

# ENERGY JUSTICE IN POVERTY

POLICY MODELLING OF INVISIBLE DRIVERS OF ENERGY DEMAND IN SLUM REHABILITATION HOUSING IN THE GLOBAL SOUTH

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## PROBLEM STATEMENT

Distributive **energy justice** entitles people to a **basic set of minimum energy services** which enable them to **enjoy an essential minimum of well-being**. However, the thresholds for a minimum energy services **remains unknown** in the literature (Sovacool and Dworkin, 2014)

## PRIMARY RESEARCH QUESTION

How do you **indicate** a ‘minimum of energy services’ for energy justice in low-income population?

## RESEARCH QUESTION 1

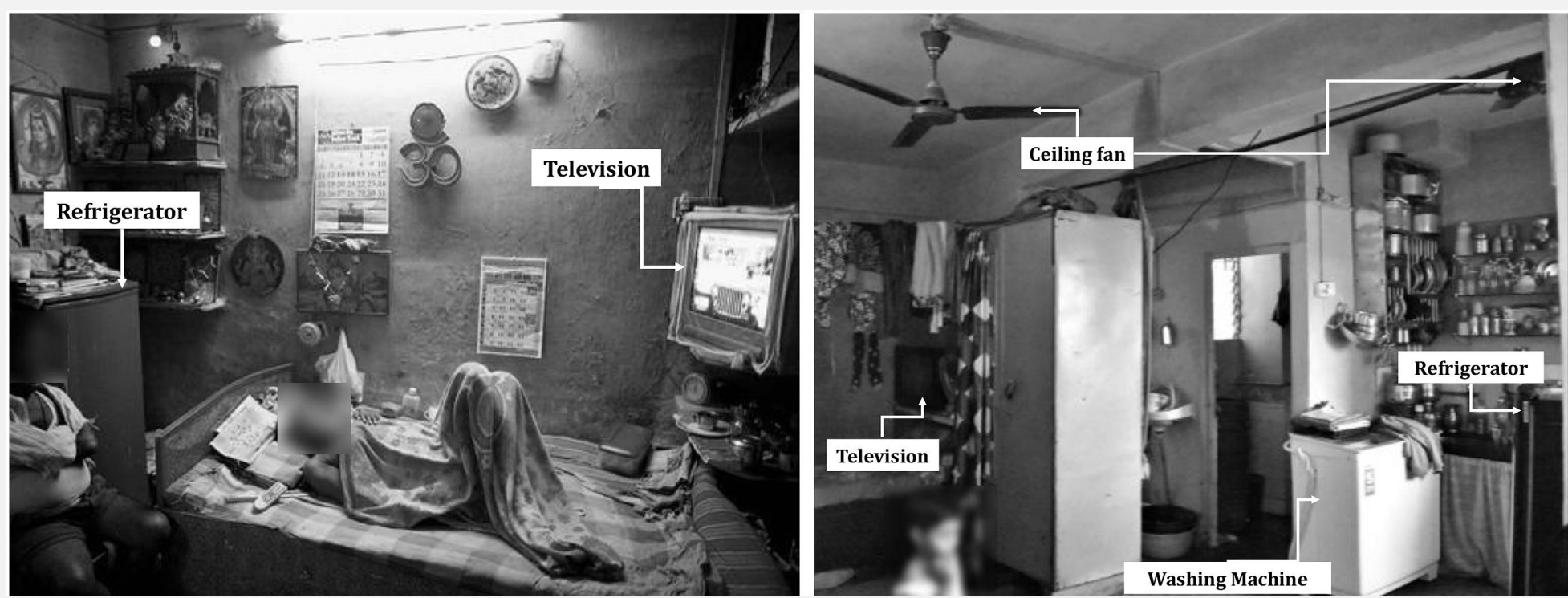
What are the **non-income drivers of energy demand in poverty**?

## ANSWER

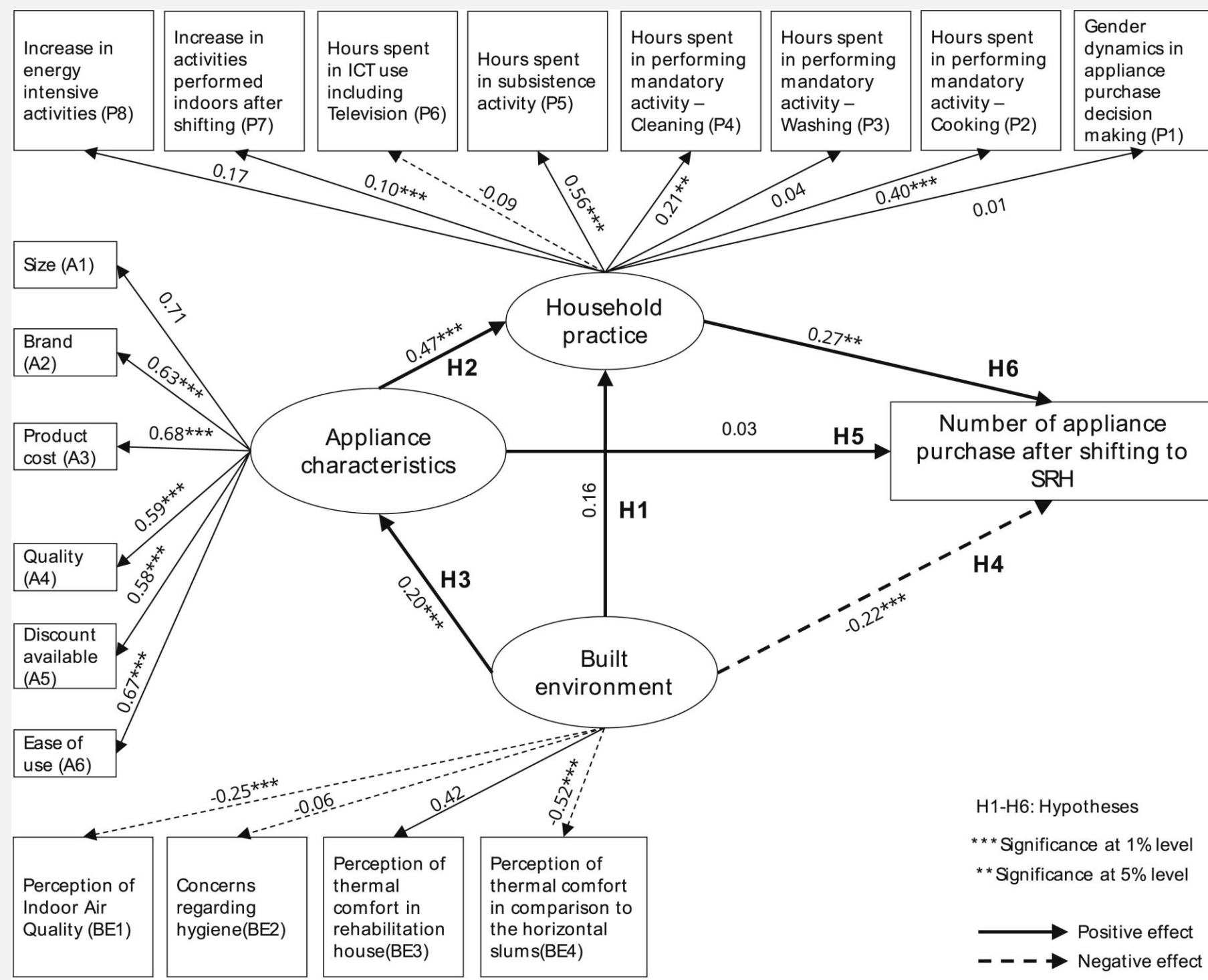
- Poor built environmental design
- Change of household practices
- Socio-cultural energy service needs
- Aspiration-driven appliance ownership
- Settled-status in slum rehabilitation houses

## METHODOLOGY

**Social Practice Theory and Structural Equation Modelling** on 1224 slum rehabilitation household, Mumbai, India.



## EMPIRICAL MODEL



## RESEARCH QUESTION 2

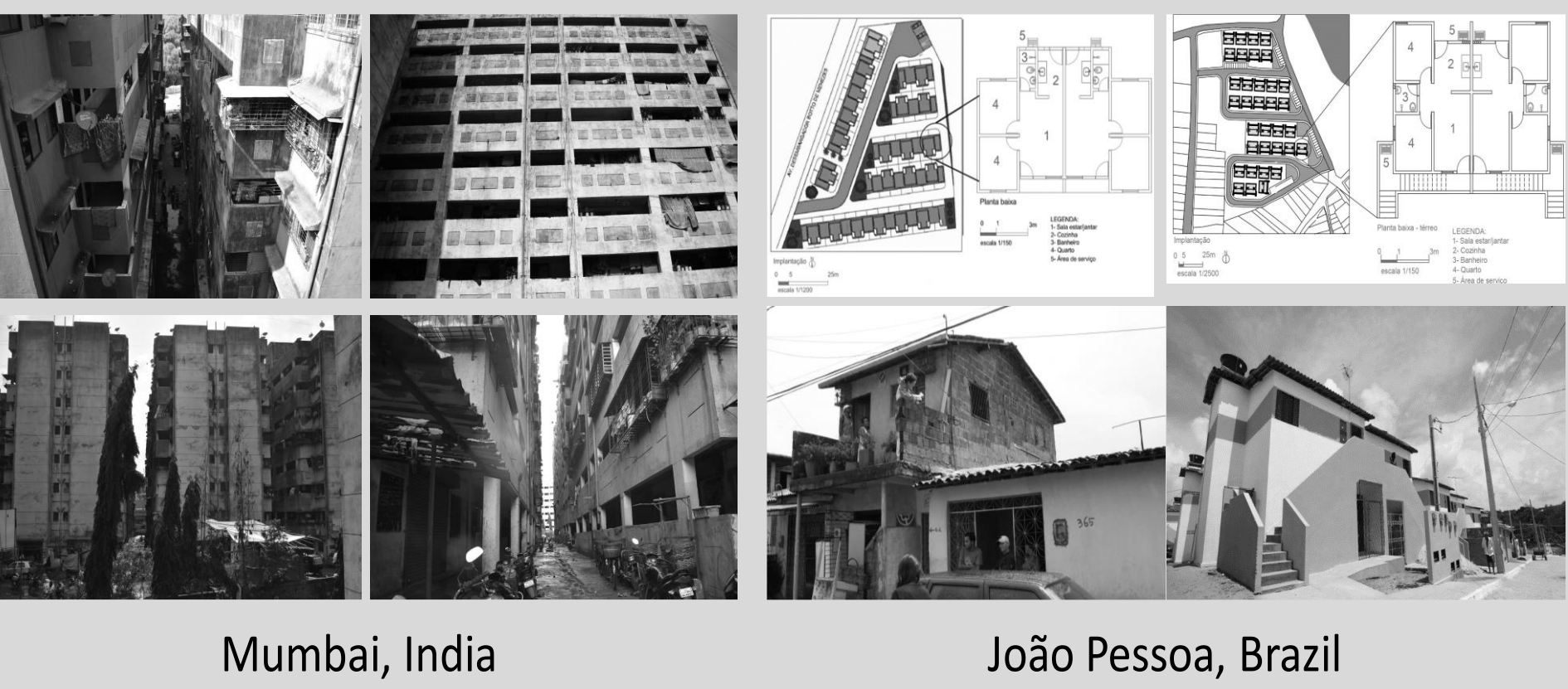
How does **social dimension of energy services influence energy justice**?

## ANSWER

- Typology of built environment influences cultural energy service demand
- Minimum of energy can be defined through comfort, cleanliness and convenience
- Environmental design – energy justice link

## METHODOLOGY

**Energy Culture Theory and Structural Equation Modelling** on 200 slum rehabilitation household



## EMPIRICAL MODEL

$$f(\text{total appliance ownership}) = \alpha(\text{comfort}) + \beta(\text{cleanliness}) + \gamma(\text{convenience}) + \text{error}(\epsilon)$$

$$f_{\text{Brazil}}(\text{total appliance ownership}) = 0.222(\text{comfort}) + 0.845(\text{convenience}) + \epsilon$$

$$f_{\text{India}}(\text{total appliance ownership}) = -0.121(\text{comfort}) - 0.501(\text{cleanliness}) + 0.695(\text{convenience}) + \epsilon$$

## RESEARCH QUESTION 3

What are the **energy externalities in poverty from a dynamic energy justice perspective**?

## ANSWER

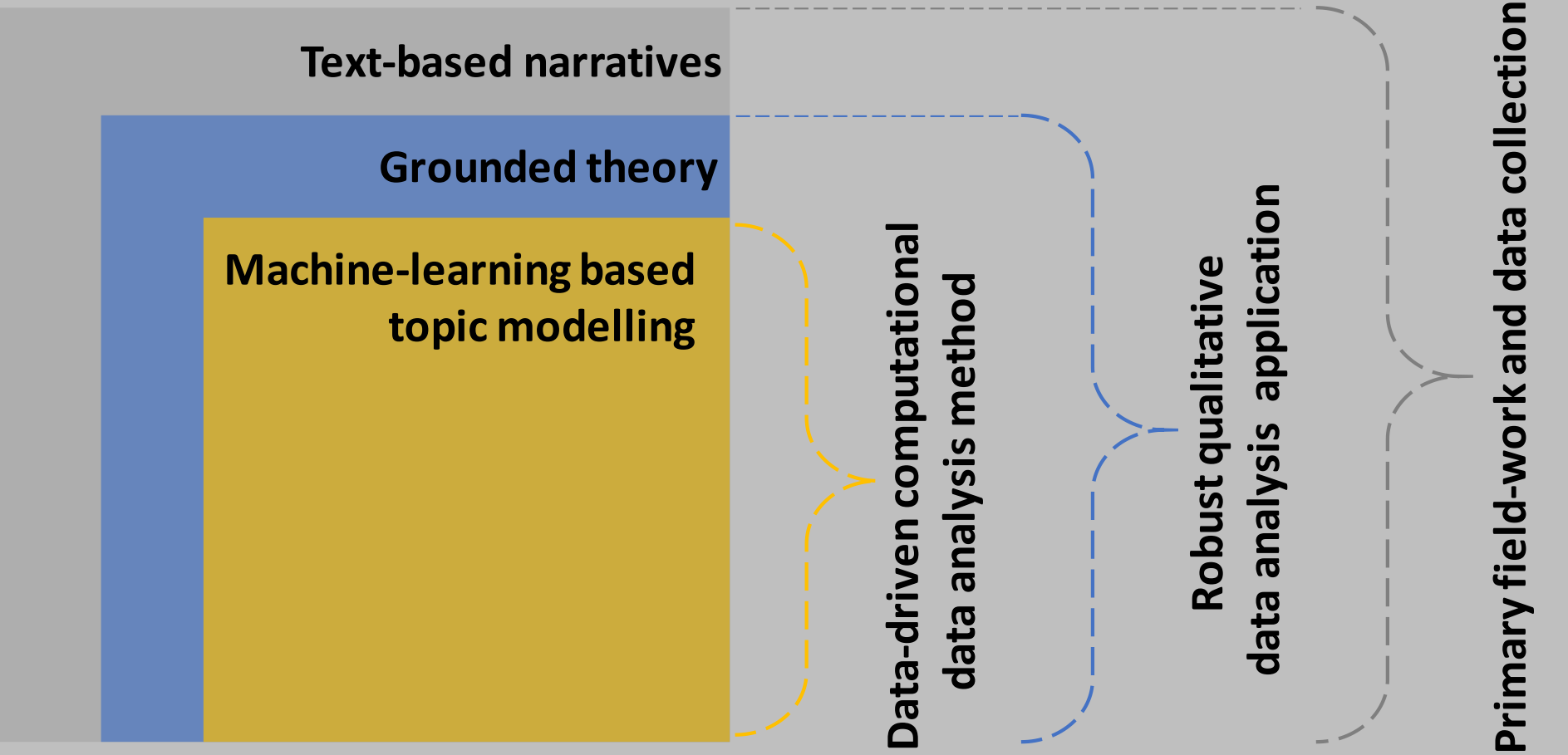
- Poverty demands energy services through the built environment and welfare component of children

### PUBLICATIONS FROM RESEARCH:

- Debnath, R., Bardhan, R., & Sunikka-Blank, M. (2019b). *How does slum rehabilitation influence appliance ownership? A structural model of non-income drivers*. Energy Policy, 132(December 2018), 418–428. <https://doi.org/10.1016/j.enpol.2019.06.005>
- Ramit Debnath, Gianna Monteiro Farias Simoes, Solange Maria Leder, Ronita Bardhan, Minna Sunikka-Blank, Roberto Lamberts (2020): *A structural model of cultural energy services and appliance ownership for energy justice in slum rehabilitation: Case of Brazil and India*, Energy Policy, Elsevier (under review)
- Ramit Debnath, Ronita Bardhan Ana Villaca, Abdulrasheed Isha, Minna Sunikka-Blank (2020): *Energy justice and human scale energy services in poverty: A nested deep narrative analysis approach using topic modelling*, Applied Energy, Elsevier (working paper)

## METHODOLOGY

Nested deep-narrative analysis approach on Brazil, India and Nigeria field-based text data



## EMPIRICAL RESULTS

