

# A Research Agenda for ICT4S

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**ICT is part of the problem**

**and part of the solution**

# 1. The Problem

# Global Distribution of Greenhouse Gas Emissions

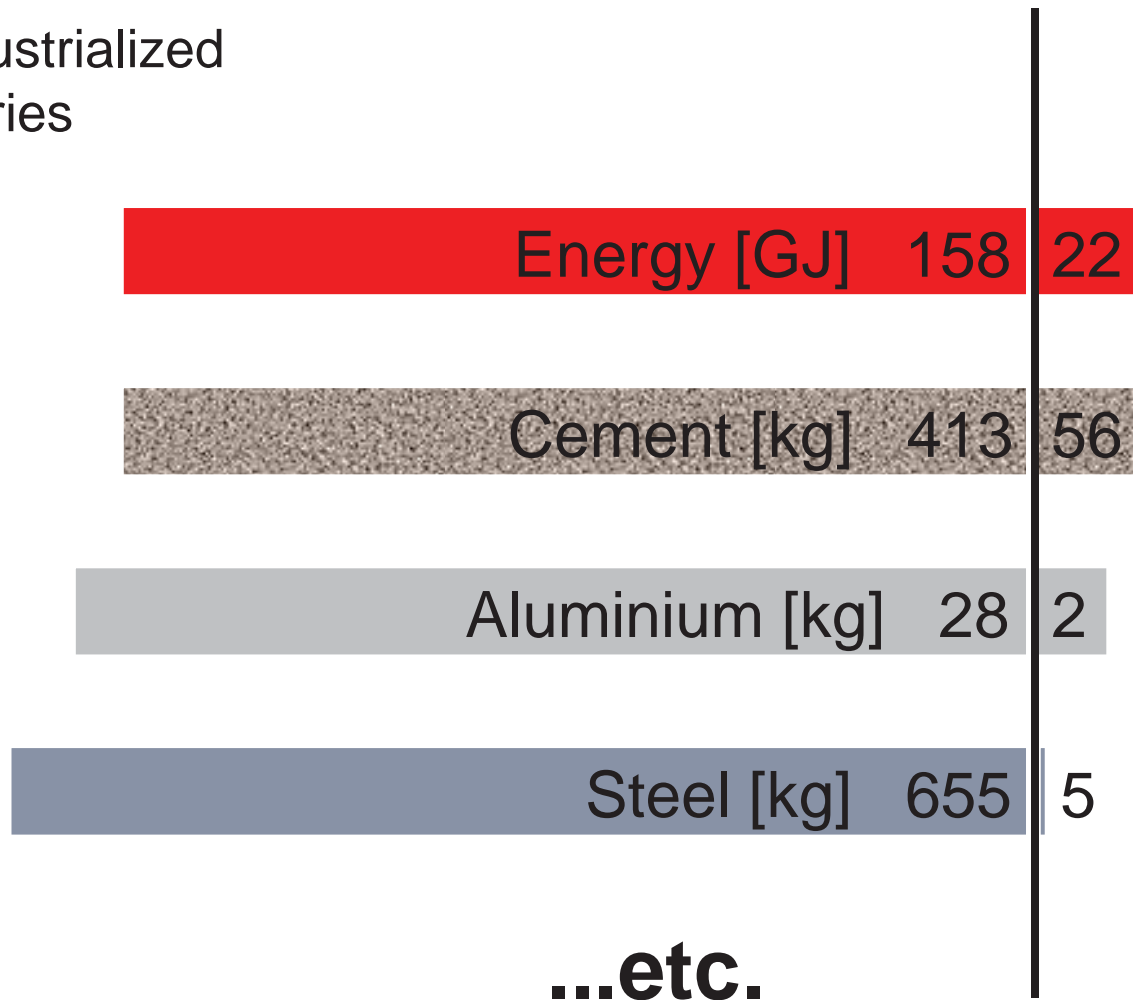


MacKay, 2009, p. 12

# Not Only CO<sub>2</sub>: Per-Capita Resource Use

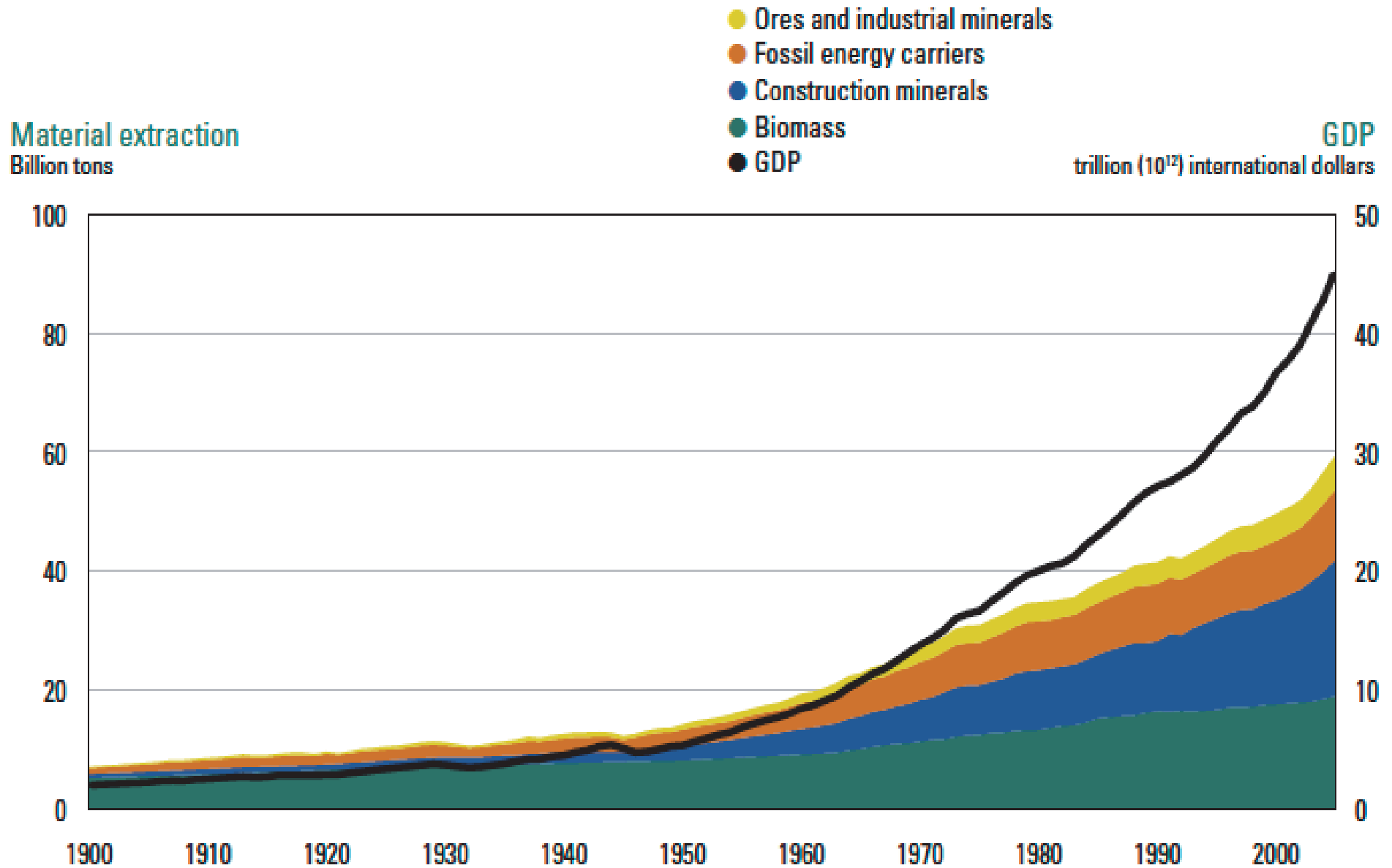
in industrialized  
countries

in developing  
countries



Based on von Weizsäcker, 1995

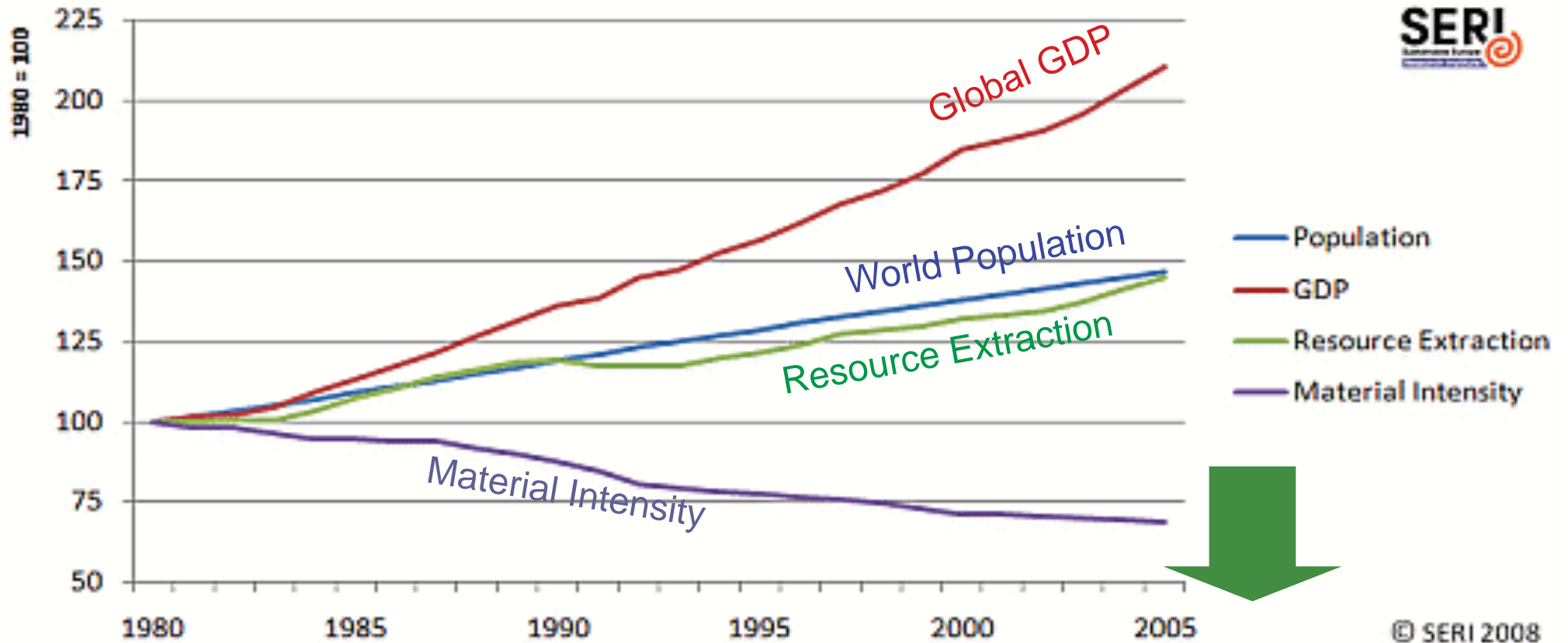
# Global Resource Extraction



Krausmann et al., 2009, cited in UNEP, 2011, p. 18

## **2. A Hope for Solution**

# Decoupling GDP from Resource Extraction



- Population
- GDP
- Resource Extraction
- Material Intensity

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$$\text{Material Intensity} = \frac{\text{Resource Extraction}}{\text{GDP}}$$



**Decoupling is based on  
technological substitution.**

# Example (Part 1)

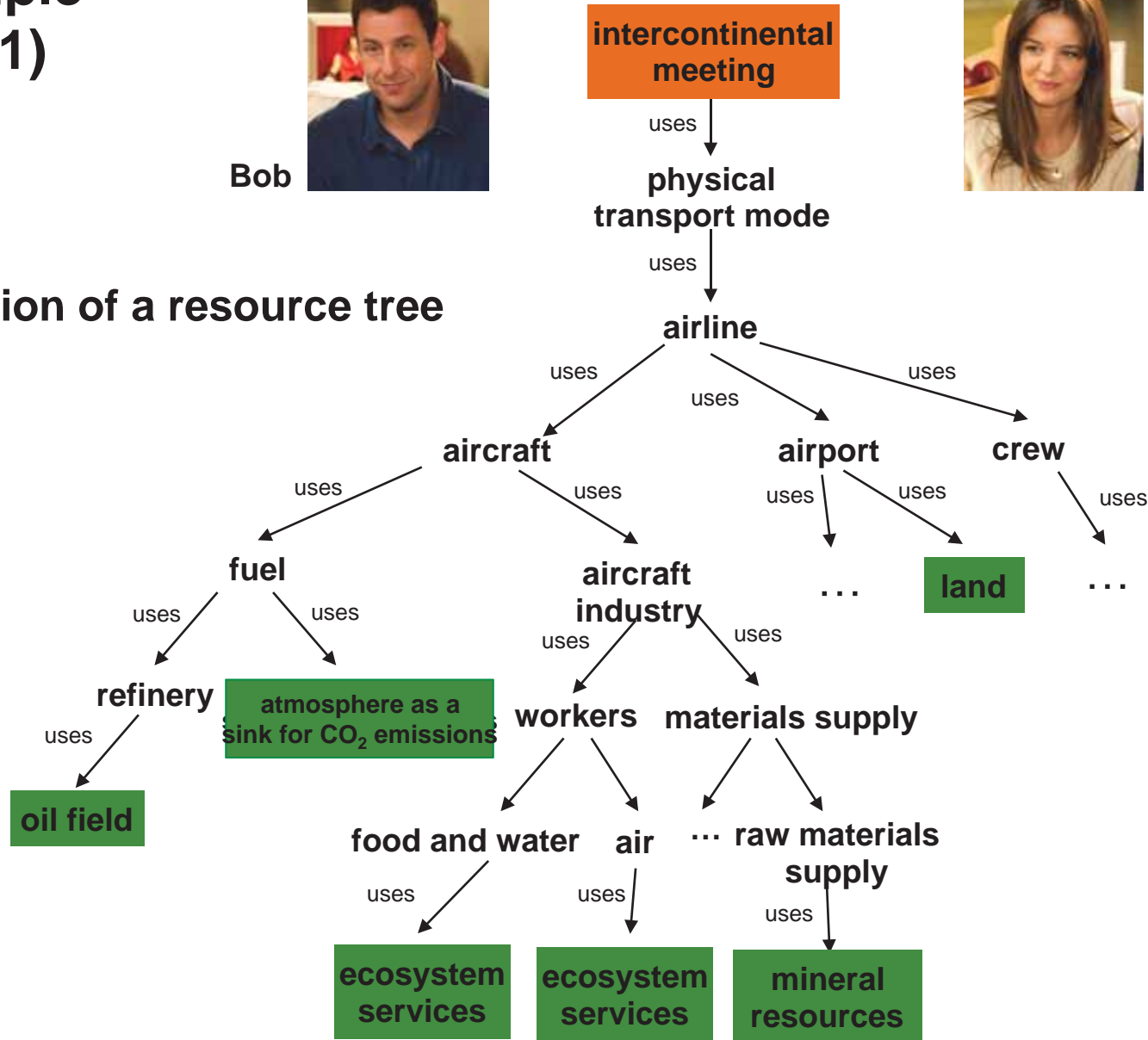
Bob



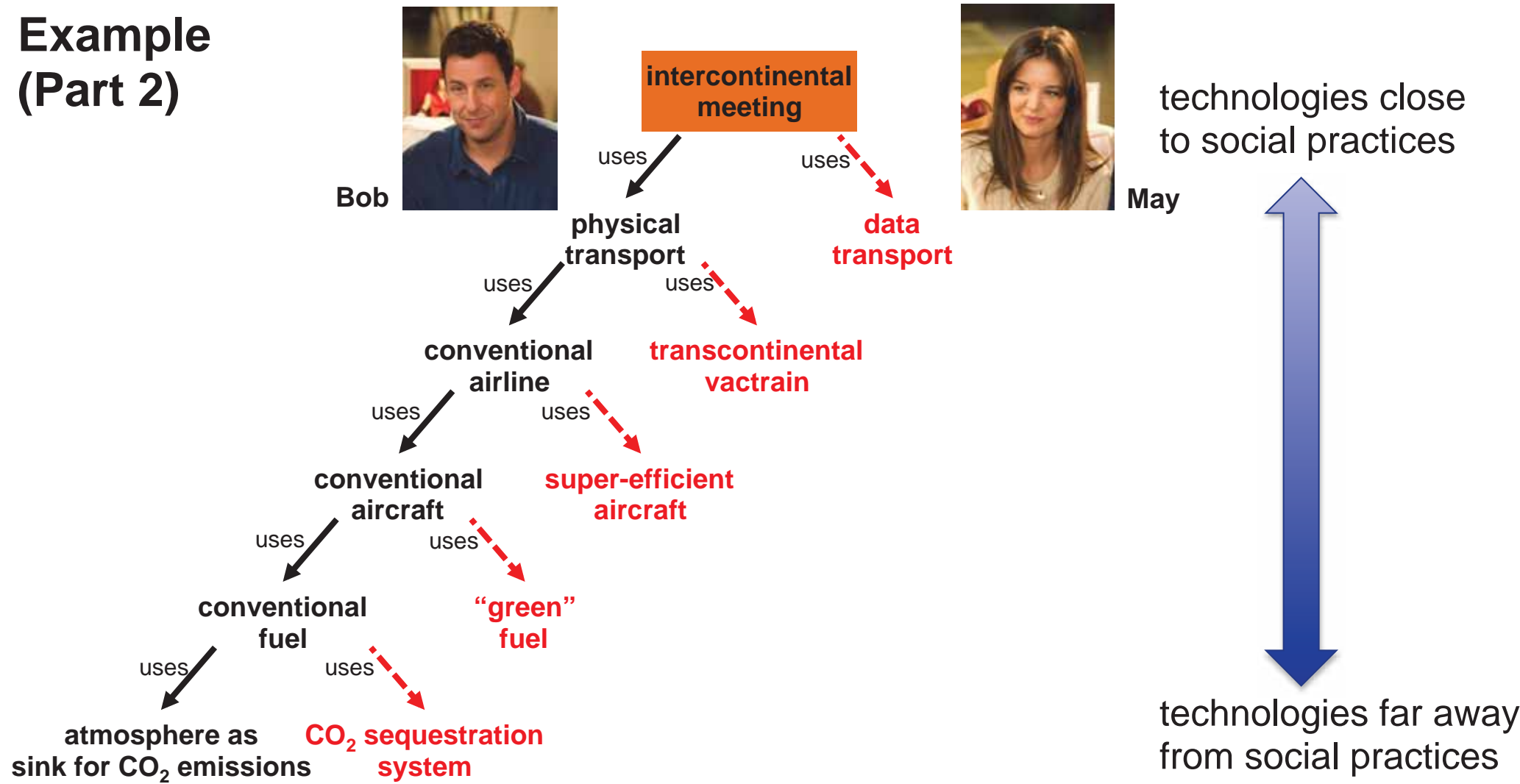
May



## Tiny portion of a resource tree



# Example (Part 2)

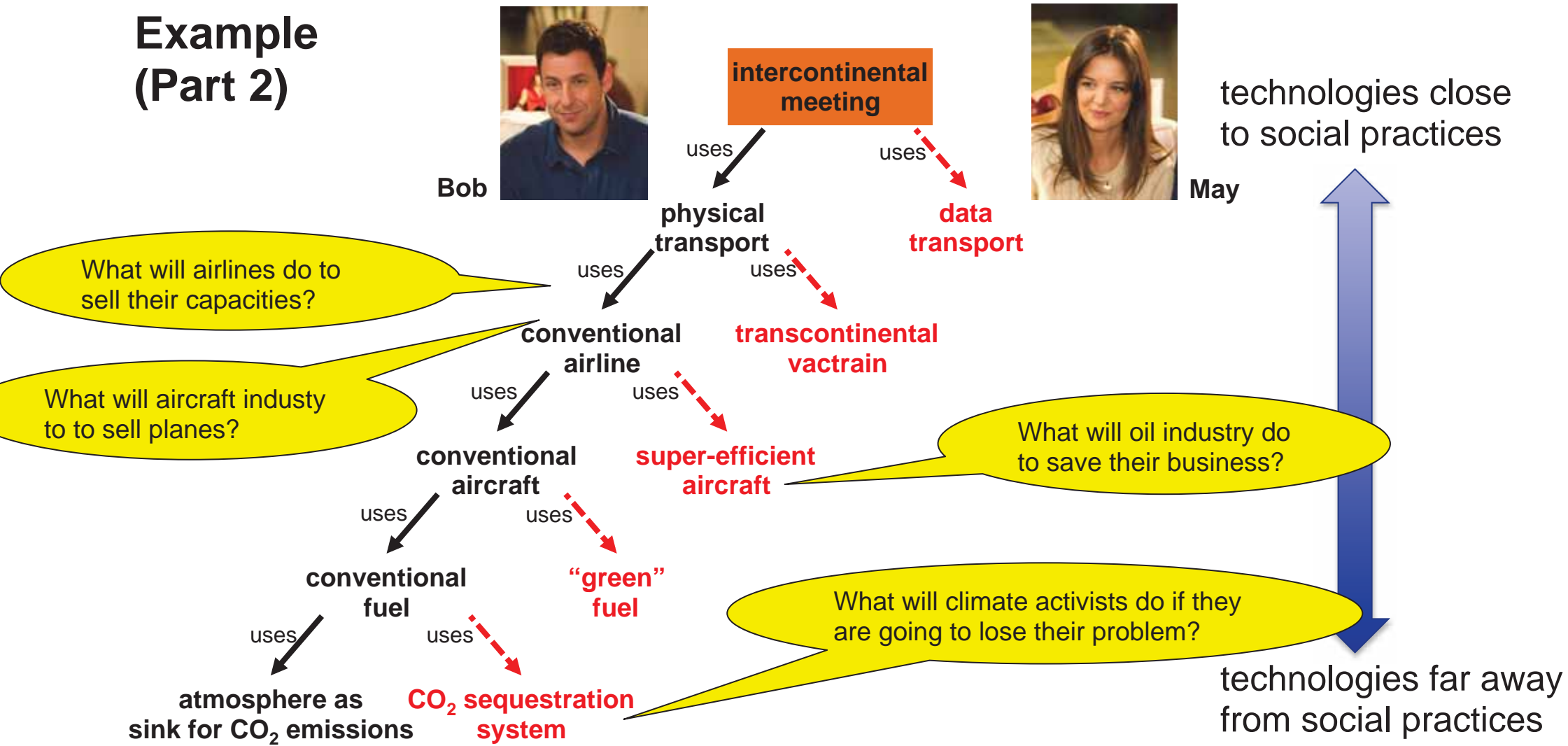


**A branch of the resource tree with potential technology substitutions**  
 Resource trees can be changed by technological substitution at any level

**Role of ICT in substitution:**

**ICT is a catalyst for substituting immaterial resources (information) for material resources.**

# Example (Part 2)



## A branch of the resource tree with potential substitutions

Resource trees can be changed by technological substitution at any level

**The missing micro-macro link:**

**Substitution is based on decisions taken by market participants, i.e., at the economic **micro**-level.**

**Decoupling is defined at the **macro**-level of the economy.**

**We do not know how micro-decisions translate into macro-behavior: there is a dynamic socio-economic system in between → more systems thinking needed**

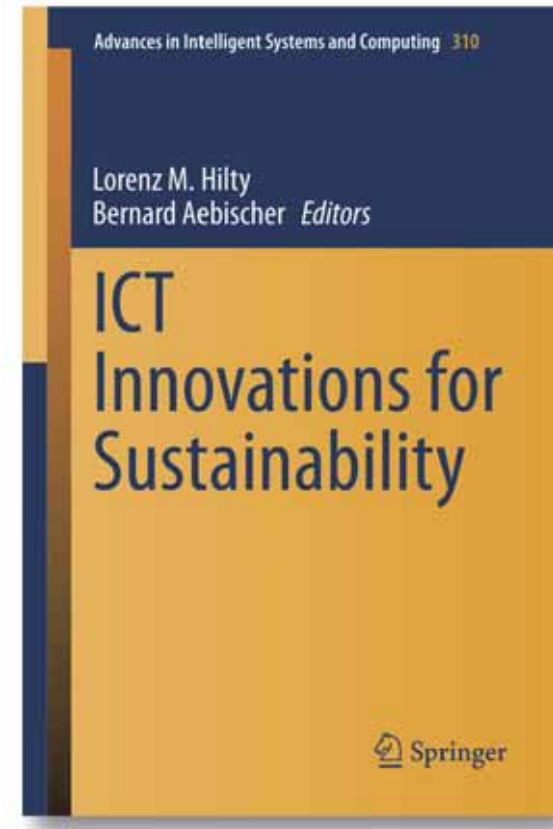
# 3. Research Agenda

# Three Big Issues for ICT4S

- 1** Understanding and improving **the role of ICT in technological substitution** at all levels of the resource tree.
- 2** Understanding and shaping the **micro-macro link**: How does the socio-economic system translate micro substitutions into societal change at the macro level?
- 3** Developing "**accompanying measures**": Designing technological artefacts is neither sustainable nor unsustainable in itself – it is unavoidable to attach a political message to them. **How can this be done systematically? How can we develop the arenas of discourse needed? And how can ICT help here?**



Some inspiration of how to tackle these issues provided by 47 authors





Thank you for your attention!

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