



# Visual data in web surveys: the case of bedroom flooring

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WEB DATA OPP Workshop

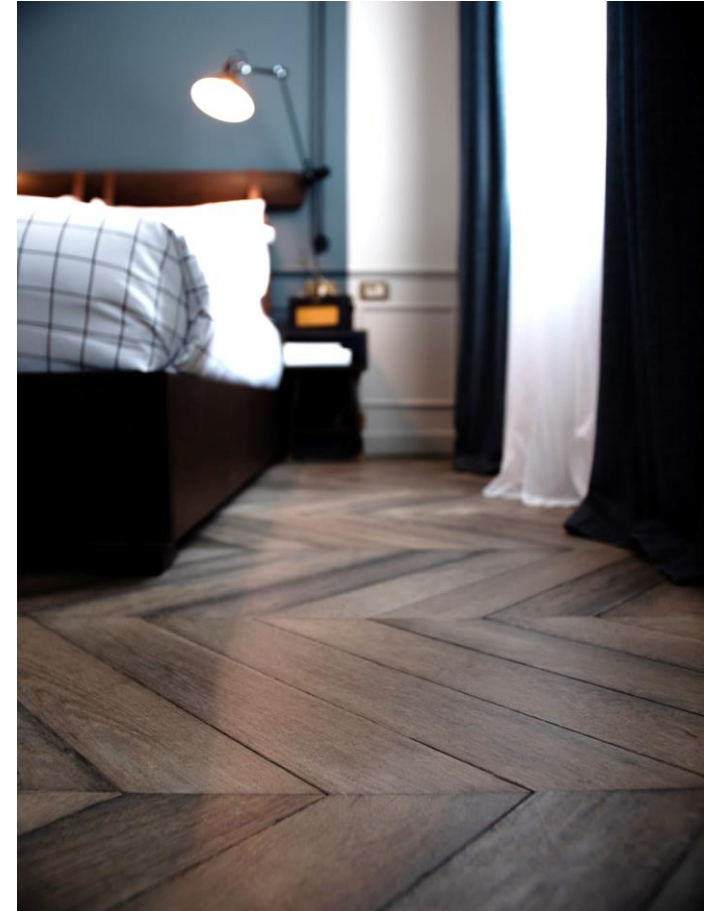
Barcelona, 18. 3. 2024



# Background

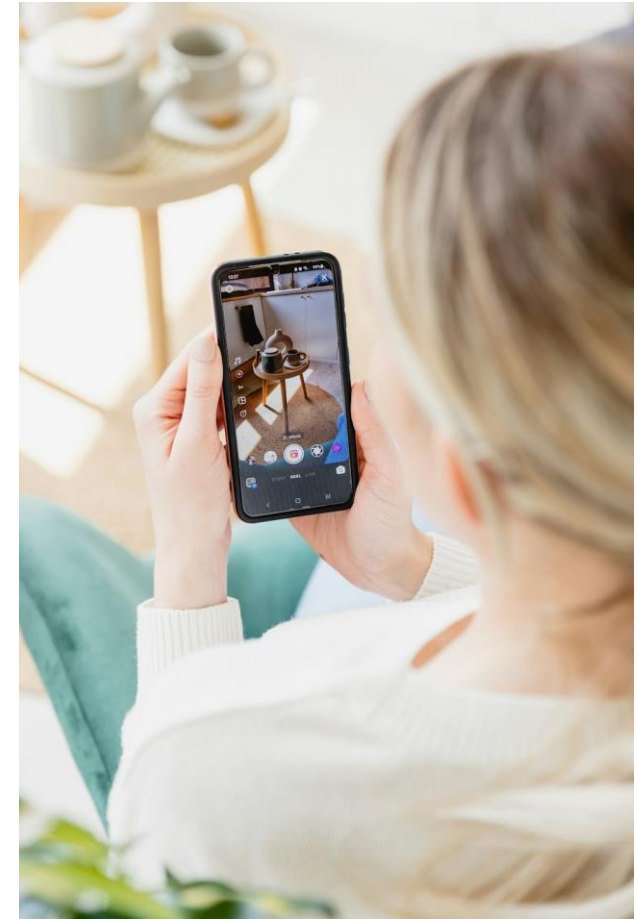
- Flooring materials have distinct properties that affect the comfort and well-being of residents
- Natural materials like wood:
  - can contribute to better indoor air quality
  - have lower carbon footprint in production and disposal
- Official data lacks specific information regarding the materials used for flooring and other household furnishing

**Funding:** Postdoctoral project „Using questionnaires to measure attitudes and behaviours of building users“ funded by the Slovenian Research and Innovation Agency (Z5-179)

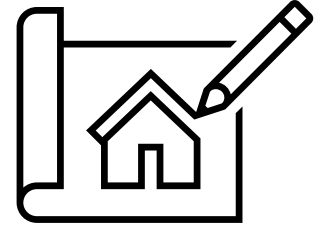


# Visual data in web surveys

- Mixed results on benefits and limitations of using visual data ([Revila 2022](#))
- Most respondents have the required skills and are willing to capture and share visual data ([Iglesias and Revilla 2023](#))
- Compliance to take picture varies between different tasks and there are privacy concerns ([Ilic et al. 2021](#), [Struminskaya et al. 2021](#))
- Asking participants to answer with images increases their completion times ([Bosch et al. 2022](#)) and leads to nonresponse ([Ilic et al. 2021](#))
- Google Vision is far from the level that a human coder can achieve ([Bosch et al. 2018](#)) and human verification of outcomes is recommended ([Iglesias et al. 2024](#))



# Two surveys



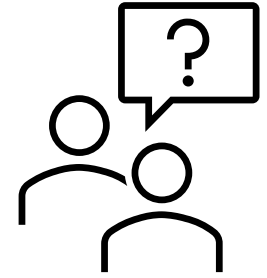
## 1st survey

- 60-questions long on various topics: Dwelling characteristics, renovation, furniture, climate change (15 min median response time)
- Quota based sample from JazVem **online marketing panel** (Valicon Ltd)
- Data collected from 23. 8. to 1. 9. 2023
- 3765 panellists invited to participate
- 1029 fully completed questionnaires (27.3%) but 20 were removed due to data quality issues so the final database has **1009 units**

## 2nd survey

- 1024 panellist from the 1st survey were invited to the 2nd that took place about a week after (September 2023)
- 8-questions long (3 min median time)
- 702 clicks and **380 started responding**
- **331 completed it and 314 uploaded an image** (+ 6 sent it by email)
- Those that did not upload, were asked why
- 368 answered to question about willingness to provide other types of information

# Research questions



## Methodological

1. How many panellists have ...
  - a. participated in the 2nd survey?  
+ With what device?
  - b. uploaded a photo?  
+ And for what reasons others have not?
2. How many photos are ...
  - a. valid and showing what was requested?
  - b. are authentic (based on metadata)?
3. How many would be willing to provide other types of information?
  - Other visual
  - GPS location
  - Sound location

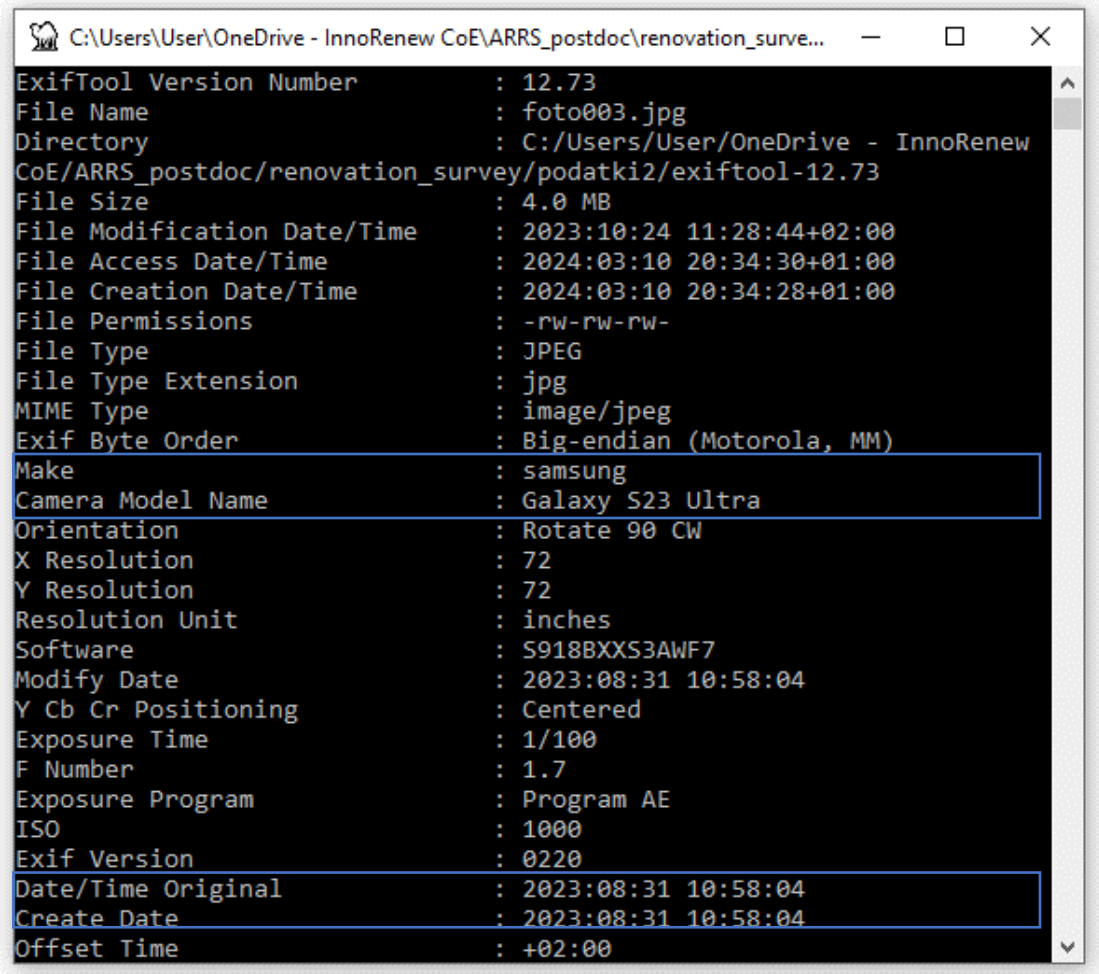
## Content

4. What is the % of different flooring materials in Slovenian homes?
  - a. How many are wood or imitation of wood (and are laminate or vinyl or ceramics or other material)?
  - b. Are respondents able to distinguish between real wood and imitations, i.e. does their answer match expert evaluations of the content of photos?

+ **Demographic differences** according to: a. device, b. gender, c. age, d. education, e. household size, f. income, g. settlement type, h. home ownership?

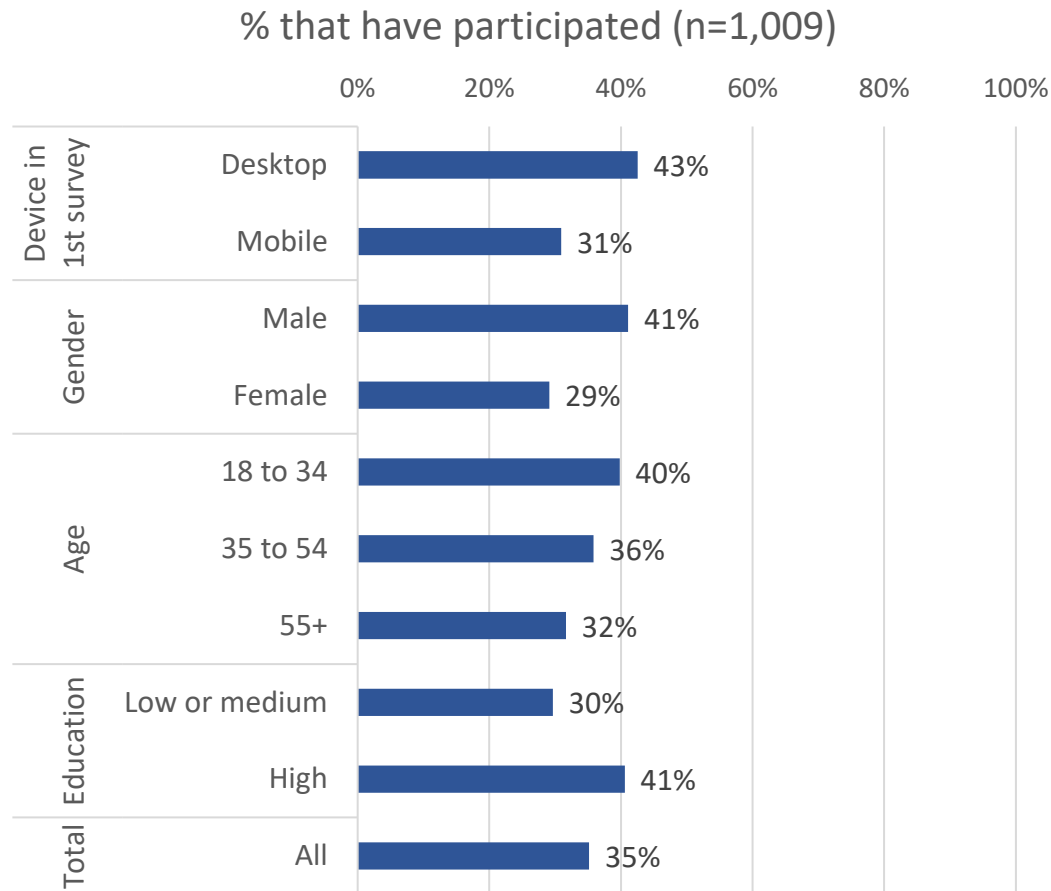
# Methods

- Download and processing of survey data collected with [OneClick Survey](#) with [IBM SPSS Statistics 29](#)
- Manual review and coding of the downloaded photos
- Extraction of photo metadata in exif format with [ExifTool 12.73](#)
- Merging data from 1st and 2nd survey with photo metadata
- Data analysis and visualisations



```
C:\Users\User\OneDrive - InnoRenew CoE\ARRS_postdoc\renovation_surve...
ExifTool Version Number  : 12.73
File Name                 : foto003.jpg
Directory                 : C:/Users/User/OneDrive - InnoRenew
                           CoE/ARRS_postdoc/renovation_survey/podatki2/exiftool-12.73
File Size                 : 4.0 MB
File Modification Date/Time : 2023:10:24 11:28:44+02:00
File Access Date/Time     : 2024:03:10 20:34:30+01:00
File Creation Date/Time   : 2024:03:10 20:34:28+01:00
File Permissions          : -rw-rw-rw-
File Type                 : JPEG
File Type Extension       : jpg
MIME Type                 : image/jpeg
Exif Byte Order           : Big-endian (Motorola, MM)
Make                     : samsung
Camera Model Name         : Galaxy S23 Ultra
Orientation               : Rotate 90 CW
X Resolution              : 72
Y Resolution              : 72
Resolution Unit           : inches
Software                  : S918BXXS3AWF7
Modify Date               : 2023:08:31 10:58:04
Y Cb Cr Positioning      : Centered
Exposure Time             : 1/100
F Number                  : 1.7
Exposure Program          : Program AE
ISO                       : 1000
Exif Version              : 0220
Date/Time Original        : 2023:08:31 10:58:04
Create Date               : 2023:08:31 10:58:04
Offset Time               : +02:00
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# Preliminary results 1a: About 35% have participated in the follow-up survey

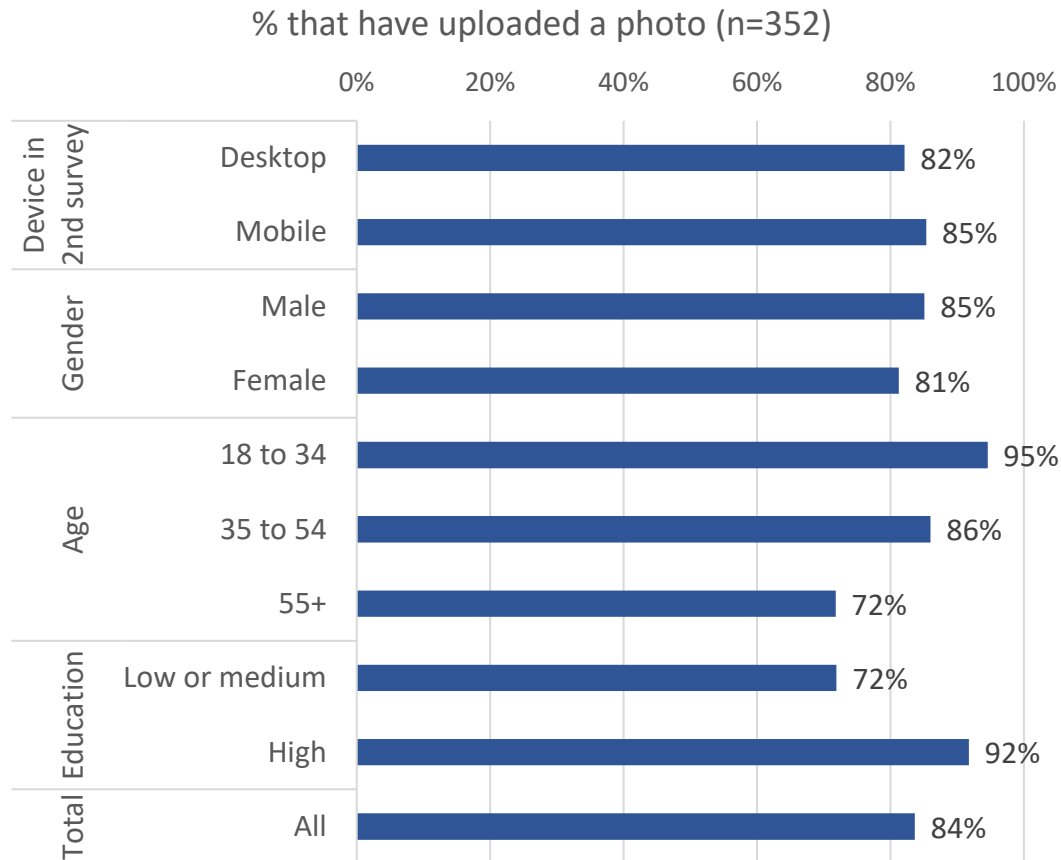


- Significant differences for
  - Respondent device ( $\chi^2=2.4$ ,  $p<0.001$ )
  - Gender ( $\chi^2=12.2$ ,  $p<0.001$ )
  - Education ( $\chi^2=11.3$ ,  $p=0.001$ )
- No significant differences for age, household size, income, settlement size, ownership

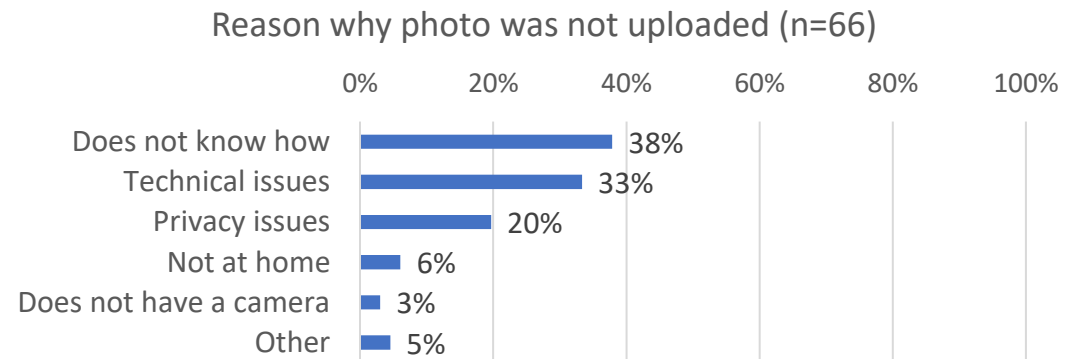
## • Device switch between 1st and 2nd survey:

1\2	Desktop	Mobile	Total
Desktop	129 (37%)	<b>27 (8%)</b>	156 (44%)
Mobile	<b>57 (16%)</b>	139 (40%)	196 (56%)
Total	185 (53%)	166 (47%)	352 (100%)

# Preliminary results 1b: 84% of those participating in the follow-up have uploaded a photo

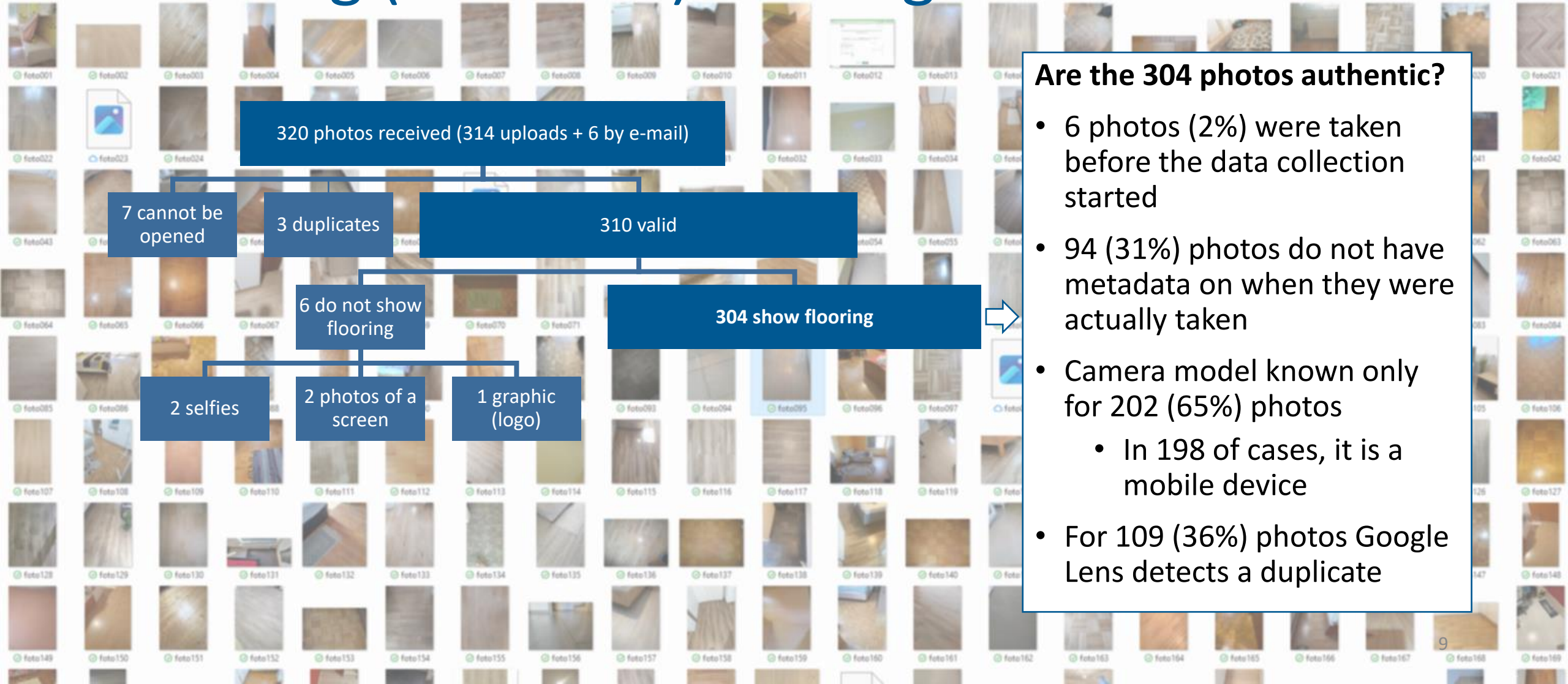


- Significant differences for
  - Age category ( $\chi^2=20.5$ ,  $p<0.001$ )
  - Education ( $\chi^2=24.4$ ,  $p>0.001$ )
- No significant differences for device, gender and other variables.
- The 16% that have not were asked why:





# Results 2: 95% of photos are valid and are showing (bedroom) flooring



320 photos received (314 uploads + 6 by e-mail)

7 cannot be opened

3 duplicates

310 valid

6 do not show flooring

304 show flooring

2 selfies

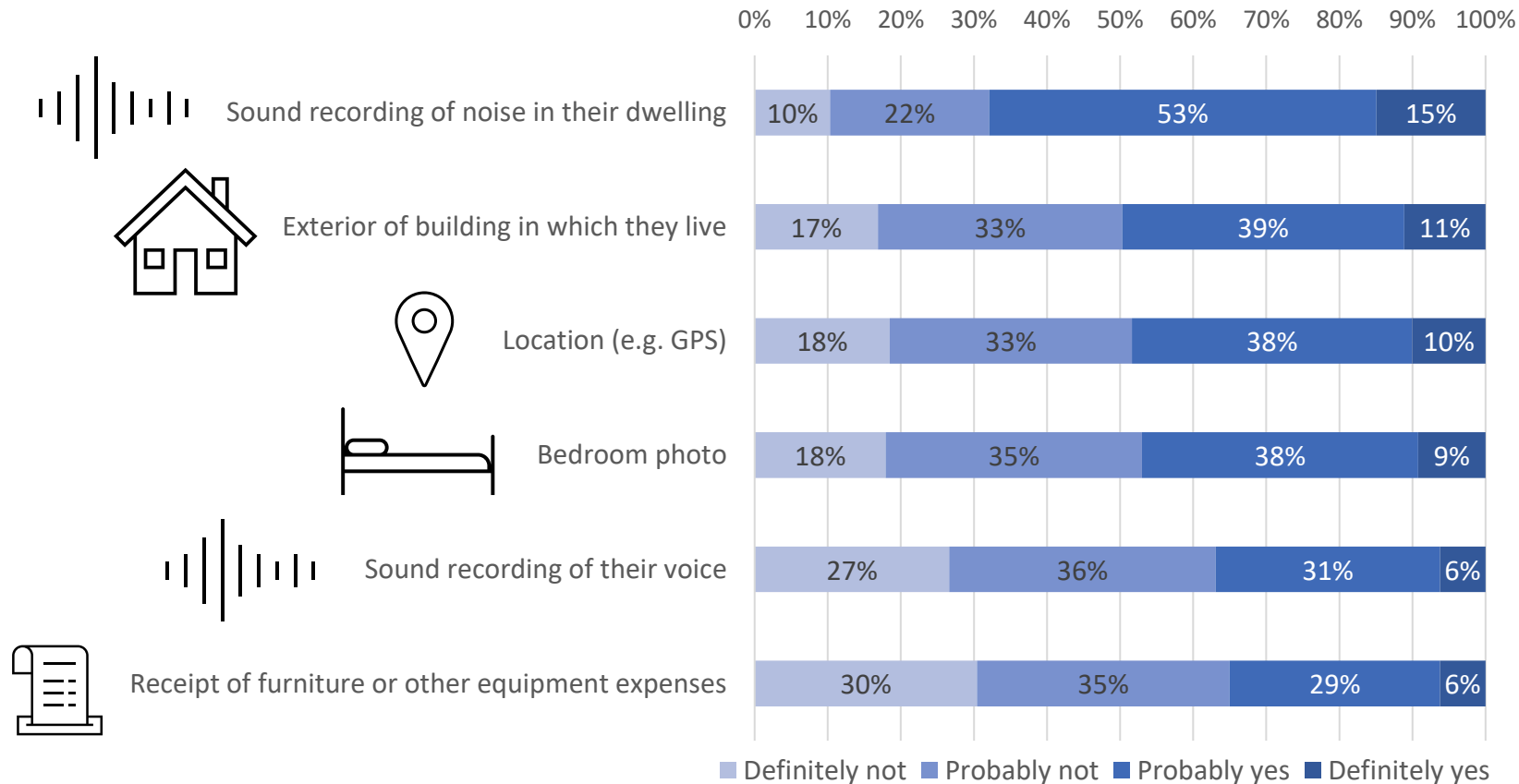
2 photos of a screen

1 graphic (logo)

## Are the 304 photos authentic?

- 6 photos (2%) were taken before the data collection started
- 94 (31%) photos do not have metadata on when they were actually taken
- Camera model known only for 202 (65%) photos
  - In 198 of cases, it is a mobile device
- For 109 (36%) photos Google Lens detects a duplicate

# Preliminary results 3: from 68% willing to record a noise to only 35% to upload a receipt



This question was followed by the last that asked for comments in open-ended format:

- 9 respondents **expressed privacy concerns**
- 7 reported additional details about their furnishing
- 5 reported **technical issues with photo upload**
- 5 expressed that they liked the survey
- **4 expressed issues with providing purchase receipts**
- 6 other

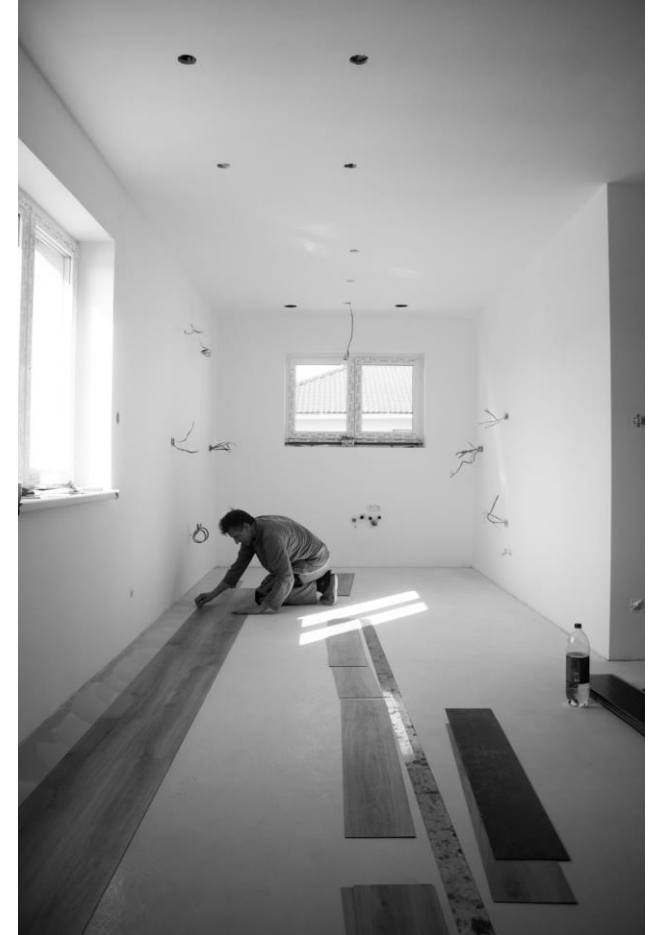
# Summary and discussion



- Only about a third of respondents have participated in the follow-up survey and uploaded a photo which is less than in previous research
- About half of them responded in desktop mode even if the introduction recommended using a mobile device
- Male, higher educated and younger respondents are more likely to upload a photo
- As previous research has indicated, respondents can have technical issues, and some have privacy concerns
- On the other hand, some respondents are less careful about the data they share
- Almost all uploads are valid, but it is difficult to estimate their authenticity
- Less willingness to provide other types of information

# Next steps and future research

- More thorough analysis including other available variables
- Comparison of respondent reports with expert evaluations
- Use of Google Vision and ChatGPT to code visual data and compare it with other data
- Publication of article(s) and datasets in line with FAIR data principles
  
- Further studies for other case studies
- Adding questions related to the authenticity of the photos?
- Automatic detection of non-authentic photos?



**Thank you for your attention!**

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