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## Frugal Innovations and Global Development: beyond technology?

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# Frugal Innovations and Global Development: beyond technology?

May 10<sup>th</sup> 2016,

Delft Global Initiative Lunch meeting

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in Africa



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## What we do at CFIA?

*We investigate how frugal innovation can contribute to inclusive growth and transformation in Africa*

### **Leiden-Delft-Erasmus strategic alliance:**

8 new research centres to demonstrate synergies

## How did we start?

*The CFIA is one of the joint multidisciplinary centres of Leiden University, Delft University of Technology and Erasmus University Rotterdam in the Netherlands.*



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1. Frugal Innovations: definition plus examples
2. Background and Relevance
3. Beyond Technology
4. Concrete Research Project:

*Non-Technological Determinants and Design  
for successful Innovation Performance*



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## Frugal Innovations: definition plus examples



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## Elements of a Definition

- Dramatically lowering costs
- Designed & engineered specifically to target Bottom of Pyramid consumers and lower middle class segment's preferences while taking into account local constraints (example: TAHMO).
- User value for money and technological sophistication



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- Portable electrocardiogram for rural areas in India
- Sold at 10% of price for electrocardiograms developed for the US market

*General Electric, Portable electrocardiogram (ECG)*



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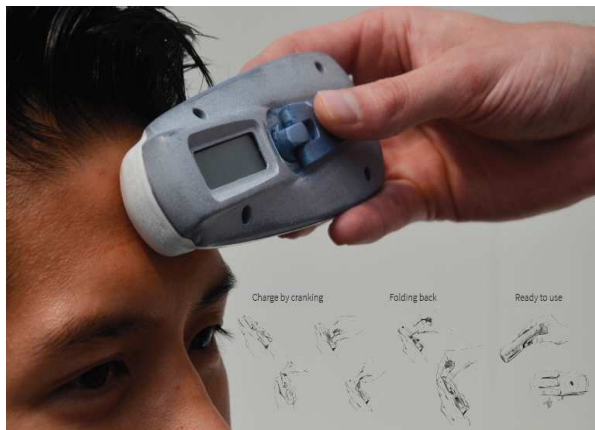
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- **Leiden:** medical anthropology, Africa know-how, history, law (IPR)
- **Delft:** engineering, design, innovation management/ entrepreneurship, ethics
- **Erasmus:** inclusive business models, local economic development



## Case Study Frugal Thermometer:

- Robust, easy to use,
- Fits in local health system,
- Reduces pressure on health system

*Next step: is there a business model?*

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## Background and Relevance



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## Background

Structural economic changes in business environment 1990-now:

- Liberalization of international trade and capital flows
- High economic growth (GDP), particularly in developing countries: strongly visible since crisis of 2008:
  - rising middle class
  - Bottom-of Pyramid (those living from \$ 2,- a day maximum)



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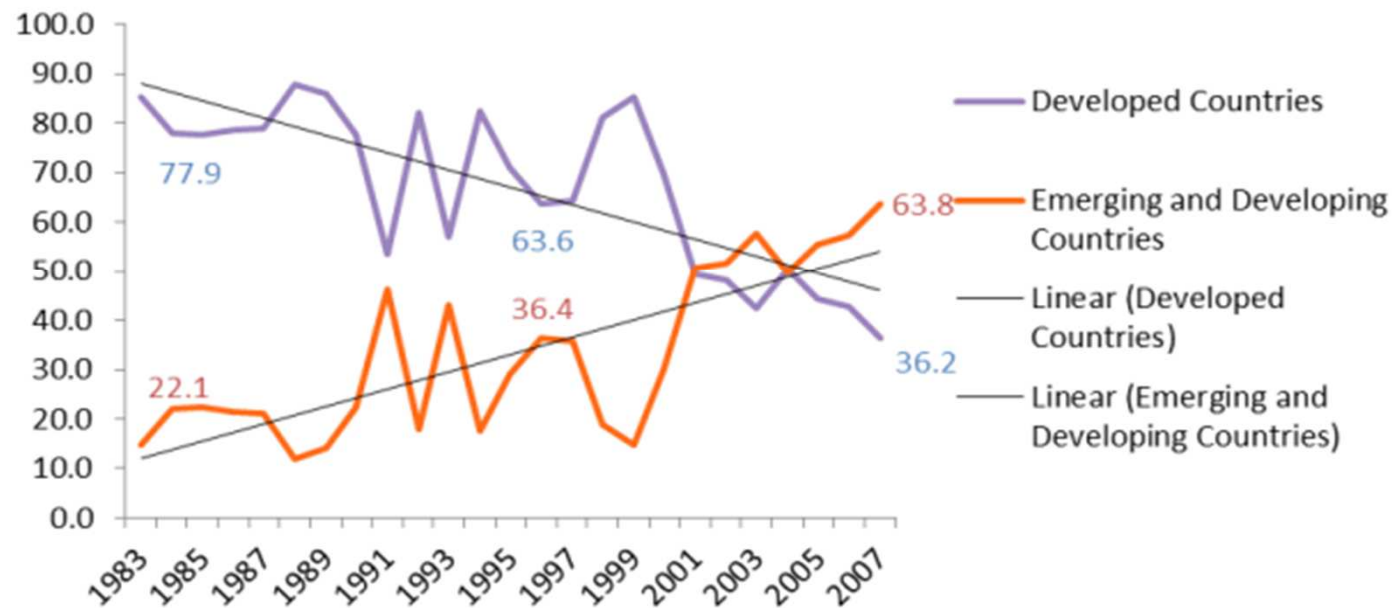


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## Origin of World Growth



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**Economic Growth in Africa:** 6 out of 10 fastest growing economies are in African Countries

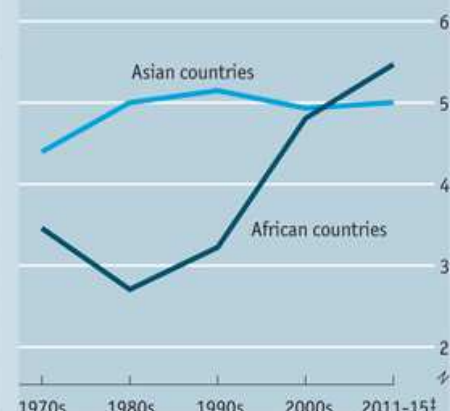


World's ten fastest-growing economies\*  
Annual average GDP growth, %

2001-2010†		2011-2015‡	
Angola	11.1	China	9.5
China	10.5	India	8.2
Myanmar	10.3	Ethiopia	8.1
Nigeria	8.9	Mozambique	7.7
Ethiopia	8.4	Tanzania	7.2
Kazakhstan	8.2	Vietnam	7.2
Chad	7.9	Congo	7.0
Mozambique	7.9	Ghana	7.0
Cambodia	7.7	Zambia	6.9
Rwanda	7.6	Nigeria	6.8

Sources: The Economist; IMF

GDP growth, unweighted annual average, %



\*Excluding countries with less than 10m population and Iraq and Afghanistan †2010 estimate ‡Forecast



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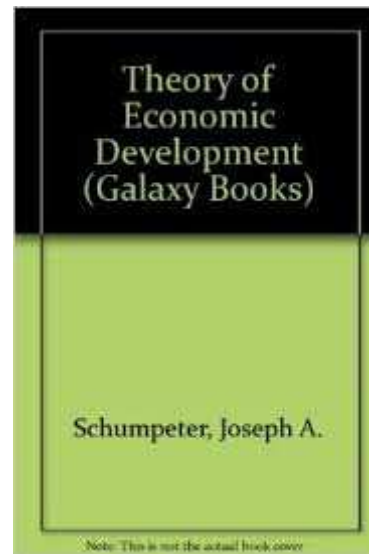
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## Background

Innovation is a dominant force in economic transformation  
(Schumpeter, 1911)



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## Africa is:

- growing rapidly
- transforming slowly

*“Manufacturing has to move to higher levels of technology to compete, but the shares of medium and high technology in both production and exports are much lower than for comparators.”*

*Source: ACET – African Transformation Report (2014)*

*“Higher investment rates are needed not only to expand production capacity but also to acquire new machinery, a channel for upgrading technology and boosting productivity.”*

*Source: ACET – African Transformation Report (2014)*



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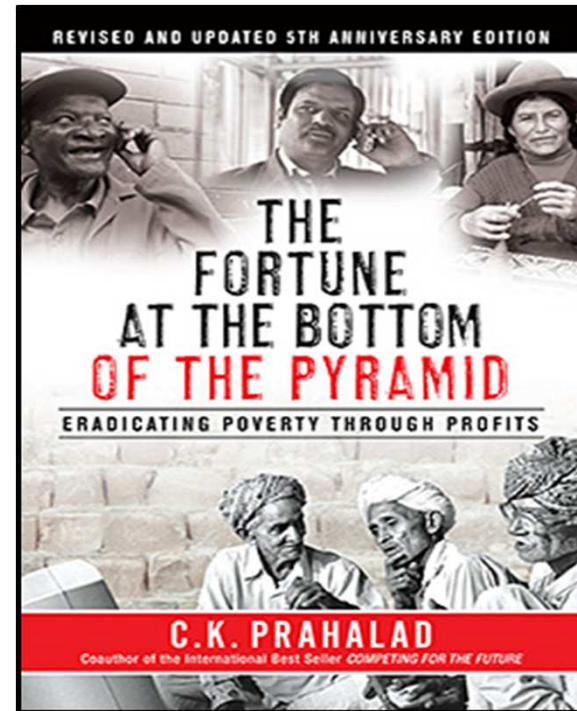
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## Background

Prahalad, C.K. and A. Hammond, 2002. Serving the World's Poor Profitably, *Harvard Business Review*, 80(9): 48-57.

Prahalad, C.K. 2012, *The Fortune at the Bottom of the Pyramid*, Pearson Education Publishers.



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## Beyond Technology?



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Technology very important but there is more..... :

Requires two elements:

- Business models: private firms are the new actors, both MNCs and SMEs
- Elements of inclusive or responsible innovation through:
  - Maintaining quality (standards)
  - Value-sensitive design (BoP and emerging middle class)



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# Frugal Innovation in Africa:

## Different kind of business models

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### Different kind of business models

- a) Multinational enterprises: Phillips, General Electric, Unilever, Tata: MNEs most dominant business model
- b) Small and medium entrepreneurs
- c) Hubs: Start up (**local**) entrepreneurs: high failure rate
- d) **Polycentric innovation: combination of a) with b) or c)? (global value chains, global diffusion of capabilities)**



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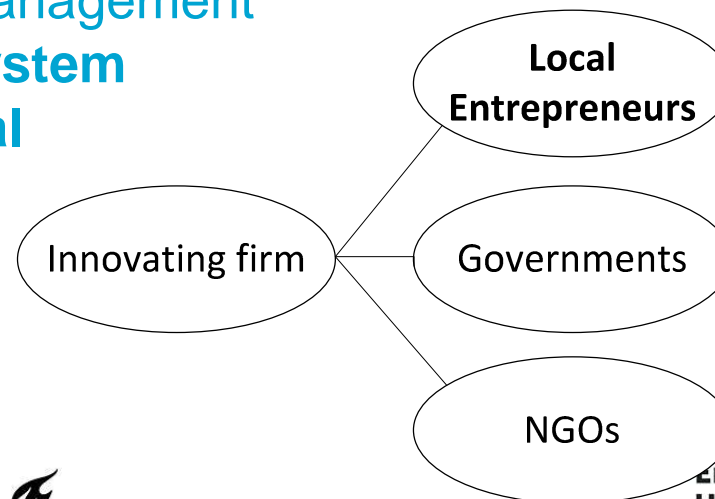
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- Inclusive business models: **link between profits and local economic development**
- From traditional product management to a **new business eco-system leading to inclusive frugal innovations**



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## Inclusiveness: Local Economic Development

1. Low-income customers demand new products, services and systems addressing specific constraints in local economy (M-Pesa)
2. Local entrepreneurs contribution to global value chains be improved by frugal innovations that reduce unreliability and instability of existing technological and institutional infrastructures (CLCs).

Example: frugal weather stations provide data that can be communicated to farmers by cell phone improving decision making.



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## Concrete Research Project: Non-Technological Factors for success

<http://www.cfia.nl/themes/responsible-innovations>



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## Core questions

- Under which conditions are frugal innovations more developmental and how to increase that likelihood?
- Move beyond case studies and develop more systematic analytical frameworks, also to strengthen developmental and policy relevance



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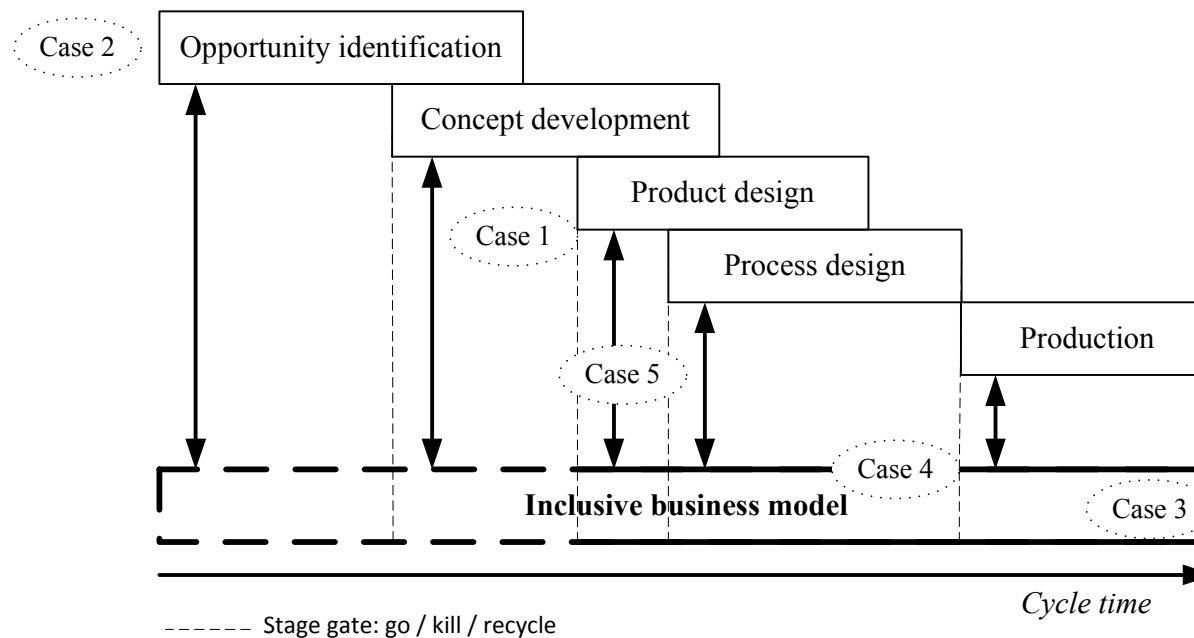
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## Planned Research: product development cycle with value sensitive design



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## Cases: CLCs

### Case 1: Philips Africa: Community Life Centers (CLCs)



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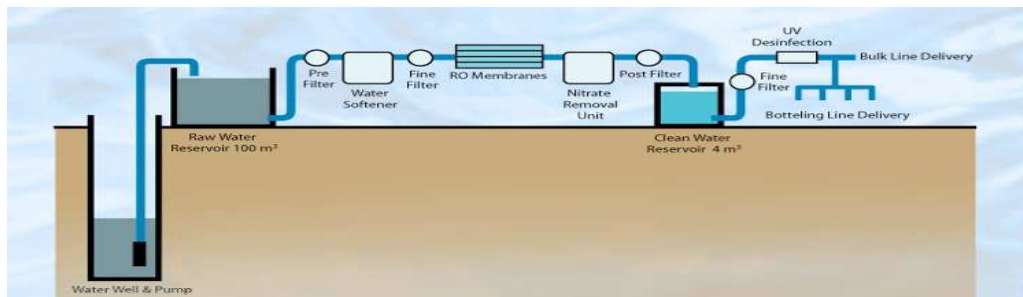
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## Cases: Water

**Case 2: OASEN** sees opportunities to link their knowledge on (potable) water provisions to the CLCs and use it to come to a sustainable and inclusive water supply at a decentralized level.



**Case 3: Hatlenboer:** Dutch Water Limited (DWL) is a company based in Kenya and part of Hatlenboer



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## Cases: Health and Water

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**Case 4: TAHMO:** The Trans-African Hydro-Meteorological Observatory is a hydro-meteorological measurement stations to be implemented in sub-Saharan Africa.



**Case 5: Frugal Thermometer:** The idea is to develop a thermometer without mercury that provides more accurate measurement of body temperature, through a device that is more robust and will be used by local health workers



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## How to bring in inclusiveness?

1. Local Economic conditions included

by means of

2. Local Entrepreneurship



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## Advantages Local Entrepreneurship in Polycentric business models

1. Distribution channel rolling out innovations to local communities, particularly relevant in remote areas.
2. Important sources on local user values but and hence important as (co-) innovators providing new ideas and values in innovation process.



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# Delft Global Initiative (DGI)

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Finding concrete solutions for problems faced by people in developing countries. In close partnership with local scientists and entrepreneurs they aim to make an impact and improve people's lives.

## Four key elements :

- 1) Global Challenges,
- 2) High-Tech Science,
- 3) **Co-Creation**
- 4) **Local Impact.**



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## Scientific interest

- Management theory studies with firm-level studies strongly focused on perspective of the firm
- Inclusive innovation / reverse innovation literature

George *et.al* (*Journal of Management Studies*: 2012: 665)

*“the richness and variability of the phenomena involved highlight questions that remain unanswered by current organizational and management theory”*



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