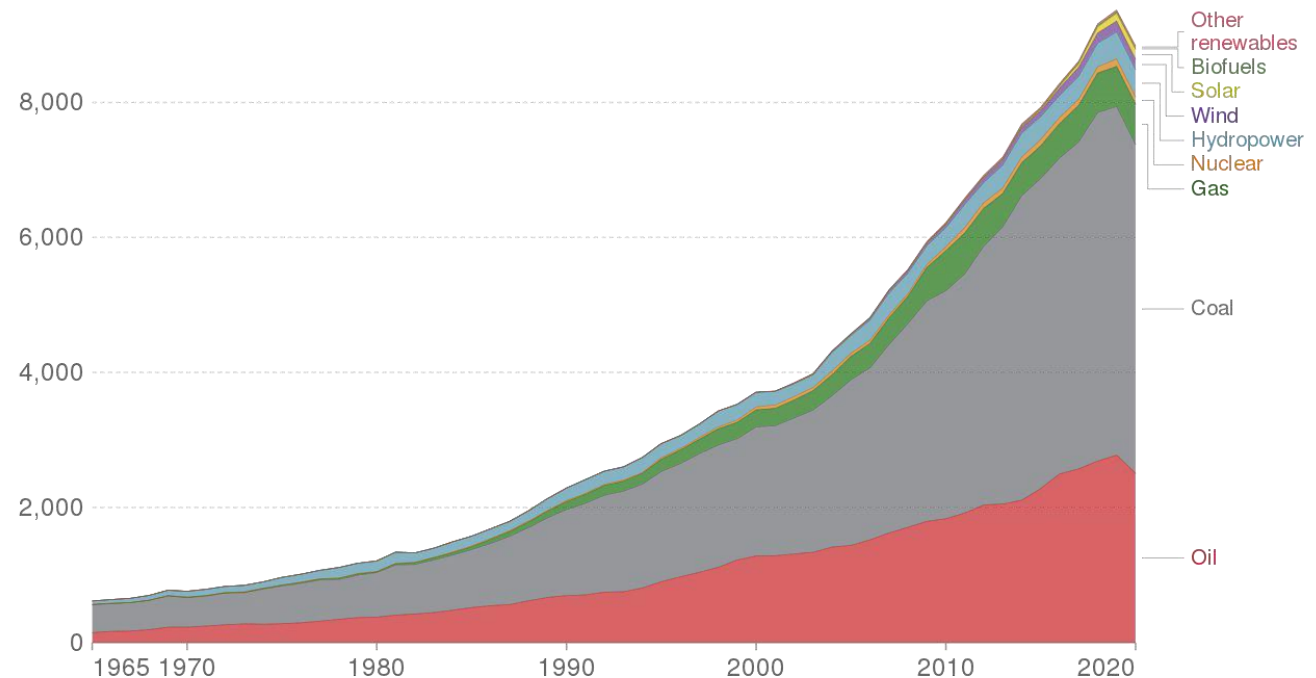
- Capital *accumulation*
- Commodity production; investment to *make profits*
- *Private ownership* of the means of production
- Efficient use of resources and raw materials due to maximization of value added in the *production process*
- *Freedom of capitalists* to act in their self-interest

Fossil fuels : demand for resources

Energy consumption by source, India

Primary energy consumption is measured in terawatt-hours (TWh). Here an inefficiency factor (the 'substitution' method) has been applied for fossil fuels, meaning the shares by each energy source give a better approximation of final energy consumption.

Our World
in Data



Source: BP Statistical Review of World Energy
Note: 'Other renewables' includes geothermal, biomass and waste energy.

Image credit: By Max Roser - Our World in Data:

<https://ourworldindata.org/grapher/energy-consumption-by-source-and-region?stackMode=absolute&country=IND>, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=115807456>

Changing dynamics: data is the new oil



David Parkins

Consumerism

- Some economists believe that ***consumer spending*** stimulates production and economic growth.
- However, consumerism has been ***widely criticized*** for its economic, social, environmental, and psychological consequences.

How is it affecting you and me?

Consumerism



Read

<https://www.ssc.wisc.edu/~wright/ContemporaryAmericanSociety/Chapter%207%20--%20consumerism%20--%20Norton%20August.pdf>

Perceived values + creation of need



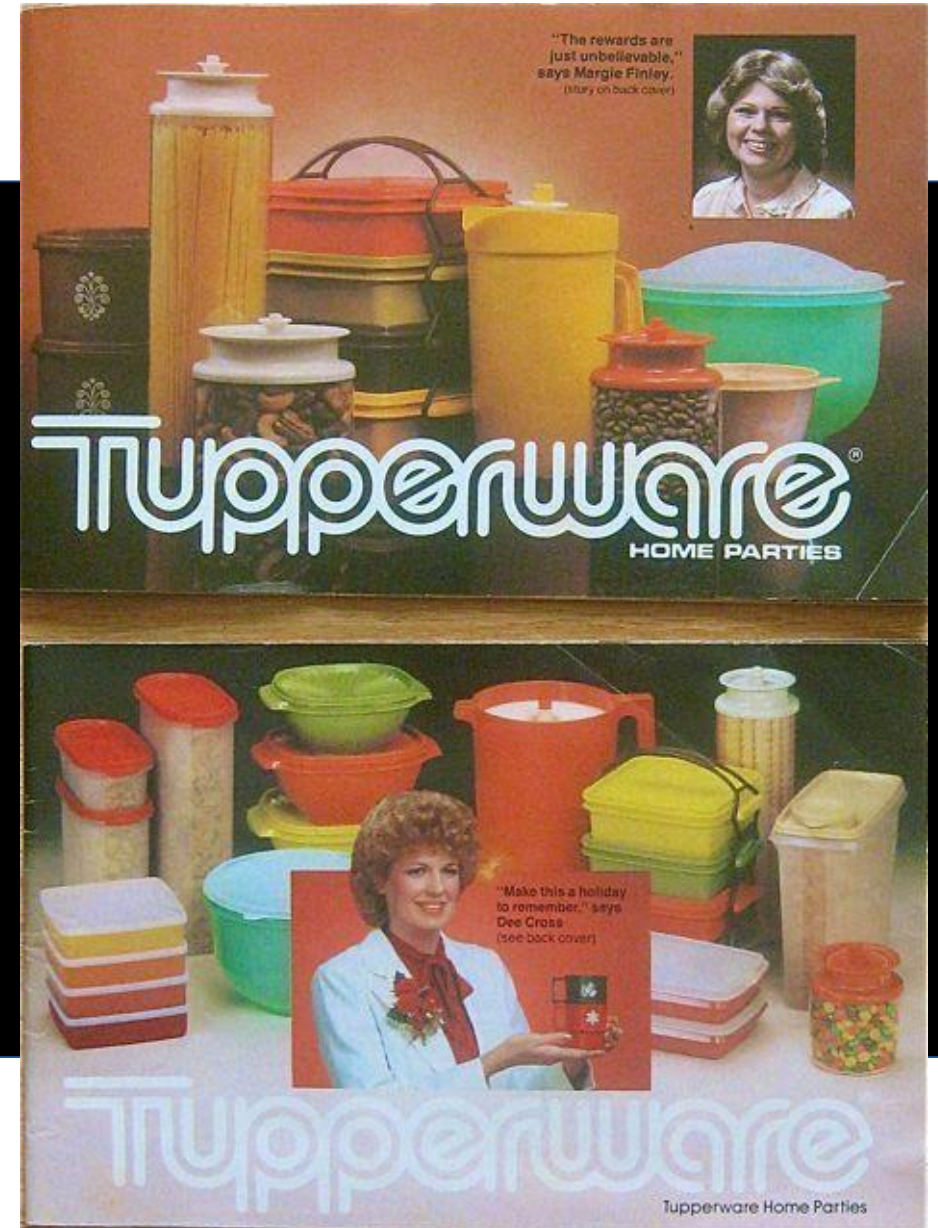
Social aspects

- Mass migration
- Introduction on labor laws
- Well being of the employs
- Quality of life (note: current changes due to the pandemic)

<https://labour.gov.in/labour-law-reforms>

<https://www.khanacademy.org/humanities/whp-1750/xcabef9ed3fc7da7b:unit-3-industrialization/xcabef9ed3fc7da7b:3-2-global-industrialization/a/industrialization-and-migration-beta>

Influence on lifestyle



Influence on lifestyle



Influence on lifestyle



Perceived values



<https://www.theguardian.com/lifeandstyle/2013/jun/01/size-zero-campaigners-london-college-fashion>

Planned obsolescence

“ Our whole economy is based on

Planned Obsolescence...

We make good products, we induce people to buy them, and then next year we deliberately introduce something that will make those products old fashioned, out of date, obsolete.

We do this for the soundest reason... to Make Money! ”

— Brooks Stevens,
Industrial Designer. 1958

*Brought to you by the
Post-Landfill Action Network*



**New and
improved!!**



Lack of inclusivity

Mainstream industry does not address

- The '**extremes**' (on a percentile curve)
- Disability
- Designing for **low-income group**
- **Rural areas**
- Sociological issues
- **Ecological issues**

How are we affecting our planet?

Ecological aspects

- Mining
- Carbon footprint
- Emissions
- Pollutants mixed with soil and water
- Landfills
- Climate change

Some important announcements

Some 'Jugaad' against Mass production

Jugaad is a term that is commonly used in north India, where everyone knows what the colloquial Hindi word means — **a way to fix a difficulty** not through conventional measures, but through the **cheapest possible means**.

<https://www.downtoearth.org.in/economy/making-jugaad-a-global-success-94467>

Jugaad



Jugaad



Jugaad



Let's look at a better approach

Jugaad >> Frugal innovation

- **Human factors** (safe, comfortable, inclusive, intuitive)
- Robust, reliable and **scalable** products
- Remove dependency on the skills of the user
- Take the benefits of **production optimization**
- How can we make it easy to **adapt** for other contexts
- Can also address to **social needs**

Frugal innovation



Gursaurabh
Dhruv Vidyut - Electric Bicycle
Conversion Kit
<https://dhruvvidyut.co.in/>

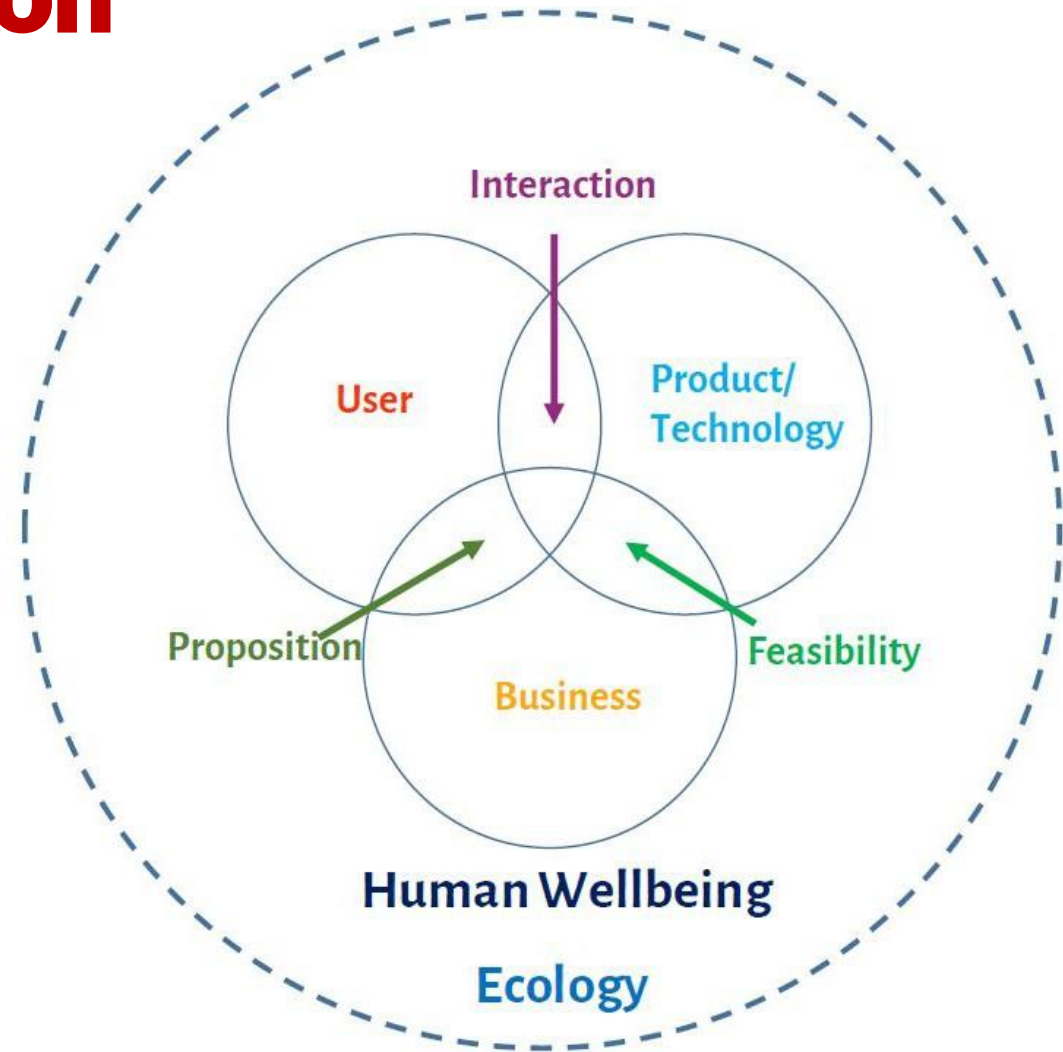


Lassi making machine
<https://kalsiproducs.com/product-category/lassi-machine/commercial-lassi-machine/>

Frugal innovation: Water wheel for rural areas



Responsible innovation



Well-designed products + Social inclusivity



Soleckshaw by: Central Mechanical Engineering Research Institute ([CMERI](#))



Smokeless Chulha
Unmesh Kulkarni/ Praveen Mareguddi
IDC, IIT Bombay

Well designed product + Social inclusivity



Carrier for construction workers
Vikram Panchal (NID)

**Inclusive
Sustainable
Frugal**



System Thinking
(responsible)

... AND 'Possible'

Ice Stupa

Ice Stupa is a form of glacier grafting technique that creates artificial glaciers, used for storing winter water in the form of conical shaped ice heaps.

During summer, when water is scarce, the Ice Stupa melts to increase water supply



Sonam Wangchuk



Warka water

- *Arturo Vittori* is an Italian artist, architect, and designer
- Uniqueness is using engineering in a unique way



HelpUsGreen

- Kanpur based set up
- FY18 revenue run rate of ₹2 crore.
- ₹4.2 crore in seed funding
- Launched two more plants in Varanasi and Mathura.



Ankit Agarwal (left) and Karan Rastogi



Mitti Cool

- A fridge made of clay; uses no electricity keeps fruits, vegetables fresh
- Reinvented the process of making earthen-ware
- Products relevant to today's needs



Mansukhbhai Prajapati
<https://mitticool.com/>



GreenSole

The soles of thrown away shoes are in good condition; sides get damaged within months.

The duo always wondered if they could find some use for the intact soles of these quality sport shoes.



GreenSole®
Step towards sustainability



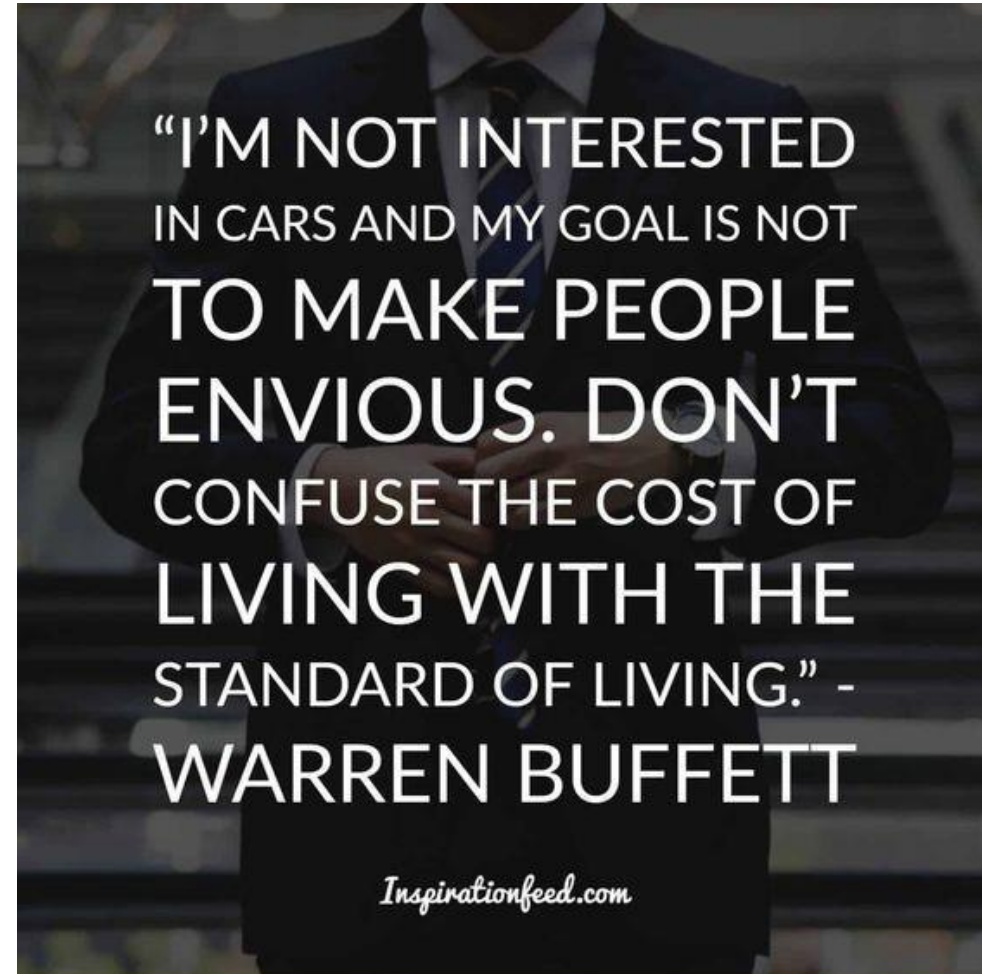
<https://www.greensole.com/what-we-do/>

Better approach .. on personal level

Responsible living for you and me

- **Pause** and think..
- Decide your own principles for **lifestyle choices**
- Borrowing the **good from our traditions**, not to go for fads
- Reducing **resources**; use local (disposable, travel, food, clothes)
- Be aware the **bigger picture** and our **personal position** in it

Warren Buffett



<https://www.investopedia.com/articles/financialcareers/10/buffett-frugal.asp>

Essential minimalism

- Do I use this item regularly?
- Does this item serve a unique purpose?
- Can I live without it?
- Would I buy this item again if I didn't already own it?
- Does this item align with my goals?

<https://barefootminimalists.com/finding-your-minimalist-essentials/>



N R house, Hyderabad, NA Architects

<https://worldarchitecture.org/architecture-projects/hfefh/bicubical-house-project-pages.html>

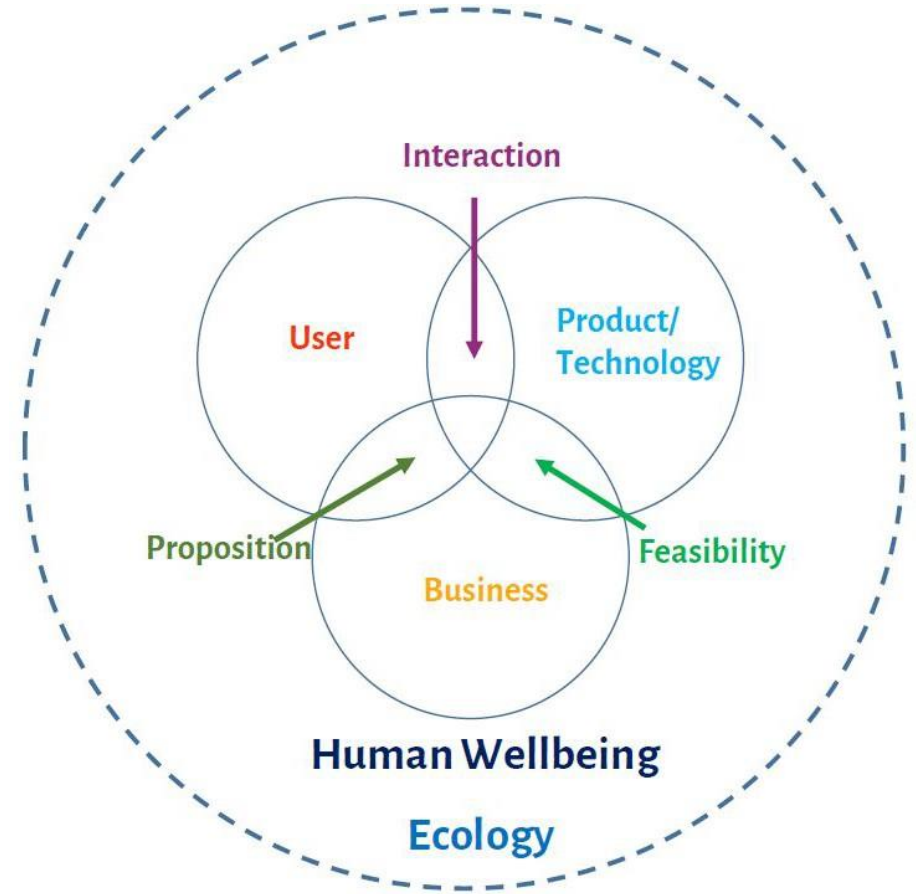


Reva and Ranjan Malik, Bengaluru

<https://www.youtube.com/watch?v=SzNzeR5ITL8>

Summary : Responsible design

- Frugal innovation
- Design for special / social needs
- Inclusive design
- Systemic design



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Next class ... 'Instructions for final submission'