# Building energy-efficiency adoption

## Eindhoven University of Technology

## Energy efficiency adoption decision

### Investigating adoption influencing factors

- Three aspects of social influences (positive vs negative comments, physical social network vs online social network, peer effect vs social norm) are investigated;

- People make limited effort in energy efficiency adoption;

- Social influences have more impact on low-cost (purchase cost) than high-cost products;

- Peers (neighbors, friends, and family member) have stronger impact than general public.

Table 1- Latent class model for appliance adoption

| Attributes | Levels | Coefficients | Utilities | Coefficients | Utilities | Coefficients | Utilities |
|---|---|---|---|---|---|---|---|
| Class | | Class 1 | | Class 2 | | Class 3 | |
| Probability | | 45.9% | | 32.0% | | 22.1% | |
| Constant | | -5.712*** | 5.712 | -0.361*** | 0.361 | -1.082*** | 1.082 |
| Capacity | 150L & 5.5 kg | 0.263 | 0.923 | 0.576*** | -0.576 | 0.327 | -0.534 |
| | 250L & 7kg | 0.923** | -1.846 | -0.103 | 0 | -0.534*** | 1.068 |
| | 400L & 10 kg | | 0.923 | | 0.576 | | -0.534 |
| Price | 4,000 | -0.588*** | 0.335 | -0.588*** | 0.335 | 0.587* | -0.058 |
| | 5,500 | -0.253*** | 0.506 | -0.253*** | 0.506 | 0.529*** | -1.058 |
| | 7,000 | | -0.841 | | -0.841 | | 1.116 |
| Energy cost | 167 | -0.495 | | 0.185 | 0.541 | -0.616** | 0.132 |
| | 223 | 0.007 | | 0.541*** | -1.082 | -0.484** | 0.968 |
| | 279 | | | | 0.541 | | -1.100 |
| Subsidy | None | 0.923* | -1.39 | 0.197 | | -1.059*** | 1.059 |
| | 1% | -0.467* | 0.934 | -0.126 | | -.137 | 0 |
| | 3% | | 0.456 | | | | -1.059 |
| Energy label | 1 | -0.289 | -0.749 | -0.552*** | 0.552 | 0.028 | -0.264 |
| | 2 | -0.749** | 1.498 | -0.004 | 0 | -0.264* | 0.528 |
| | 3 | | -0.749 | | -0.552 | | -0.264 |
| Recommendation | None | 0.119 | | -0.099 | | | |
| | Family or friends | -0.115 | | -0.254 | | | |
| | Club, community, or co-workers | -0.583 | | 0.148 | | | |
| | People met online | | | | | | |
| Negative comment | None | -0.875*** | 2.739 | -0.667*** | 0.335 | | |
| | Family, friends, or other people you know | 1.864** | -3.728 | -0.332*** | 0.664 | | |
| | Internet or people met online | | 0.989 | | -0.999 | | |
| Popularity | None | 1.425*** | -0.728 | 0.017 | | | |
| | According to shopping website | 0.697** | -1.394 | 0.027 | | | |
| | According to the salesman | | 2.122 | | | | |
| McFadden Pseudo R² | | 0.2988 | | | | | |
| AIC | | 1855.1 | | | | | |

*Note*: *** indicates significance at the 1% level. ** indicates significance at the 5% level. * indicates significance at the 10% level.

## Agent-based simulation

### Simulating interventions for encouraging energy efficiency adoption
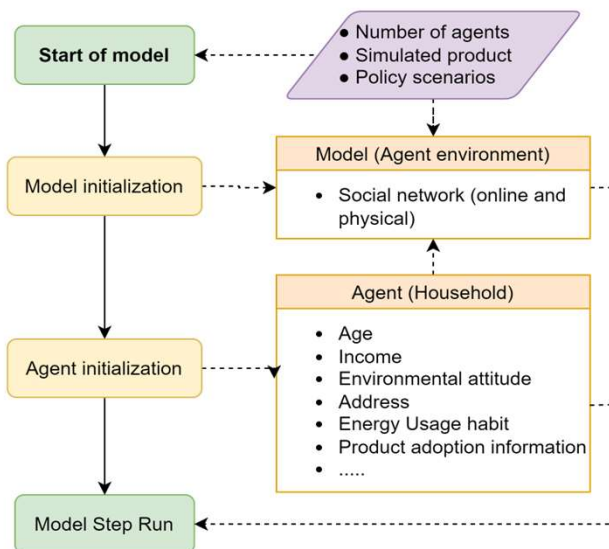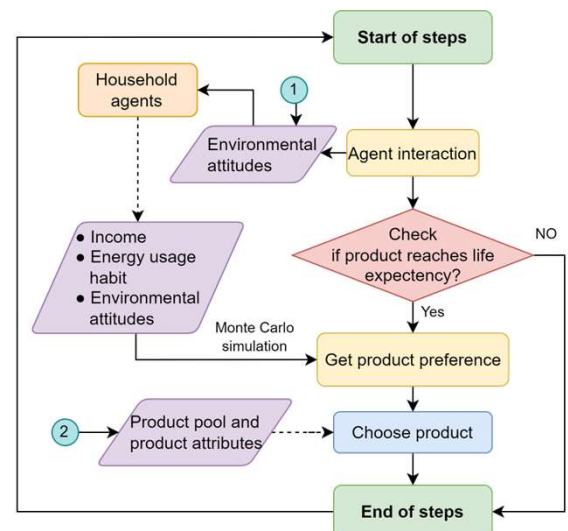


Figure 1- Model structure



Figure 2- Agent decision process

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