



# How AI Helps Reduce Food Waste in Lithuania:

Insights for Policy Makers  
and Marketers

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# Food Waste: A Growing Sustainability Challenge



**Food waste is one of the most pressing sustainability challenges facing modern food systems.**

It contributes to climate change, wastes natural resources, and creates unnecessary economic losses. Across the European Union, **households generate the largest share of food waste**, making everyday consumer decisions a key driver of the problem.

In Lithuania, household food waste remains high. Each year, people **discard around 75–86 kg** of food per person, much of which could be avoided through better planning, storage, and food use practices.



# Why Consumer Behaviour Matters

Most food waste happens at home, not in farms or factories.

Common causes include:

- Buying more food than needed
- Poor meal planning
- Improper storage
- Not using leftovers

Reducing food waste therefore requires supporting consumers in daily decision-making, not only raising awareness.



## The Role of Artificial Intelligence

Artificial intelligence (AI) is increasingly influencing how people manage food.

AI-powered mobile applications now help users:

- Plan meals
- Track food at home
- Receive expiry reminders
- Get personalised recipe suggestions

These tools have strong potential to reduce food waste – but their real impact on behaviour has not been well studied.





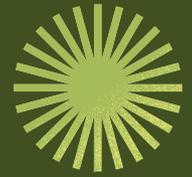
## Purpose of This Report:

This report presents findings from two empirical studies conducted in Lithuania that examine whether AI-powered mobile application can help reduce household food waste and how they influence consumer behaviour.

- 1 Study** evaluates whether using an AI-based food app leads to real reductions in food waste.
- 2 Study** explores the psychological mechanisms behind AI use, such as engagement, interaction, and user confidence.

The insights are intended to support businesses, policymakers, and non-profit organisations in designing effective digital solutions for food waste reduction, in line with UN Sustainable Development Goal 12.3.

# Study 1



## AI in Action: Can an AI App Reduce Food Waste?

### Aim of the Study

This study examined whether using an AI-powered mobile application (Samsung Food) can lead to real reductions in household food waste. Rather than focusing on attitudes or intentions, the study measured actual behavioural changes among Generation Z and Generation Y users.

### Study Design

**Method:** Field experiment

**Groups:**

**Experimental group** – used an AI-based food app for one month

**Control group** – did not use the app

**Focus:** Changes in food waste behaviour before and after app use

### Key AI Features Examined

The study focused on four AI-related values:

**Personalisation** – tailored suggestions and feedback

**Interactivity** – user engagement, feedback, and control

**Usability** – ease of use and clarity

**Passion (enjoyment)** – emotional appeal of the app

## Sample

The study included **624** people in Lithuania:

 **309** did not use the app (control group)

 **315** used the AI app (experimental group)

All respondents were selected to represent different genders and age groups across Lithuania.

Baseline food waste behaviour did not differ significantly between groups, supporting the validity of the comparison.

## Gender

### Control group



### Experimental group



## Age

### Control group



**33,7 %**

Generation Z  
(16–27 years)



**66,3 %**

Generation Y  
(28–43 years)

### Experimental group



**38 %**

Generation Z  
(16–27 years)



**63 %**

Generation Y  
(28–43 years)

## Education

### Control group

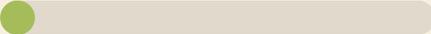
<b>4,5 %</b>	Primary / basic
<b>13,6 %</b>	Secondary
<b>7,8 %</b>	Higher secondary / special
<b>3,2 %</b>	College
<b>12,9 %</b>	Higher education (non-university)
<b>57,9 %</b>	Higher education (university)

### Experimental group

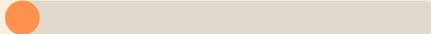
<b>3 %</b>	Primary / basic
<b>16 %</b>	Secondary
<b>7 %</b>	Higher secondary / special
<b>5 %</b>	College
<b>18 %</b>	Higher education (non-university)
<b>51 %</b>	Higher education (university)

## Income

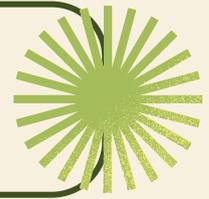
### Control group

No income / Low income ( $\leq 450$ €)	 <b>18,2 %</b>
Lower-middle income (451–750 €)	 <b>6,5 %</b>
Middle income (751–1500 €)	 <b>38,5 %</b>
Upper-middle income (1501–2500 €)	 <b>26,5 %</b>
High income ( $\geq 2501$ €)	 <b>12,3 %</b>

### Experimental group

No income / Low income ( $\leq 450$ €)	 <b>12 %</b>
Lower-middle income (451–750 €)	 <b>8 %</b>
Middle income (751–1500 €)	 <b>44 %</b>
Upper-middle income (1501–2500 €)	 <b>30 %</b>
High income ( $\geq 2501$ €)	 <b>6 %</b>

# Key Empirical Findings



## The AI App Worked – Users Wasted Less Food

### Before the experiment

Both groups started at nearly the same level of food waste behaviour:

**Control group:**

M = 8,77 (SD = 4,91)

**Experimental group:**

M = 8,54 (SD = 4,61)

**Difference:**

0,22 points (not statistically significant)

This confirms that the two groups were comparable at the start.

### After using the AI app

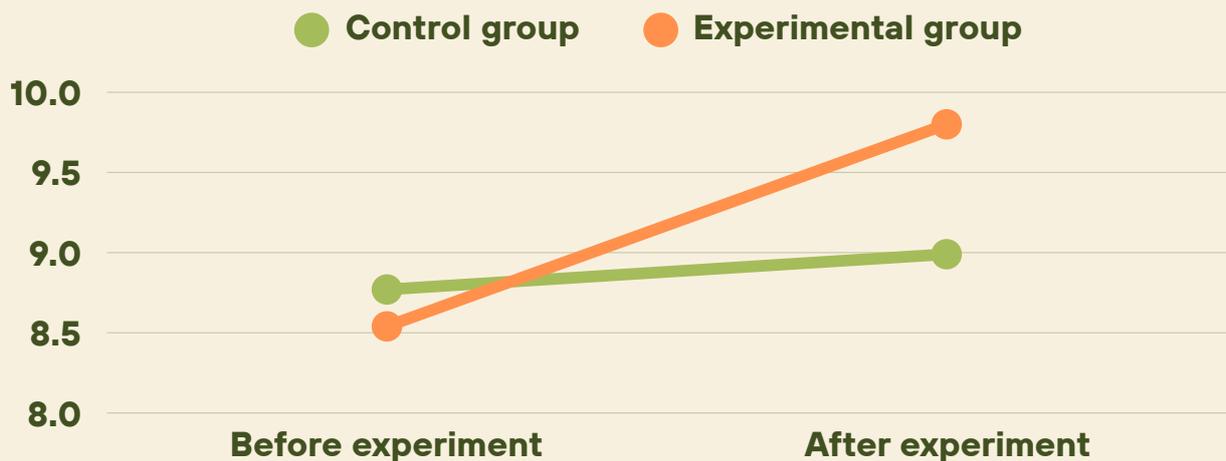
Clear differences emerged:

**Control group:**

remained almost unchanged at M = 8,99 (SD = 4,05)

**Experimental group:**

improved to M = 9,80 (SD = 5,54)



# 5x

Participants who used the AI app showed around five times more positive changes in food waste behaviour than those who did not use the app.



## Which App Features Reduced Food Waste?

**+57,7 %**

### PERSONALISATION

#### Strongest effect

- Tailored suggestions, reminders, and meal ideas had the largest impact
- Users wasted significantly less food when the app adapted to their habits

**+13,5 %**

### INTERACTIVITY

- Two-way communication, progress tracking, and real-time feedback supported sustained behaviour change



## Features That Did Not Reduce Food Waste Directly

**+3,8 %**

### ENJOYMENT / PASSION

#### Not significant

- Liking or enjoying the app did not automatically lead to less food waste

**-0,7 %**

### EASE OF USE / USABILITY

#### No effect

- A simple and user-friendly interface alone was not enough to change behaviour

## Overall Result

Consumers who used the AI-based food app showed a statistically **significant reduction in food waste** compared to those who did not.

The findings confirm that **interactive** and **personalised** AI features drive **real behaviour change**, while **enjoyment** and **ease of use** alone **do not**.



# Generation Z vs Generation Y

Z



Generation

- Strong within-group improvement
- Significant pre-post change ( $t = -5,36$ )
- Responds strongly to interactivity, gamification, and quick feedback

**Gen Z users are more responsive to interactive and dynamic features and preferred engaging, app-driven experiences**

Y



Generation

- Strong between-group differences (compared to control)
- Shows more stable, structured improvement
- Prefers personalisation, planning, and practical tools

**Gen Y users responded better to structured guidance and valued practical tools and organised feedback**

## Overall Result

All applications **can reduce food waste**, but only when they:

- **Actively engage users**
- **Provide personalised and interactive support**

**Simple, passive, or “nice-looking” apps are not enough**

# Practical Implications for Policymakers and Marketers



The experiment demonstrates that AI-based mobile applications can meaningfully reduce household food waste, but only when they incorporate the right design features. Personalisation and interactivity emerged as the strongest drivers of behavioural change, while usability and enjoyment alone were insufficient. These findings provide clear and actionable guidance for Lithuanian marketers and policymakers.

## 1 Design AI tools that *personalise and interact*, not just inform

AI-based interventions should actively support users in daily food decisions rather than merely provide information.

Marketers should prioritise:

- Personalised reminders based on users' consumption habits
- Adaptive meal planning and food storage suggestions
- Interactive elements such as progress bars, challenges, and real-time feedback

These features produced the largest behavioural effects and were the only design elements that significantly reduced food waste behaviour:

- Personalisation:  $\beta = 0,577$
- Interactivity:  $\beta = 0,135$

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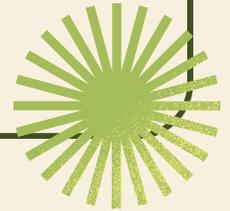
## 2 Move beyond simple "ease of use"

The experiment showed that these features did not lead to measurable reductions in food waste:

- Usability ( $\beta = -0,007$ )
- Passion / enjoyment ( $\beta = -0,038$ )

This indicates that campaigns focused solely on attractive design, intuitive navigation, or enjoyable experiences are unlikely to change behaviour. Policymakers and businesses should therefore invest in AI functionality that nudges action, not just visually appealing interfaces.

# Practical Implications for Policymakers and Marketers



## 3 Create generation-specific engagement strategies

The findings highlight clear generational differences:

- Gen Z responds more strongly to interactive, dynamic, and gamified features
- Gen Y responds better to structured, organised, and practical tools

Marketers should therefore:

- Gen Z: use gamification, short tasks, and social-sharing features
- Gen Y Emphasise planning tools, cost-saving indicators, structured guidance

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## 4 Integrate AI-driven solutions into national food waste strategies

Because the AI intervention directly improved food waste behaviour in Lithuania, policymakers can:

- Promote AI-based food management apps as household tools supporting SDG 12.3
- Fund public campaigns encouraging families to track and reduce food waste digitally
- Partner with retailers, municipalities, and technology providers to embed app-based food waste monitoring

Such integration supports both environmental objectives and household budget savings.

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## 5 Use incentives and public recognition to sustain long-term engagement

To maintain behavioural change over time, policymakers and businesses should complement AI tools with motivational mechanisms, such as:

- Discounts or loyalty points linked to consistent waste reduction
- Public recognition (badges, certificates, community challenges)
- Retention rewards for sustained app use

These incentives reinforce motivation and help transform short-term improvements into long-term habits.

# Study 1



## Key Takeaways

**Marketers** should focus on personalised, interactive, and generation-specific AI experiences rather than simple design features.

**Policymakers** should integrate AI-based tools into national sustainability strategies, combining them with incentives, confidence-building features, and cross-sector collaboration.

The Samsung Food AI app **can meaningfully reduce household food waste** – but only when its features are interactive and personalised. Simply enjoying the app or finding it easy to use does not lead to behavioural change. To be effective across age groups, AI tools must be tailored: Millennials respond best to structured, practical guidance, while Generation Z engages more with dynamic, gamified, and fast-interactive experiences.

# Study 2



## From Pixels to Plates: How AI Design Shapes Motivation to Reduce Food Waste

### Aim of the Study

While Study 1 examined whether an AI app can change actual food waste behaviour, Study 2 explored how and why AI app features influence users psychologically. The study focused on understanding:

- How AI design features shape user experience
- Why engagement does not always translate into intention
- What helps users feel motivated to reduce food waste

### Study Design

**Method:** Survey-based empirical study

**Dalyviai:** 315 AI app users in Lithuania

**Tikslinés grupės:**

**Generation Z (16–27 years)**

**Generation Y (28–43 years)**

**Focus:** Psychological mechanisms behind food waste reduction intentions

### Key AI Features Examined

The study focused on four AI-related values:

**Personalisation** – tailored suggestions and feedback

**Interactivity** – user engagement, feedback, and control

**Usability** – ease of use and clarity

**Passion (enjoyment)** – emotional appeal of the app

## Psychological Mechanisms Examined

The study examined how AI features influence users through three internal reactions:

**Psychological Engagement** – how focused, inspired, and emotionally involved users feel

**Social Presence** – whether the app feels friendly, supportive, and human-like

**Self-Efficacy (Confidence)** – users' belief that they can successfully manage food and reduce waste

These mechanisms explain why some AI apps motivate action while others do not.

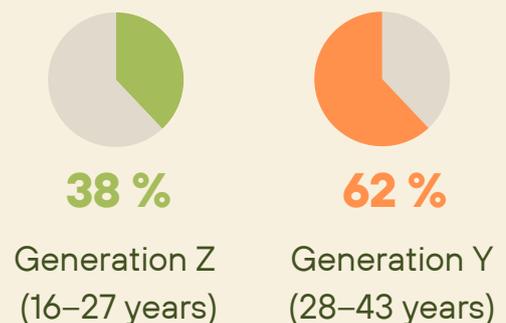
## Sample

The study surveyed **315** consumers in Lithuania

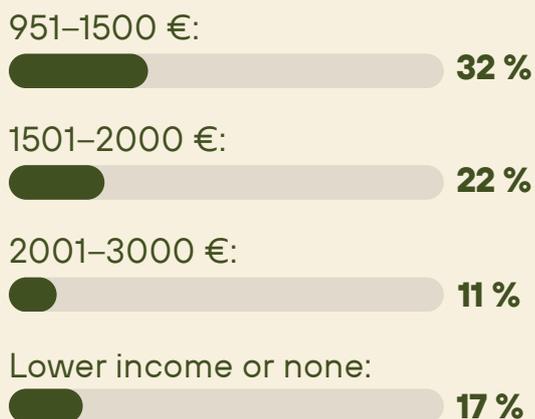
## Gender



## Age



## Income



## Education



# Key Empirical Findings



The AI app strongly shaped user experience – but weakly shaped intention

The AI app was highly effective at shaping how users felt, but less effective at shaping what they planned to do

AI features explained:

**51%** of how socially connected and human-like the app felt

**64%** of users' psychological engagement

Only **20%** of users' intention to reduce food waste

This shows that engagement alone is not enough to motivate action



# Which App Features Had the Strongest Impact?

## INTERACTIVITY

Strongest overall driver

- Increased Social Presence ( $\beta = 0,357$ )
- Increased Psychological Engagement ( $\beta = 0,193$ )

Interactivity was the most powerful feature for creating connection and involvement.

## PASSION / ENJOYMENT

Strong for engagement,  
weak for action

- Strongly increased engagement ( $\beta = 0,476$  – largest effect in the model)
- Slightly increased social presence ( $\beta = 0,233$ )

Enjoyment helped users feel engaged, but did not increase intention to reduce food waste.

## USABILITY

Comfort  
without motivation

- Improved social presence ( $\beta = 0,238$ )
- Did not increase engagement ( $\beta = 0,103$ , not significant)

A clear and simple interface made users comfortable, but did not motivate behaviour change.

## PERSONALISATION

Limited impact

Basic personalisation features showed no significant effects:

- Social Presence:  $\beta = -0,028$
- Psychological Engagement:  $\beta = 0,126$

## THE KEY MISSING LINK: SELF-EFFICACY

Self-efficacy played a critical role in turning engagement into intention.

- Engagement and social presence influenced intention only when users felt confident
- Without confidence, even highly engaging apps failed to motivate behaviour change



# Generation Z vs Generation Y

Although generational comparison was not a primary objective, additional analysis revealed distinct patterns:

## Z



Generation

- Highly responsive to interactivity
- Prefers fast tasks, challenges, and dynamic features
- Engagement driven by gamification and real-time feedback

## Y



Generation

- More responsive to personalisation that feels supportive
- Prefers structured guidance and planning tools
- Values clarity, trust, and practical benefits

**A single AI design approach does not work equally well for both groups**

## Overall Result

Study 2 shows that **AI apps can strongly influence user experience**, but **behavioural intention depends on confidence**.

AI tools **motivate food waste reduction** only when **engagement is supported by self-efficacy**.



# Generation Z vs Generation Y

Although generational comparison was not a primary objective, additional analysis revealed distinct patterns:

## Z



Generation

- Highly responsive to interactivity
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## Y



Generation

- More responsive to personalisation that feels supportive
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**A single AI design approach does not work equally well for both groups**

## Overall Result

Study 2 shows that **AI apps can strongly influence user experience**, but **behavioural intention** forms only when **users believe in their ability to successfully manage food and reduce waste**.

AI tools **motivate food waste reduction** only when user **engagement is supported by self-efficacy**.

# Practical Implications for Policymakers and Marketers



## 1 Build AI tools that strengthen user confidence

Engagement leads to intention only when users feel capable.

Prioritise:

- Progress tracking (“You saved 12% this week”)
- Simple goal setting
- Visual feedback (money saved, CO<sub>2</sub> avoided)
- Achievement badges and streaks

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## 2 Use interactivity as the main driver of involvement

Interactivity was the strongest psychological trigger.

Focus on:

- Real-time feedback
- Timely reminders
- Gamified actions and challenges

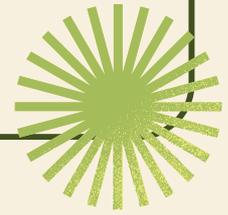
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## 3 Do not rely on usability or enjoyment alone

- Usability ≠ intention
- Enjoyment ≠ behaviour change
- Basic personalisation ≠ motivation

A visually appealing app is not sufficient.

# Practical Implications for Policymakers and Marketers



## 4 Redesign personalisation to be meaningful

Move from surface-level (cosmetic) personalisation to value-based personalisation:

- Household-specific planning
- Habit-based advice
- Adaptive feedback based on past waste

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## 5 Tailor strategies for Generation Z and Generation Y

Gen Z: dynamic, interactive, gamified content

Gen Y: structured guidance and supportive personalisation

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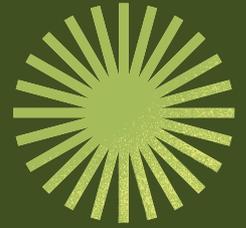
## 6 Integrate AI into national food waste strategies

Policymakers should embed AI apps into a wider ecosystem:

- Education campaigns
- Retail partnerships
- Municipal and school programmes
- SDG 12.3 action plans



# Study 2

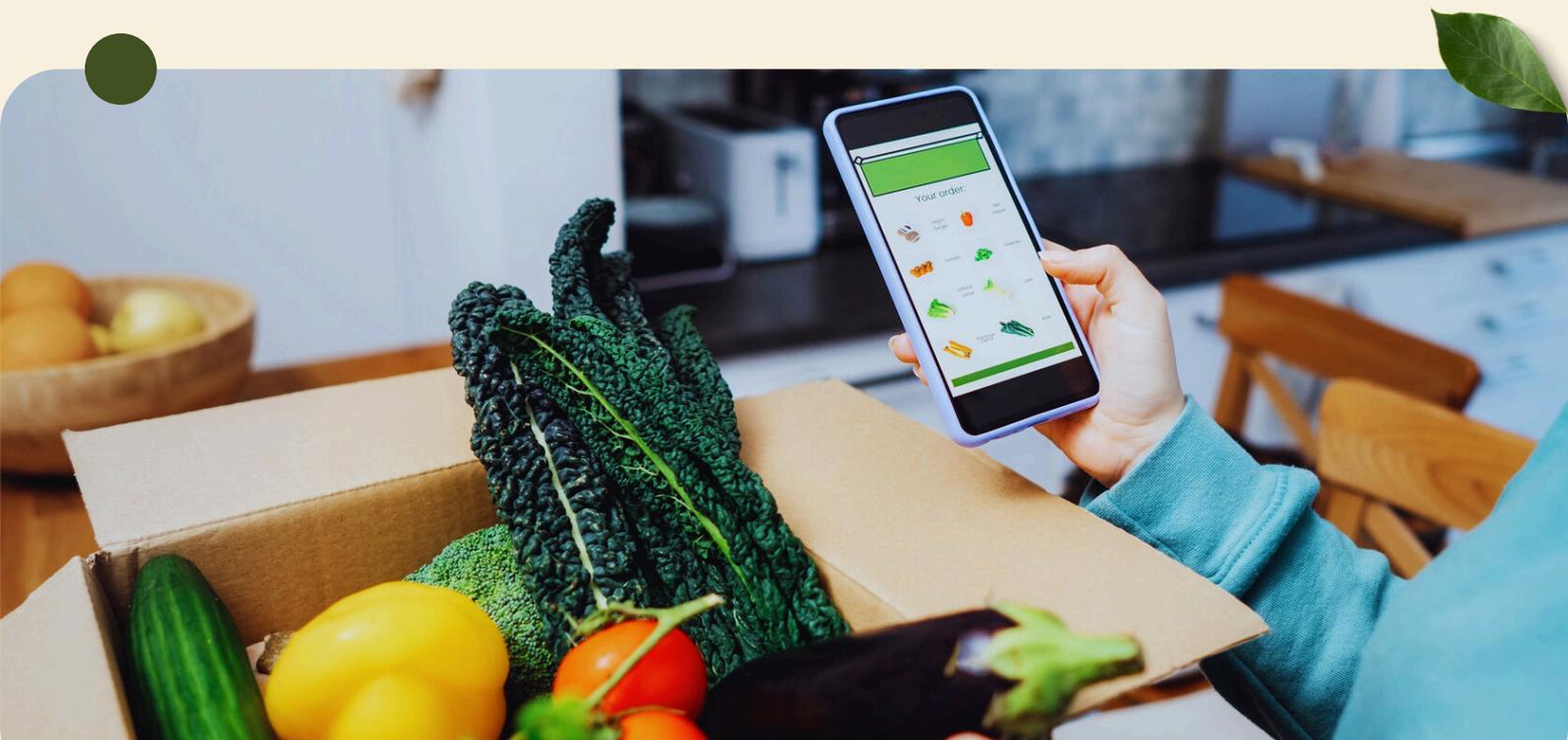


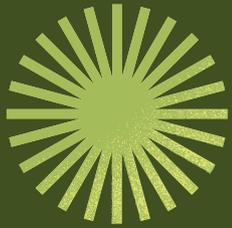
## Key Takeaways

**Marketers** should focus on interactivity, confidence-building, and meaningful personalisation

**Policymakers** should integrate AI tools into national food waste strategies rather than using them in isolation

**AI apps change behaviour** only when engagement is combined with confidence, structure, and ecosystem support



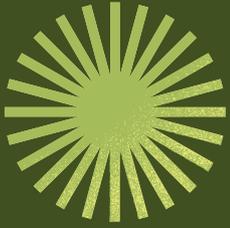


# Key Messages for Lithuania

- AI can reduce food waste, but design matters more than technology
- Interactivity and personalisation drive behaviour change, not usability alone
- Confidence (self-efficacy) is the missing link between engagement and action
- Generation Z and Generation Y respond differently and require tailored approaches
- AI works best as part of a wider food waste ecosystem, not as a standalone tool

AI-based food applications offer a powerful opportunity to reduce household food waste in Lithuania. However, their success depends less on technological sophistication and more on how effectively they support human behaviour. When AI tools are interactive, personalised, and designed to build user confidence, they can help households waste less food, save money, and contribute to national sustainability goals. For policymakers and marketers alike, the key lesson is clear:

**AI should be designed not only to engage users, but to empower them.**



# Future research directions

- Examine long-term effects of AI interventions
- Compare different types of AI-based food solutions
- Include older age groups and diverse household types
- Combine experiment and survey with objective data (actual waste, purchase records)
- Study AI as part of a broader policy and market ecosystem, not a standalone tool



**Prepared by Dr. Rafiq Mansoor and Prof. Dr. Aušra Rūtelionė**

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