



京都大学  
KYOTO UNIVERSITY



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Institute of Advanced Energy

# Household roles and efficient appliances purchasing in urban Indonesia and The Philippines

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Data-Oriented Approaches to the Social Sciences and Humanities

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# Content



## 1 *Background*

- Household appliances in sust consump lit (gender/*household roles*)
- Gaps

## 2 *Household roles – efficient appliances analysis*

- Framework • Results • Discussion

## 3 *Conclusion and future directions*

- Residential electricity share growing in many countries (lifestyle change, income growth, electric appliances use)
- SE Asia is one with the highest growth rates of new household appliances purchase (high income growth)
- Strategies to reduce residential power consumption
  - Promotion of energy-efficient appliances
  - Changes on consumer behavior
- Sustainable consumer programs
  - Target consumer replacement of older appliances

- Gender an important determinant of sust consumer behavior (1)

- Women express stronger environmental concern

*“Hong Kong females score significantly higher in environmental attitude, environmental concern, perceived seriousness of environmental problems, environmental responsibility” (Lee, 2009)*

*“German women are more likely than men to express concern about consumption’s broader impacts and act upon those concerns” (Luchs and Mooradian, 2012)*

- Women participate more in recycling and green consuming

*“Chinese women when compared to men participate more in private environmental behaviors” (Xiao and Hong, 2018)*

*“Green purchase intentions are greater among highly educated Malaysians, females in particular” (Chekima et al., 2015)*

- Gender important determinant of sust consumer behavior (2)
  - Women adopt more energy-efficient appliances

*“In Indonesia, women more concerned of electrical energy consumption at the household than men” (Senjawati et al., 2018)*

*“In Vietnam, higher income and more children exhibit more significance to energy efficient appliance adoption than gender and age” (Nguyen et al., 2019)*

- Family relations could also affect household energy consumption
  - ❑ How household ‘gender-factors’ (roles) influence energy consumption (Permana et al., 2015)
    - “The person consistently making household decisions on overall and energy expenditures is independent of the primary source of income”*
    - “Household energy expenditures are lowest when women make decisions about the expenditures (Women are undeniably the best energy saver)”*
  - ❖ Recurrently ‘gender’ (women) link with more sust consump
  - ❖ Still, fewer focus placed on the influence of ‘household roles’ in the growing sust consump lit

- This study fills the gap of *household roles* in the gender – sust consump nexus, particularly from a Global South perspective

## Objective

*Analyse household roles in connection with efficient appliance purchasing preference taking Indonesia and the Philippines as case studies*

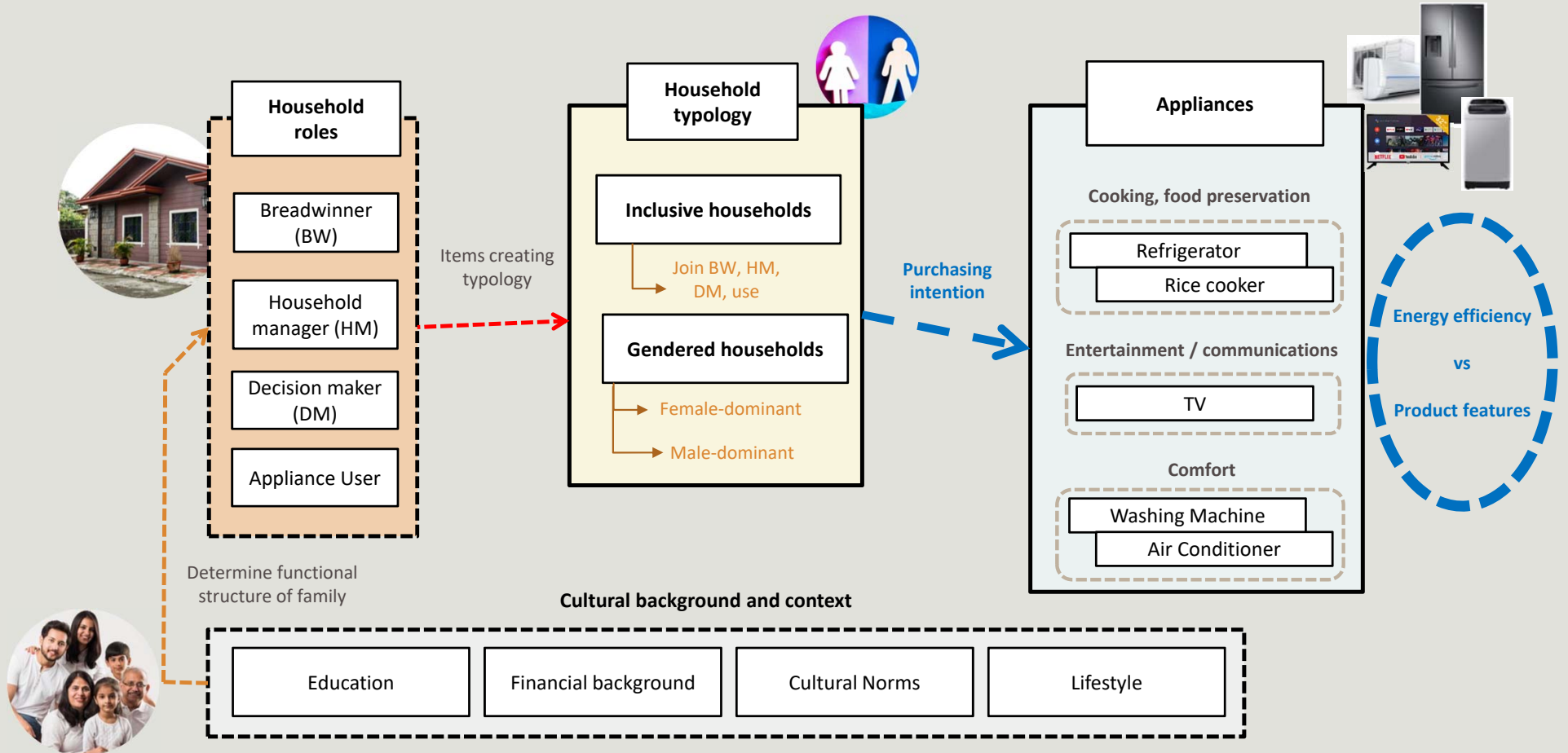
## Significance

- Expand knowledge on efficient appliance purchasing dynamics
- Identify residential practices promoting sustainable energy use
- Create interlinkages between SDGs (gender equity, clean energy) for more sustainable transitions

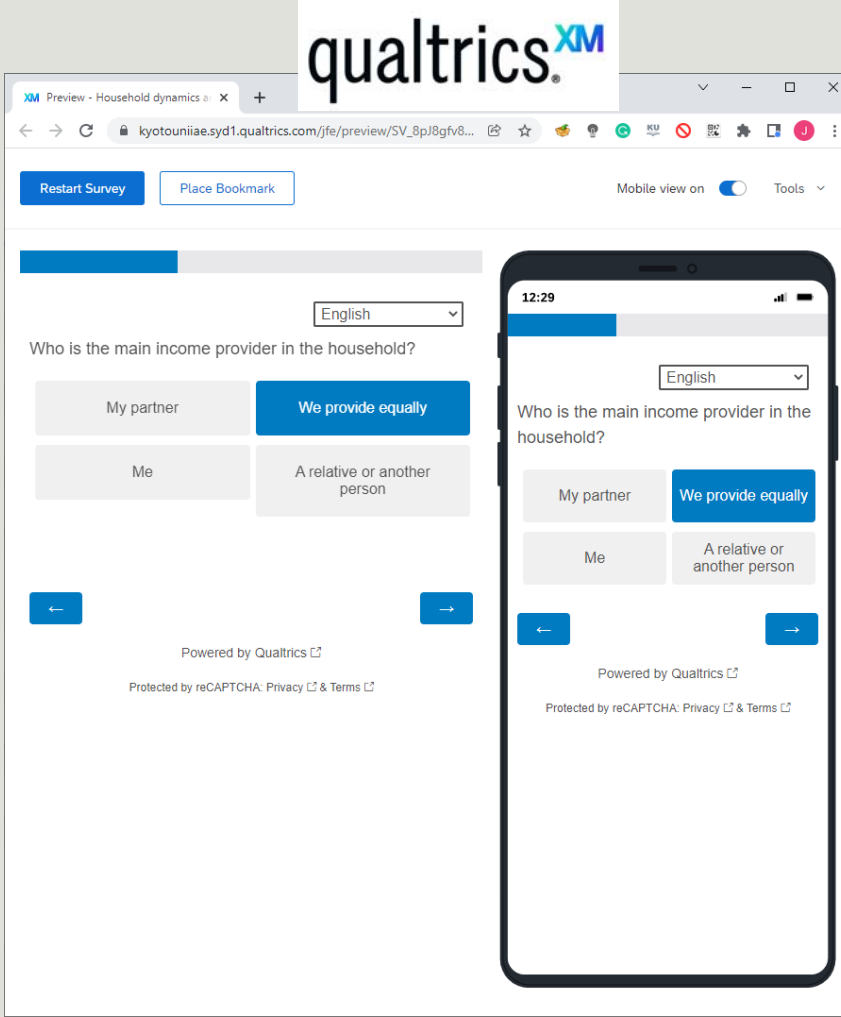
METHODOLOGY



# Household roles and energy-efficient appliance purchasing



Category	Code	Domains	Items	Measurement
<b>Background</b>	-	Gender, age, education, occupation	14	Nominal
<b>Household Roles</b>	BW	Bread Winner	1	Female/Male – Inclusive
	HM	Household Management (plans, payments, cooking, clean, childcare)	5	Female/Male – Inclusive
	DM	Decision Maker	5	Female/Male – Inclusive
	User	Appliance User	5	Female/Male – Inclusive
<b>Appliances</b>	-	Appliance Purchasing	5	Ordinal (5p-likert scale)



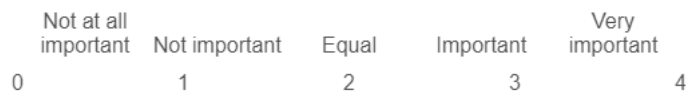
English

**IMPORTANT:**

Assume that the following appliances cost the same, they come from reputable brands and are equally attractive, the only differences are identified in the descriptions.

Drag the slider to score in a 5-point importance scale.

Which would be your preference when buying a REFRIGERATOR?



**Product features**  
Frost free, linear and door cooling, antibacterial, odor filter, moist balance, movable ice tray, smart problem diagnosis



**Energy efficiency**  
Smart sensors to reduce energy use



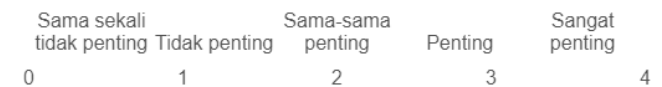
Bahasa Indonesia

**PENTING:**

Anggaplah peralatan elektronik rumah tangga di bawah ini memiliki harga yang sama, sama-sama berasal dari merek bereputasi baik dan desain menarik. Perbedaan hanya terdapat pada deskripsi.

Geser *slider* untuk memberi skor tingkat kepentingan dalam skala 5 poin.

Yang manakah yg lebih penting bagi Anda jika membeli kulkas?



**Fitur produk**  
Frost free, linear and door cooling, anti bakteri, filter bau, moist balance, movable ice tray, smart problem diagnosis



**Efisiensi energi**  
Smart sensor untuk mengurangi penggunaan energi



### Bread Winner

**Gender: \* Who is the main income provider in the household?  
Crosstabulation**

Count

		Who is the main income provider in the household?			Total
		Me	Partner	Equal	
Gender:	Male	222	42	108	372
	Female	115	228	149	492
Total		337	270	257	864



**Bread Winning (one/both)**

	Frequency	Percent	Valid Percent	Cumulative Percent
One member	607	70.3	70.3	70.3
Both equally	257	29.7	29.7	100.0
Total	864	100.0	100.0	

**(3P) Bread Winner (provider)**

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	450	52.1	52.1	52.1
Female	157	18.2	18.2	70.3
Both	257	29.7	29.7	100.0
Total	864	100.0	100.0	

*Similar for HW, DM and User*

# Refrigerator

**Preference when buying a REFRIGERATOR? Product features \* Preference when buying a REFRIGERATOR? Energy efficiency Crosstabulation**

Count

		Preference when buying a REFRIGERATOR? Energy efficiency					Total
		Not at all important	Not important	Equal	Important	Very important	
Preference when buying a REFRIGERATOR? Product features	Not at all important	17	0	10	10	11	48
	Not important	22	4	12	6	14	58
	Equal	130	8	54	70	60	322
	Important	30	5	101	65	39	240
	Very important	18	15	55	22	86	196
Total		217	32	232	173	210	864



**Refrigerator (efficiency - features - equal)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Features	406	47.0	47.0	47.0
	Equal	226	26.2	26.2	73.1
	Efficiency	232	26.9	26.9	100.0
Total		864	100.0	100.0	

*Similar for  
Rice cooker, TV, WM, AC*

## Pretesting and pilot surveys

Jan-Mar, 2021

- Using Social Media and Twitter among university students

## Full-scale survey

Apr-Jun, 2021

- Convenience sample
- Co-habiting adults
- 14 Metropolitan cities



**gender & energy survey**

Participate in the survey and get a chance winning gift card of your preference for 1,000 yen

[bit.ly/genderandenergy](https://bit.ly/genderandenergy)

We are interested in understanding the correlation between gender dynamics in households and the preference for buying appliances in metropolitan cities in developing nations represented by India, Indonesia, and the Philippines. This survey is intended for people who are married/had been married and currently living in the countries under study.

**[bit.ly/genderandenergy](https://bit.ly/genderandenergy)**

Participate in this survey by going to the link above.  
We are waiting for your response!



For further info, please contact us at [gendergy2020kyotouni@gmail.com](mailto:gendergy2020kyotouni@gmail.com)



**gender & energy survey**

Ikuti surveinya di tautan berikut dan dapatkan kesempatan memenangkan gift card senilai 1,000 yen atau IDR 138k

[bit.ly/genderandenergy](https://bit.ly/genderandenergy)

Kami tertarik untuk memahami dinamika dan interaksi gender dalam rumah tangga serta efeknya terhadap preferensi pada saat membeli peralatan elektronik di kota metropolitan di Filipina, India, dan Indonesia. Survei ini diperuntukkan bagi rekan-rekan yg sudah berkeluarga dan sedang tinggal di Indonesia.

**[bit.ly/genderandenergy](https://bit.ly/genderandenergy)**

Akses survei ini pada link di atas.  
Partisipasimu kami tunggu!



Jika ada pertanyaan lebih lanjut, silahkan kontak Latifa melalui email [gendergy2020kyotouni@gmail.com](mailto:gendergy2020kyotouni@gmail.com)

## Multinomial Logistic Regression (MLRs)

1. Run stepwise models for each appliance
  - ❖ Refrigerator, Rice cooker, WM, AC, TV
2. Identify significant factors (BW, HM, DM, User)
3. Interpret the factor's odds ratios

## Multiple Correspondence Analysis (MCA)

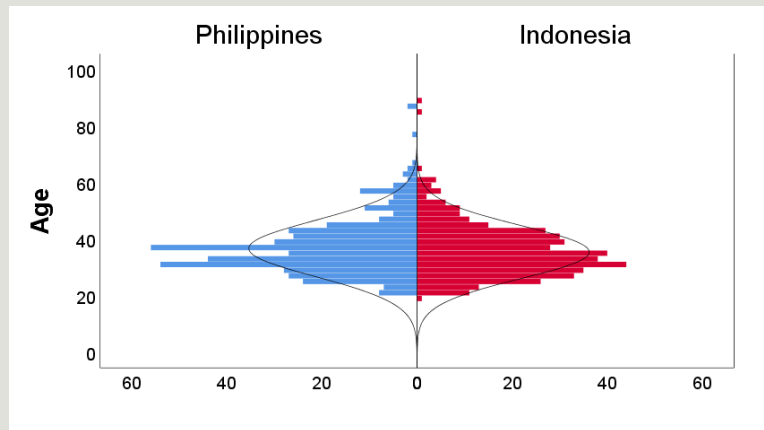
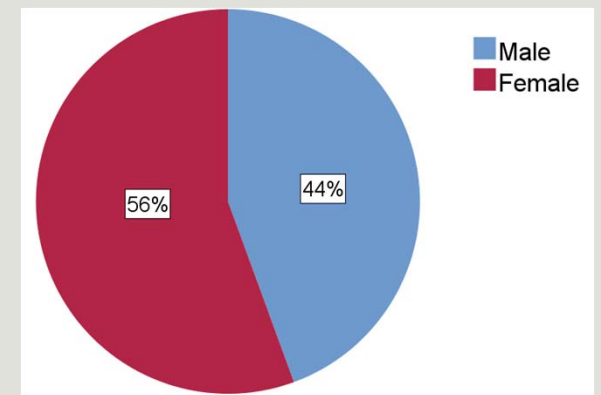
1. Visualise associations between gender categories
  - ❖ Household roles (BW, HM, DM, User) with...
  - ❖ Appliance preference (efficiency-features)

## RESULTS AND DISCUSSION

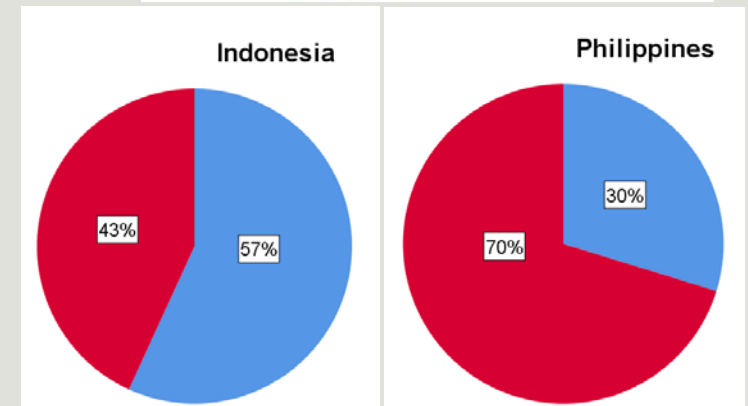


# Sample details (1)

Country	Sample Size	Date of collection
Indonesia	424	Apr-Jun 2021
The Philippines	440	Apr-Jun 2021

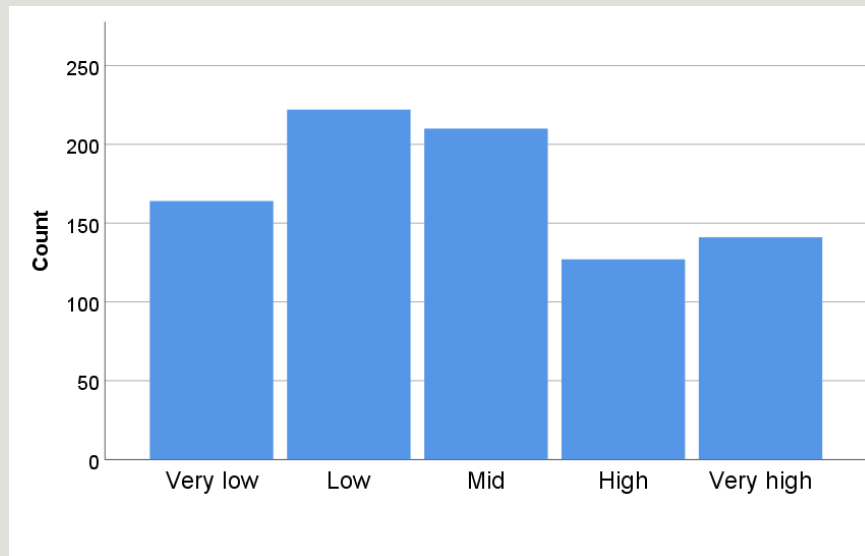


Age

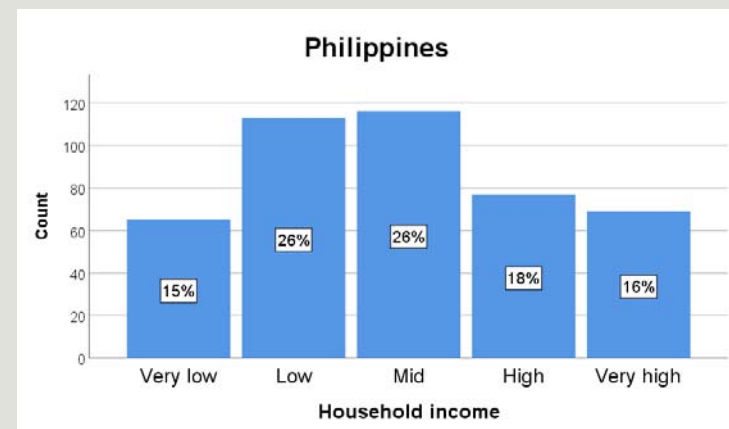
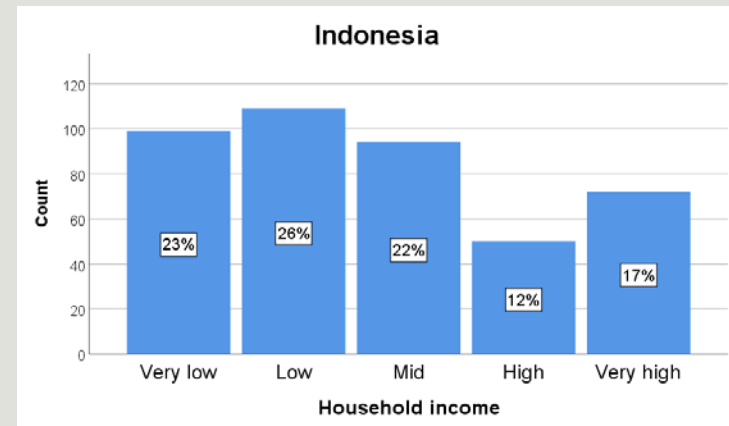


Sex

## Sample details (2)



**Income**



# Household roles - energy-efficient appliances (MLRs)

		Refri	Rice	WM	AC	TV
		Tot	Tot	Tot	Tot	Tot
0	<b>Demographics</b>					
	Country	○	○	○	○	○
	Age					
	Education					
	Income		△			
1	<b>BW</b>					
2	<b>HM</b>					
	Plan					
	Payments			△		
	Child care					
	Clean				△	
	Cooking					
3	<b>User</b>				△	
4	<b>DM</b>	○				○

③

②

①

○	Statistically sig difference (Chi-square, p<0.05)
△	Notable difference (non-statistically significant)
■	Significant factor

## Comparison:

### One member vs Both (inclusive household)

- Significant effect for 'Decision Maker'
  - ❖ *DM Inclusive households report more efficient-appliance purchasing intention*
- Partial effects for 'Household Manager' and 'User'
- No effect for 'BreadWinner'

## ‘Decision Making’ effects (significant parameters)



Compared to a features-based appliance selection:

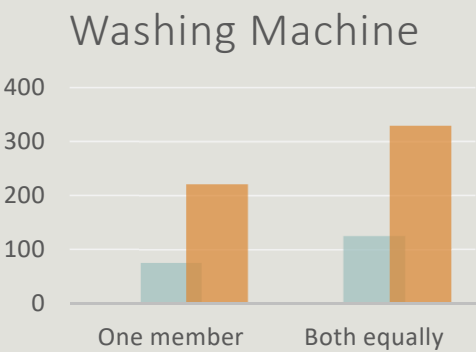
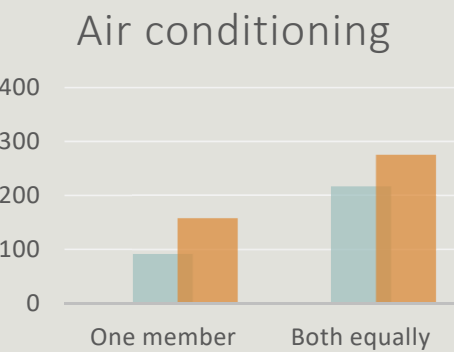
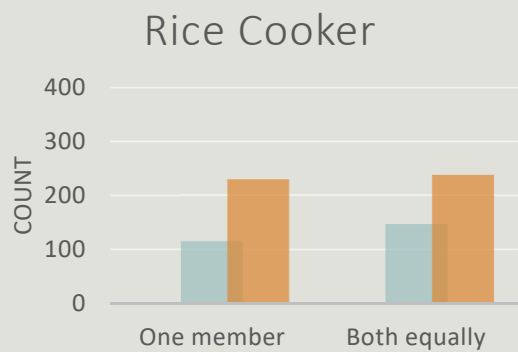
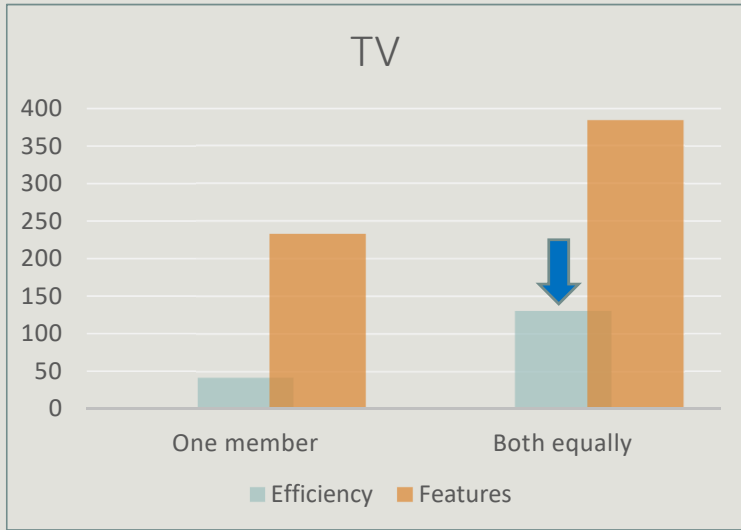
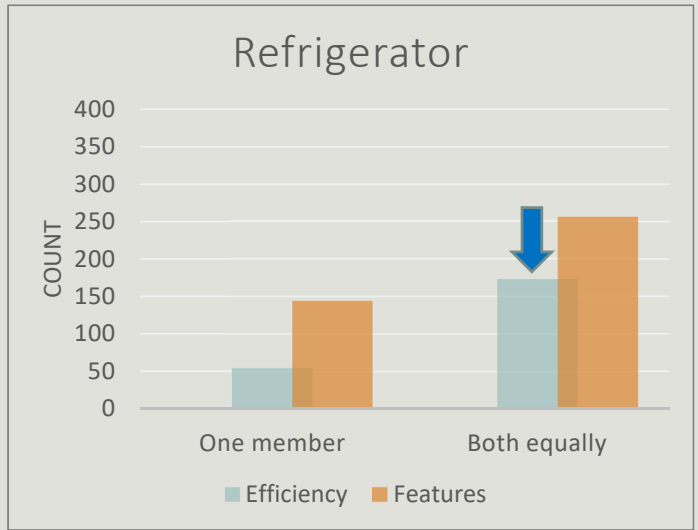
**55% less likely** that individual DM results in **efficient Refrigerator** selection

**44% less likely** that individual DM results in **efficient TV** selection

### Philippines

**Mid-income households** (8-14万円 per month) **3 times more likely** to select **efficient refrigerators** -than based on features-

### Differences (significant) by decision maker



## Effects from 'user' and 'household manager'



Compared to a features-based appliance selection:

**38% less likely** that individual users select **efficient washing machine**

**44% less likely** that individual users select **efficient rice cooker** (Philippines)

### Indonesia

**Mid-education** households **1.8 times more likely** to select efficient **ACs**

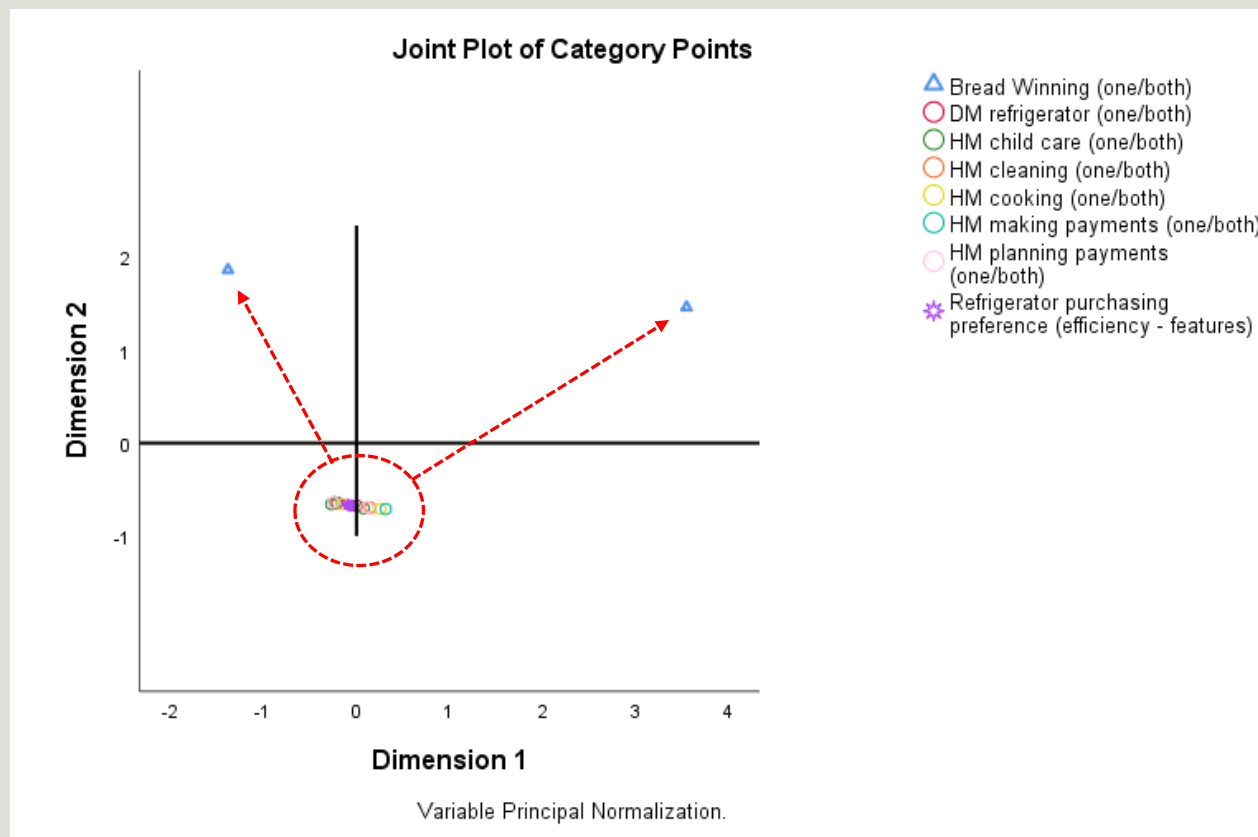
**Greater Age** (1 year rate) **3% less likely** to select efficient **rice cookers**

### Philippines

**High-income** **72% less likely** to select efficient **WM**

**Higher/lower incomes** **71% less likely** to select efficient **rice cookers**

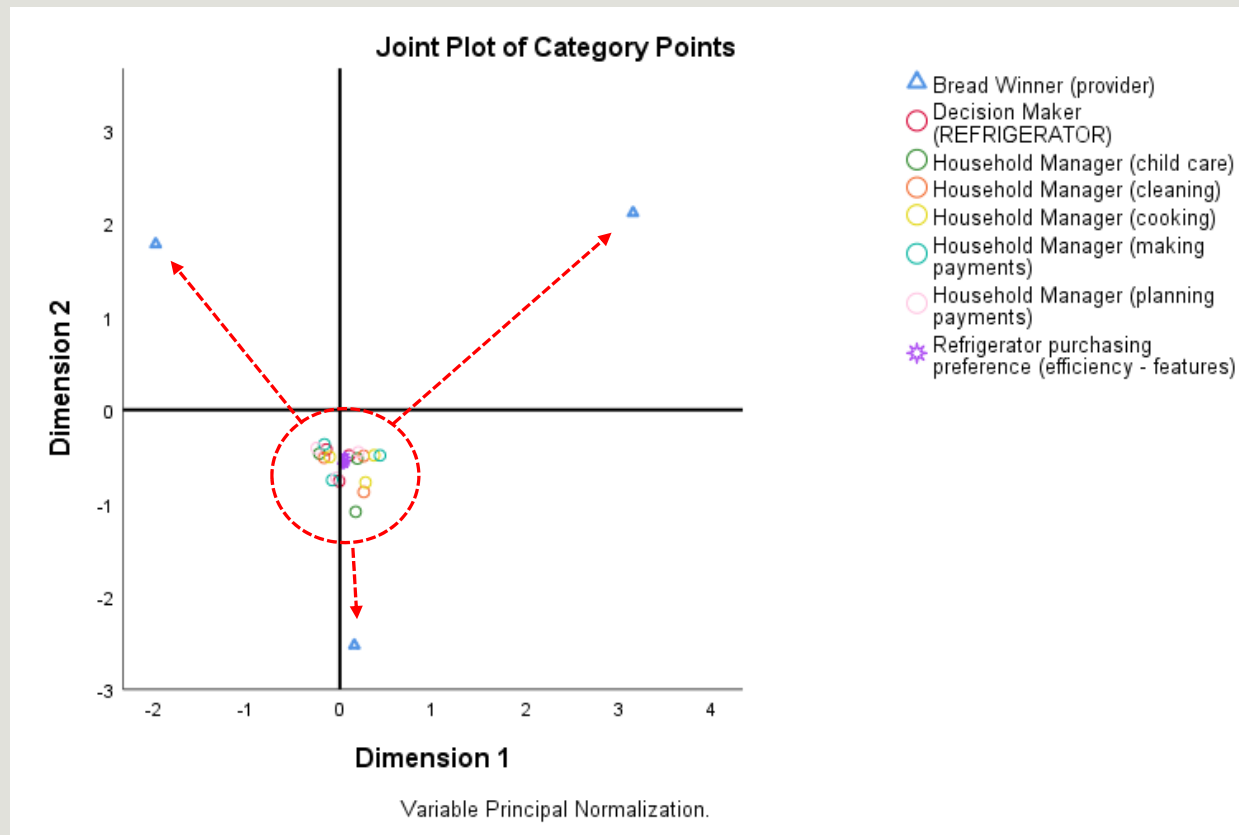
## Household roles - Refrigerator purchasing (MCA)



*MCA analysis includes  
BW, DM, HM  
(2 categories:  
One member vs Both)*

➤ **No effect for  
'breadwinner'**

## Household roles - Refrigerator purchasing (MCA)



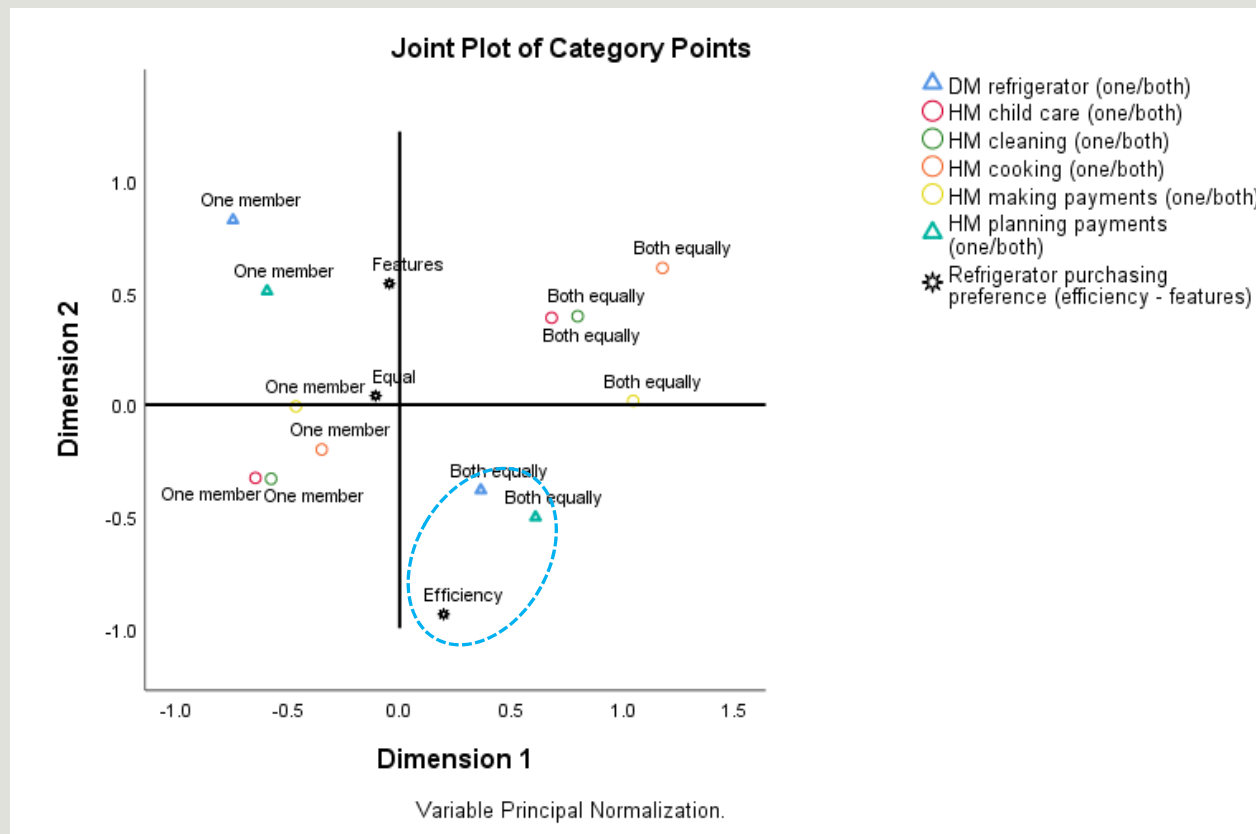
*MCA analysis includes  
BW, DM, HM*

*(3 categories:  
Male, Female, Both)*

➤ **No effect for  
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## Household roles - Refrigerator purchasing (MCA)

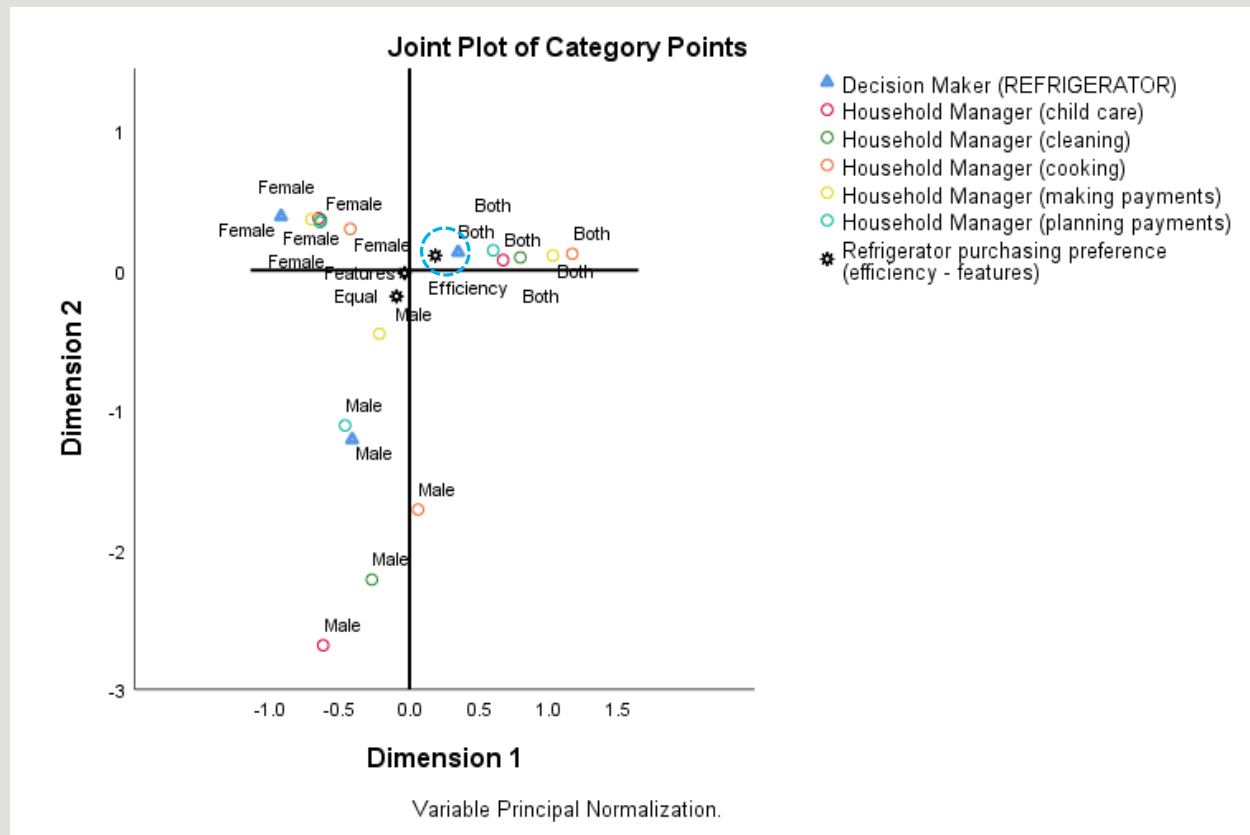


*MCA analysis includes  
DM, HM*

*(2 categories:  
One member vs Both)*

- ❖ Stronger link with Joint DM and HM-planning (closer to 'Efficiency')

## Household roles - Refrigerator purchasing (MCA)



*MCA analysis includes  
DM, HM*

*(3 categories:  
Male, Female, Both)*

- ❖ Stronger effects for Joint DM and HM-planning  
(closer to 'Efficiency')

## Discussion (1)

Results expand common understanding:

- Traditionally, women tend to adopt energy-efficient appliances
- But equitable participation in household functions are also relevant
  - ❖ (1<sup>o</sup>) Decision Maker (2<sup>o</sup>) User & Household Manager

Inclusive roles and type of appliance:

- Significant effects for *cooking and entertainment*-related app
  - Refrigerator and TV
  - Rice cookers: an exceptional case?
- Less significant for *comfort*-related app
  - Washing machine and air conditioner

## Discussion (2)

- ❑ Energy use and carbon reductions connect positively with equity inside the households
- How can policies prioritize this in related programs (efficient appliances substitution, energy conservation, etc.)?

CONCLUSION

- ❑ Inclusive roles associate with more efficient-appliance purchasing intention

**‘decision making’ - ‘use’ – ‘house management’**

### **Limitations and future directions**

- Further analysis for more conclusive knowledge on linkages
- Insights from qualitative modes of inquiry
  - Interviews with householders who recently engaged in purchasing appliances
  - Ethnographic fieldwork that considers material and social aspects of appliance purchasing in situ

# Contributions

## □ Complement common understanding

- *Not only gender is determinant of sustainable behavior*
- **More equitable participation in household functions are also relevant**

Acknowledgement: KU GCOE Students Latifa Seniorita, Samuel M.G. Dumlao, Kiran-Kumar Krishna-Murthy, and Prof. Chen Qu



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