



The Role of Business Models in the Adoption of Clean Cooking Stoves in Africa

Addisu Lashitew
Rotterdam School of Management

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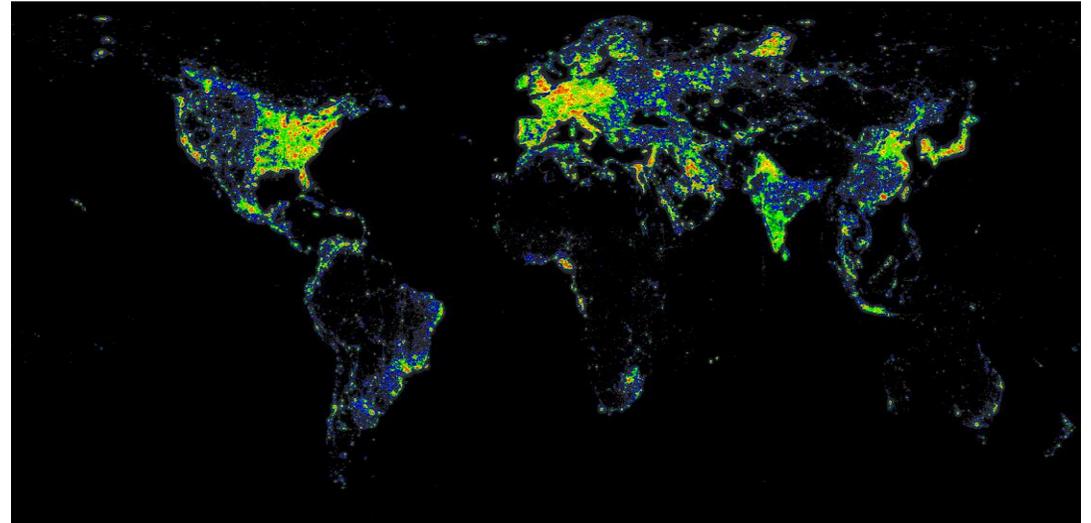
The Hague

Outline

- 🍁 The problem
- 🍁 The solution
- 🍁 Challenges
- 🍁 Business models
- 🍁 Results
- 🍁 Conclusion

The problem

- ✓ Around 40% of humanity has no access to electricity (2.7 billion people)
 - The share is even greater in Africa, with 57% of people lacking access (621 million people)



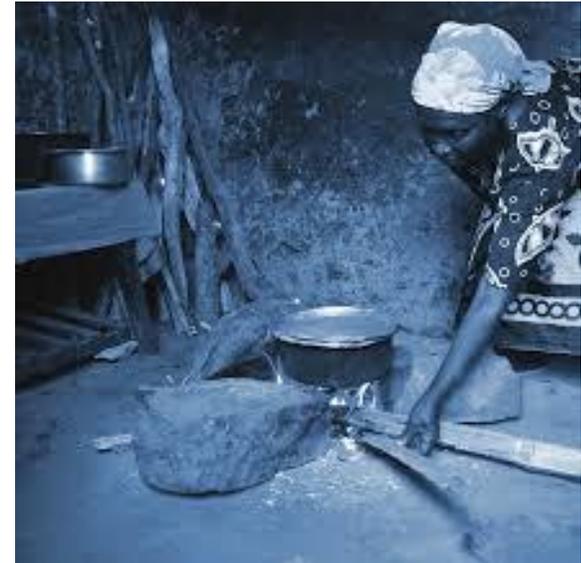
The problem

- ✓ Cooking on open fires with biomass has several effects
 - 🍁 Significant time & money spent on firewood
 - 🍁 Deforestation & CO₂ emissions
 - 🍁 Adverse health effects

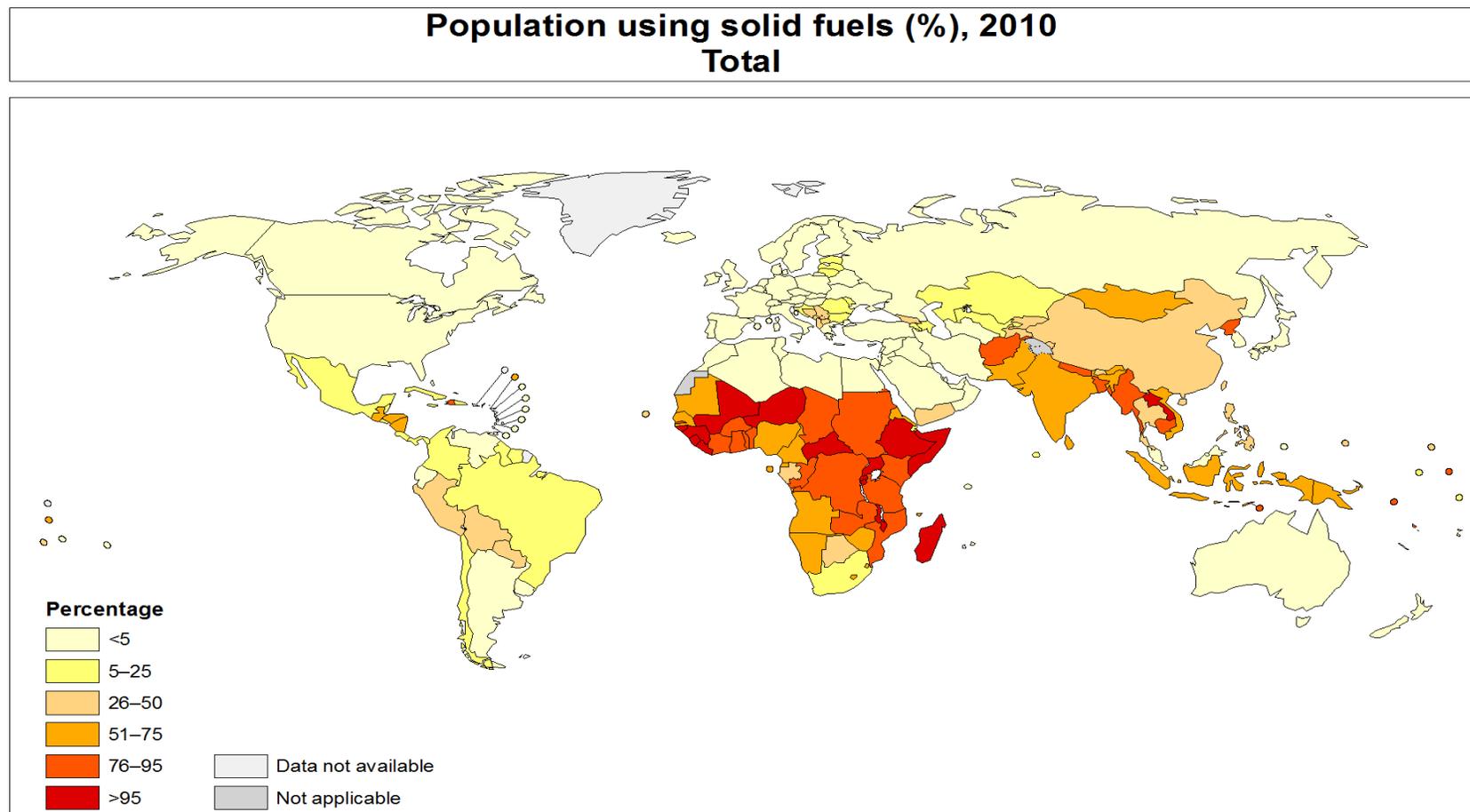


The problem

- ✓ Household cooking leads to 4.3 million deaths per year
 - 🍁 Acute lower respiratory infections
 - 🍁 Chronic pulmonary disease
 - 🍁 Lung cancer
 - 🍁 Eye diseases etc.



The problem



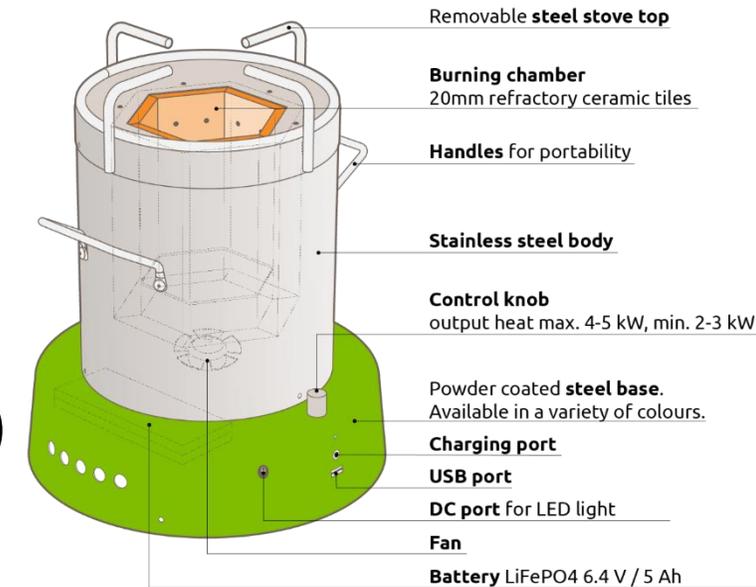
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Data Source: World Health Organization
Map Production: Public Health Information
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The solution

- ✓ **Cleaning cooking stoves**
 - 🍁 GACC aspires 100m stoves by 2020
- ✓ **Gasifier cooking stoves**
 - 🍁 Nearly as clean as cooking with gas
 - 🍁 Highly fuel efficient (as much as 65-80% fuel saving)



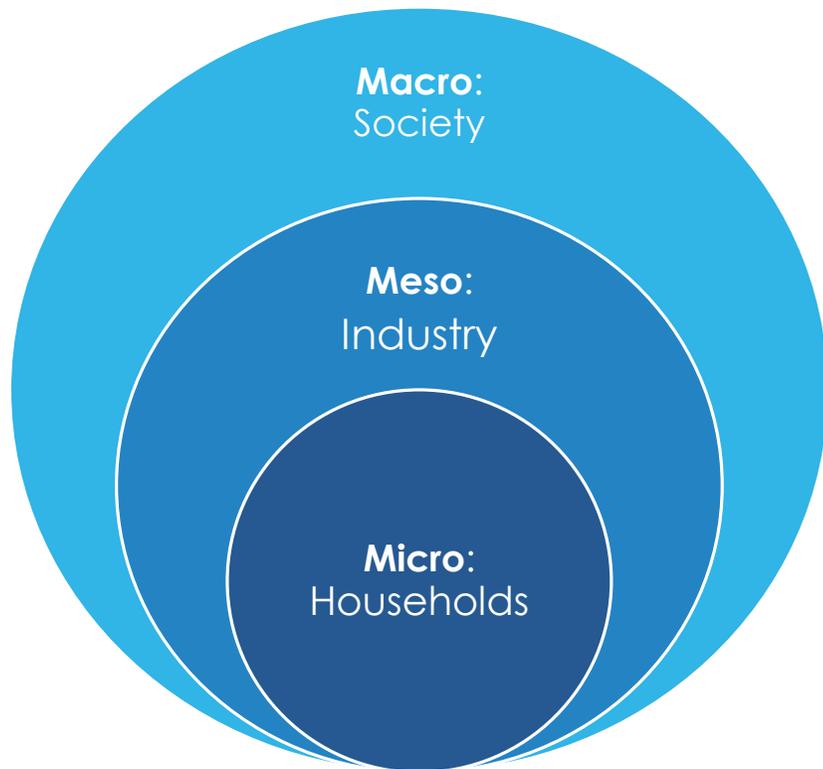
The solution

- ✓ Gasifier cooking stoves
 - 🍁 Most efficient with pellets and briquettes
 - 🍁 Cost from 50-150 USD
 - 🍁 ~50k have been sold



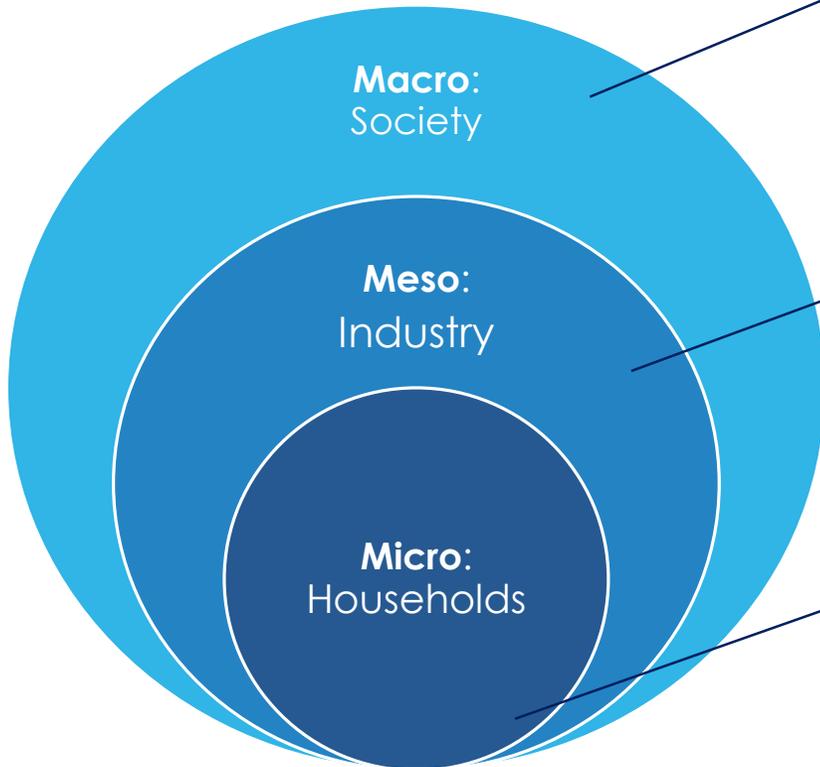
The challenge

Multi-level barriers to adoption



The challenge

Multi-level barriers to adoption

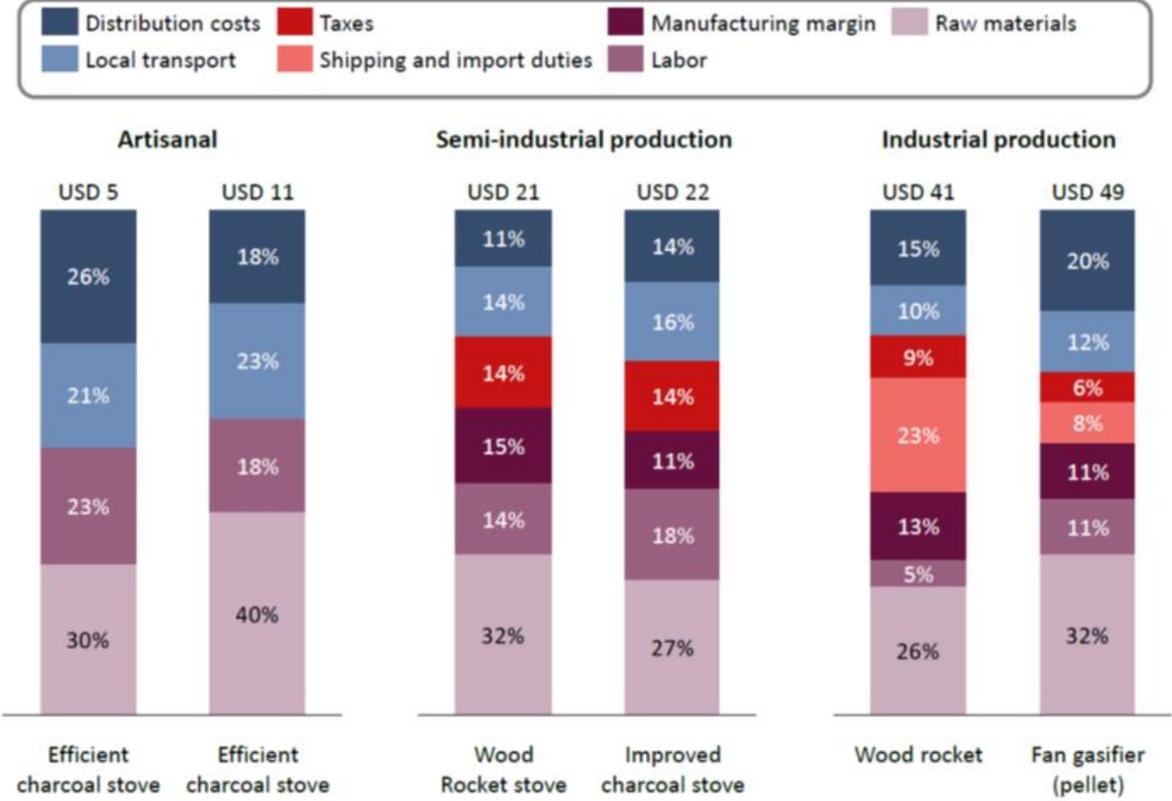


- ✓ Policy support
- ✓ Institutional voids
 - E.g. Financing, infrastructure

- ✓ Technological barriers
- ✓ Incomplete value chains
- ✓ Perceived risk

- ✓ Cognitive barriers
- ✓ Economic barriers
- ✓ Unique market preferences

The challenge



Cost components of marketing a fuel stove

The two business cases

Clean Energy Solutions (CES)

- ✓ Started as a partnership with an MNC in 2011
- ✓ Became independent in 2013
- ✓ Commercial operations mainly based in Europe
- ✓ A plant in a small African country
 - Exports to the rest of Africa

The two business cases

Yaneni Cooking Stoves (YCS)

- ✓ Started as a pilot in 2012
- ✓ It produces/sells fuel pellets and distributes cooking stoves
 - Razor + blade business model
- ✓ Sometimes subsidizes cooking stove prices
- ✓ Operates only within one country

The two business cases

Yaneni Cooking Stoves (YCS)

Started Following WorldStove International's **Five-Step Program**

Step 1: Establish the “Stove Hub” with staff and facilities

Step 2: Build a factory for stove assembly

Step 3: Scale up operations (e.g. a larger pellet plant)

Step 4: Bio-char collection and fuel Supplies

Step 5: Distribute the char produced at the Stove Hub

Business models

A business model depicts an organization's “**structure and governance of transactions designed so as to create value**” (Zott, Amit and Massa, 2011).

A business model is abstract representation of an organization's **core logic for creating and capturing value**.

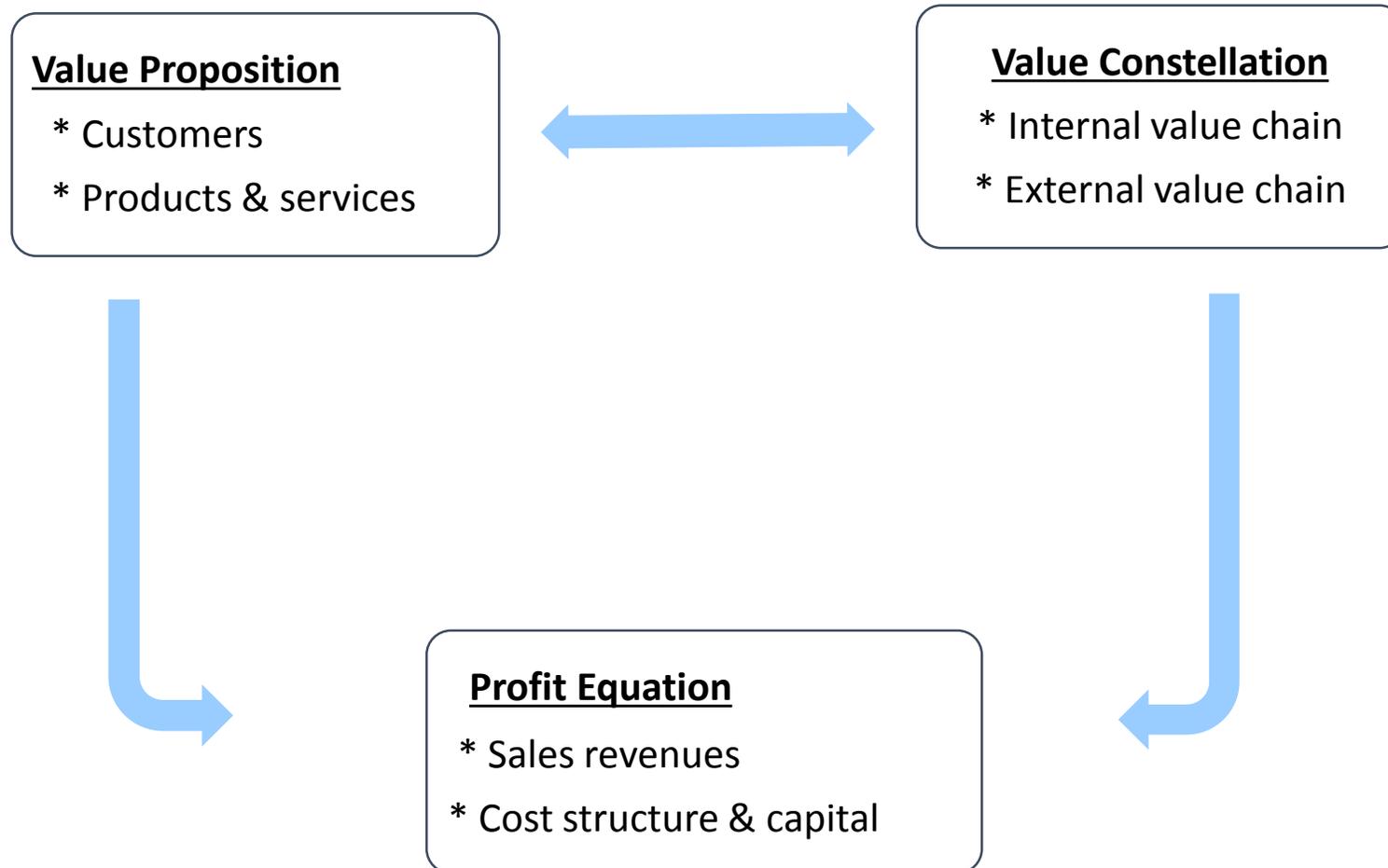
Business models

- ✓ Novel business models can be used to address adoption obstacles

Adoption barriers	Business model features /strategies
Low level of affordability	<ul style="list-style-type: none">* Frugal technologies* Micro-financing schemes* Scale* (Cross-)Subsidies* Carbon credit schemes
Unique consumer preferences	<ul style="list-style-type: none">* Co-design* Iterative design
Local conditions (e.g. electricity, fuel availability)	<ul style="list-style-type: none">* Proper piloting* Co-designing
Low level of awareness	<ul style="list-style-type: none">* Demonstrating* Early engagement
External barriers <ul style="list-style-type: none">- high import duty- lack of financing- logistics	<ul style="list-style-type: none">* Local partners* Local sourcing* Policy engagement

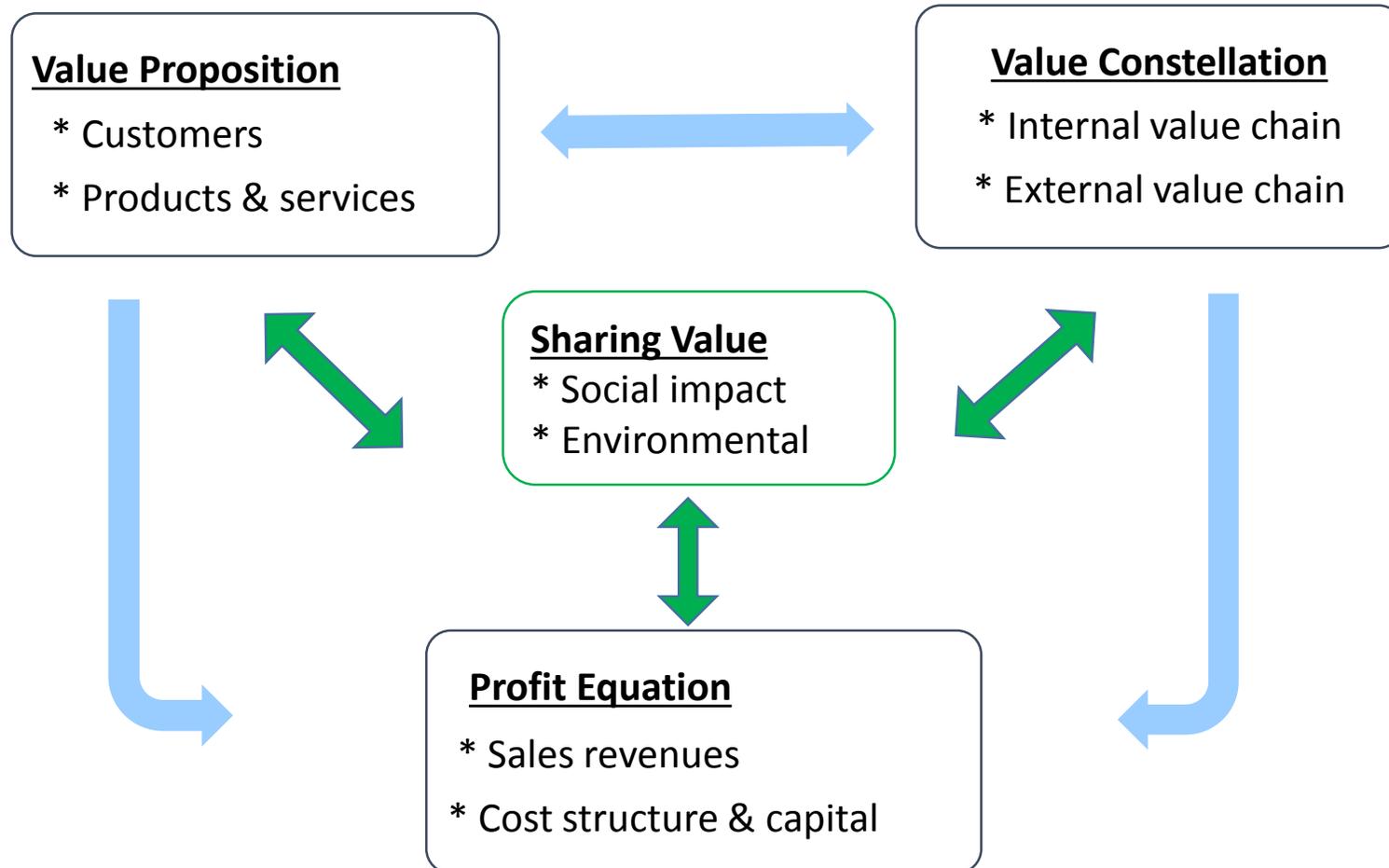
Business models

A business model framework (Yunus, Moingeon, and Lehmann-Ortega, 2010)



Business models

A business model framework (Yunus, Moingeon, and Lehmann-Ortega, 2010)



Business models

Value proposition	Value constellation	Value capture	Sharing value
Clean Energy Solutions: <u>Traditional FDI</u>			
Clean cooking stoves - solar lamp - charger Middle income earners	Centralized production Distribution - Own centres - Third party agents - Web-shop	Low production cost High distribution cost Relatively high prices (\$150)	Social & environmental benefits embedded in product Employment in factory

Business models

Value proposition	Value constellation	Value capture	Sharing value
Yeneni Cooking Stoves: <u>Razor + Blade model</u>			
Cheap and clean stoves + Constant fuel pellet supply Maintenance and follow up	Externally source stoves -- Stepwise approach Build local presence -- Pellet factory -- Retail shops	Low cost pellet production Revenue from pellets Small/no profit from stove sales Carbon credit	Social & environmental benefits embedded in product Low income/rural households accessed through stove+fuel program

Comparative results

- ✓ **Embedded vs. arms-length** business models
 - Yenedi builds local presence – own & partner retailers and street vendors
 - E.g. Crowd-sourcing of firewood
- ✓ Embeddedness could offer several advantages
 - ‘**Native capabilities**’ -- knowledge of local resources and markets (London and Hart, 2004)
 - Strong local networks as substitute for missing **formal institutions**
 - Builds trust and change mindsets
- ✓ But ‘native capabilities’ are non-transferable

Comparative results

- ✓ **Interactive vs. standalone** business models
 - Yenedi actively builds relationships to develop local markets
 - E.g. Selling carbon credits; working financial institutions for mobile banking
- ✓ Interactive business models involve
 - “Integrating the firm’s internal resources with the ecosystem’s capabilities to create new business opportunities” (Sanchez and Ricart, 2010)
 - More relevant in dynamic and uncertain environments
 - Substitute for missing **supporting institutions**
- ✓ However, building **formal relationships** is costly

Conclusion

- ✓ Different business models could have different capacities to encourage the adoption of cleaner cooking stoves
- ✓ More data is needed to conclude on the potential impact of each model