

D6.2: Scientific report on the consumer perspective of digital labels and solutions

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Executive Summary

The Digi-Label project intends to develop a digital solution to support consumers in making an energy-efficient choice when purchasing an appliance. The first draft of such a tool was developed and then discussed with two groups of consumers in Germany and Spain in the summer of 2016.

The tool is designed for use on a smartphone or any other connected device while shopping, but can also be accessed via a website. The tool contains the relevant information for appliances with energy labels on a model basis. The model-specific information can be accessed via a manual search function or by scanning the QR code featured on products in stores.

22 individuals took part in the group discussions to test the tool. The participants were a heterogeneous set of individuals comprising younger and older (29-68 years) men and women with different levels of education, with and without children. Most of them had purchased one or more appliances in the twelve months preceding the group discussions. The Spanish group had a higher level of education and several of them work in fields related to energy or consumer issues.

The main findings from the two consumer groups can be summed up as follows:

The current energy label and its role for past purchases

- **High level of awareness of the current energy label** – most participants were aware of the energy label and recognized it; and most found it useful in terms of providing guidance for their purchasing decisions.
- **Clarity of icons and symbols** – some participants criticized the icons and symbols on the energy label which were not fully understood by them, particularly what the given information implied about energy cost in relation to other appliances or over the lifetime of the appliance. This finding is in line with the literature (Kardel 2016).
- **Habits for purchasing appliances in line with PocketWatt approach** – participants typically bought appliances in big retail stores and usually searched for information before making a decision. Online sources are used most regularly for this, i.e. PocketWatt should be compatible with their habits. Participants differed in the importance they attached to energy efficiency – the majority consider this to be one feature among others, while a few admit that it is not relevant for them.

Accessing and using PocketWatt

- **Mixed reactions to accessing the PocketWatt tool via a QR-Code** – most participants appreciated the possibility to access it easily in stores via the QR-code. However, while nearly all the participants regularly use a smartphone in their daily lives, less than a quarter have regularly used a QR-code so far.
- **Using the PocketWatt tool on a smartphone** – some of the participants were less enthusiastic about this due to the smartphone's small screen and the high density of information. Using it at home on a computer was preferred but it was also proposed that retailers should offer devices in stores like tablets to access the tool.
- **Being able to access findings offline was evaluated positively** – being able to save, print or email an appliance choice was considered important and helpful for offline use as well. Participants showed little interest in interactive functions, like commenting on the appliances.

Features and information provided by Pocket Watt

- **Participants valued the tool's conversion of energy use into running costs** – there was also a lot of interest in customized information, offered either in a standardized form, e.g. using typical household sizes or usage frequency, or in a dynamic way so that consumers can enter their own data like number of washing cycles per week.
- **The comparison list received positive feedback** – on the one hand, participants would like to get more detail about the products (e.g. size, weight, features) in the tool, on the other hand, they warned about the danger of overloading it. The possibility to add choices of appliances to a comparison list was considered very helpful.
- **The product search function was appreciated** – the filter function was seen as useful and relevant filters were identified such as household size, volume and size of appliance. Overall, this way of accessing information was viewed as very valuable in order to be well-informed before going into the shop and to narrow down the range of products.
- **Complete and recent database as a precondition - including the product price?** – Overall, the participants emphasized that an underlying high quality database is essential and that they would like this to include the product price as well.

The overall evaluation of the tool was mixed – Evaluations range from very useful to not at all useful with a slight majority rating it as useful. In line with this, around half the participants stated they intend to use it in the future, while the other half does not intend to do so. The German participants were much less enthusiastic than the Spanish ones. This is probably related to the different composition of the two groups. The intention to not use the tool was usually linked to a general disinterest in energy issues, not to a negative evaluation of the tool itself.

Conclusion – the further development of the tool will need to consider consumer-oriented improvements to the tool itself but must also focus on motivating consumers to use it.

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1 Introduction

Energy efficiency continues to be a key factor for consumers when purchasing electrical products in stores, or hitting the ‘Check Out’ button online. But despite consumers wanting to know more about how much energy the latest gadgets use, and how much they will cost to run, current energy labels remain too difficult to understand and do not let consumers accurately compare how energy efficient different products are. The Digi-Label Project aims to change that – making energy labels simple to comprehend and information more readily available, both in store and online. The project is designing and testing a digital tool that will allow consumers to assess how energy efficient a product really is – both as a smartphone app used in shops, and via a website containing the latest information on product efficiency and running costs. The idea is to bring energy labels into the digital era.

In order to monitor the success and impact of the project and develop a digital solution that really supports consumers, the project also includes an evaluation process. Part of this evaluation is an early exchange with consumers about a draft version of the developed digital tool. This deliverable reports on this step. The findings have already been used as input to further develop the tool. To collect and document feedback from the target group of this tool, consumer workshops were conducted in two of the five countries which form the focus of this project: Spain and Germany. This choice features a pilot country and one from the roll-out phase of the project, i.e. a country where the digital tool will first be tested in stores and another where it will be implemented later. The choice also covers a southern and a central European country.

What is PocketWatt - the Digi-Label tool?

PocketWatt is a digital tool that enables consumers to assess how energy efficient a product really is – both on a smartphone while shopping, but also on a website for all other internet-connected devices.

To enable easy access and spare consumers the effort of typing in model data, it is planned to equip each appliance in a store with a product-specific QR-code. By scanning the QR-code with a mobile device, consumers can directly access the tool’s information on this specific appliance. In addition, consumers can also search manually for a specific model or browse through specific appliance categories, e.g. washing machines.

For each appliance, the tool provides information about energy consumption and costs. One of the aims of the consumer study is to discover what type of data is relevant and interesting for consumers. A first draft version of the tool was presented in the workshops and is illustrated in this report using screenshots (see chapter 3).

The tool is developed by the Digi-Label project consortium and technically implemented by Solstice Associates, Hadleigh, Suffolk.

This report is structured as follows: Chapter 2 provides an overview of the structure and methodology of the consumer workshops. Chapter 3 outlines the findings from the workshops. Finally, Chapter 4 presents the conclusions and recommendations drawn from the workshops and the subsequent analysis.

2 Methodology

A qualitative approach was chosen to elicit feedback about a draft version of the digital tool, i.e. a format that is not fully structured and therefore leaves room for feedback and reactions from respondents. A workshop or focus group format was selected. This is a structured group discussion which is usually recorded and transcribed and later analysed by applying a systematic coding system. This approach is especially suitable if the subject of interest is new, as in our case, because the group process supports participants in forming an opinion and giving ideas to each other (Marshall and Rossman 1999; Morgan 1988). Another advantage is that the researchers also have the possibility to react flexibly to feedback and, e.g. expand explanations if issues are not well understood. In contrast to quantitative approaches, such a format does not permit conclusions, e.g. about the level of impact of a digital label, which was, however, not the goal at this stage of the project. The next sections of this chapter provide more detail about how the consumer workshops were conducted.

2.1 Target group and recruitment

To obtain meaningful findings, choosing the appropriate target group is a major concern of qualitative research. In our case, we were interested in how consumers deal with the issue of energy efficiency when purchasing an appliance, and how the PocketWatt tool can support them in taking energy efficiency into account when making such choices. Therefore, the target group for the consumer workshop should comprise preferably individuals who have recently purchased one or more of the relevant appliances. It is assumed that the process of decision making is more salient to them so they are able to give more valid feedback.

Besides this criterion, another aim was to recruit a heterogeneous group of participants. This means, the groups were supposed to consist of buyers of different appliances, men and women of different ages and different education levels. However, no fixed quotas were applied. The group size was intended to be around 8-10 participants.

For the recruitment stage, a screening questionnaire (see 5.2) was used to ensure the heterogeneity of the sample. It comprises questions about gender, age, level of education, employment status, household size and children. Two further questions were included with regard to the purchase of appliances: the type of appliance bought in the last six months and the place of purchase. The screening questionnaire was also used to gather information on the socio-demographic data of the final group. The description of the final sample is given below.

For the German group, finding suitable participants was outsourced to a market research institute, which recruited participants using the screening questionnaires from their contact directory to ensure heterogeneity. In Spain, participants were also identified by a company.

2.2 Workshop material: questionnaires and discussion guideline

The main aim of the workshops was to receive feedback and recommendations from the participants about the draft (alpha) version of the PocketWatt tool. This was done by combining questionnaires with group discussions. The questionnaire had the goal of ensuring that feedback from every participant was collected, while the group discussions served as an open format in which participants could openly exchange and develop views by interacting with each other.

On arrival, participants filled in a questionnaire (see 5.3) about their personal background (e.g. household size), smartphone ownership, appliances in their home, their habits regarding appliance purchase, and their awareness of the European energy label.

For the discussion part of the workshop, a standardized guideline (see 5.4) was developed including guiding questions and a list of relevant topics to ensure comparability between the two countries. At first, the *awareness and knowledge* of energy labels for appliances was discussed. Afterwards, the group talked about the *last purchase of an appliance* and the role of energy efficiency. Subsequently, the *draft version of the PocketWatt tool* was presented to the participants who evaluated the tool with all its elements. Finally, the intention to use the tool was discussed in the group.

After the workshop the participants received a brief second questionnaire (see 5.5) on their evaluation of PocketWatt and intention to use it. In order to match all questionnaires, the first names of the participants were inserted.

All materials were presented in national language versions, i.e. in German and Spanish, and the group discussions took place in the local language as well.

The following figure gives an overview of the procedure.

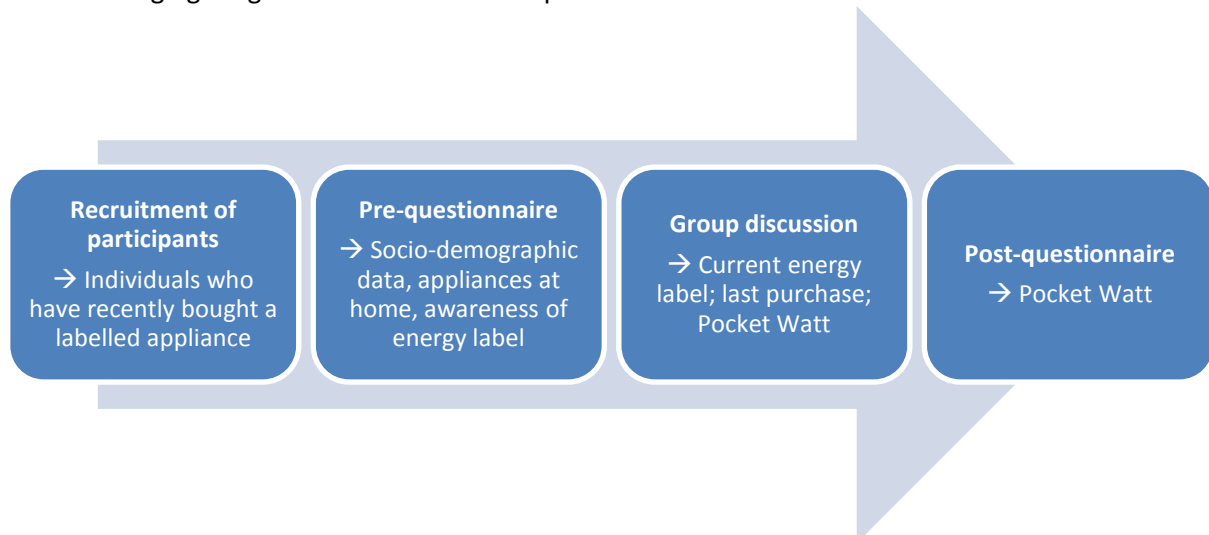


Figure 1: Procedure for empirical study

2.3 Workshop implementation and data preparation

The German workshop took place at the Fraunhofer ISI in Karlsruhe on 28 July 2016, organized by the Digi-Label project team members from Fraunhofer ISI. The Spanish one was held in a meeting room in the city centre of Madrid on 13 September 2016, organized by Escan. Both Fraunhofer and Escan are partners in the Digi-Label consortium. In Germany, participants received €60. In Spain, the participants received a free meal. Overall, the German workshop lasted 2.5 hours, and the Spanish one 3.5 hours.

The questionnaires were collected by the group moderators and entered into SPSS-files for statistical analysis. The group discussions were recorded and verbally transcribed afterwards. Escan subcontracted a company for the audio recording and transcription. The translation from Spanish to English was carried out by Escan staff.

As the analysis was done by researchers from Germany, no translation was needed for the German transcript.

2.4 Sample description

In total, 22 individuals participated in the two workshops (ten in Germany, twelve in Spain). Women accounted for half the participants in each group. Ages in the German group ranged from 29 to 63, and from 36 to 68 in the Spanish group. The majority of the German group had completed a professional training and only one person had a university degree, while in Spain all the participants had completed tertiary education, i.e. the level of education was higher in the Spanish group. Further sample characteristics are displayed in Table 1.

Table 1: Sample characteristics

Number of...	Germany	Spain
<i>...participants</i>	10	12
...employees	7	11
...participants living alone	1	3
...participants living with children	4	4
...home owners	4	11
...participants with high income	1	5
...participants with medium income	8	2

The table shows that, while the majority of participants are employed, some are currently not employed. Overall, the participants practise a broad range of professions; in the Spanish group, several work in energy or consumer-related fields. The participants included a few people who live on their own as well as some families. In Germany, people in rented accommodation formed the larger part of the group. Participants were asked to rate their household's income as either low, medium or high. Those who provided an answer categorised themselves as either a high or medium income household. Overall, the representation of the different characteristics indicates that a heterogeneous sample has been compiled.

Table 2: Appliances in participants' households

	Germany	Spain
<i>Number of participants</i>	10	12
Fridge-freezer	All	All
TV	All	All
Washing machine	All	All
Dryer	8	3
Dish washer	8	8
Air conditioner	1	4
Electric oven	9	11
Vacuum cleaner	All	9
Range hood	7	All
<i>Average number of appliances per participant</i>	7.3	6.9

Participants also provided information about what kinds of appliance they have. While all have a fridge and/or freezer, a TV and a washing machine, there is some variation for other appliances; on average, seven of the nine appliances that were asked about were present (Table 2).

The preference was to choose participants who had recently bought an appliance to participate in the group (see also Table 3 in section 3.4). In Germany, this was fully successful and all the participants had recently bought one or more appliances (range 1-6 months, mean 2.7 months ago), including two fridge-freezers, three TVs, five washing machines / dryers, three dishwashers, one air-conditioner and a vacuum cleaner, i.e. 16 appliances. In Spain, eight of the twelve participants had bought an appliance about one year ago and four of them more than one year ago. Overall, the Spanish participants discussed their experiences of having bought 14 appliances in total including four fridge-freezers, two TVs, one washing machine / dryer, two dishwashers, one air-conditioner, three electric ovens and a range hood. Thus, most of the Spanish participants are also experienced consumers.

2.5 Data analysis

Over 50 pages of transcript representing more than 22,000 words were generated from the workshops. The transcripts were analysed using content analysis software. The qualitative data were coded with the software ATLAS.ti. Coding is an important technique in qualitative research and content analysis; while coding, each segment is labelled with a certain code, i.e. a word or short phrase describing the content. Some of the codes were pre-determined, i.e. derived from the topics in the discussion guideline. However, new codes arising from the data were also developed (Bernard 2006; Saldana 2011). If an issue was mentioned several times, it was coded several times. This can give an indication of the density and salience of issues for the focus group as a whole. After coding, the segments belonging to a certain code were analysed and compared (synopsis) and relationships between codes were identified (axial coding).

It should be noted that all coding is inevitably selective and normative. Here, priority is given to coding information that provides detail (typically in terms of reasoning and substantiation of views).

For practical reasons, it was not taken into account which participant made which statement in the focus groups. Thus, it was not possible to link certain statements to the socio-demographic data of the consumers. However, identifying relationships is not an objective in qualitative research. Furthermore, by carefully compiling focus groups with heterogeneous backgrounds, a variety of perspectives was ensured.

To illustrate the results, selected literal quotations of the participants are included in the text. When quotations from the German transcript are inserted, they have been translated into English for the purpose of this report. Omissions within quotations are indicated via [...]. Sometimes additions by the authors of this report were made to make quotations more comprehensible. These are marked by brackets.

3 Results of the consumer workshops

This chapter presents the workshop results on awareness, knowledge and evaluation of the energy label in sections 3.1 to 3.4. These indicate the importance of energy efficiency for consumers when purchasing appliances. The main aim of the two workshops was to obtain feedback from consumers on the draft version of the PocketWatt tool. These results are presented in section 3.5 and comprise the evaluation of the access to the tool and the different parts of the tool as well as the need for further information. At the end of the chapter, the results are presented concerning participants' future behaviour, i.e. the intention to use or recommend the tool to peers.

3.1 Awareness of the energy label

The questionnaire handed out before the group discussion suggested a high level of knowledge about the European energy label – all but one participant from Germany stated they had seen the label before. This was confirmed in the group discussion. Almost all the consumers are aware of the energy label and have seen it several times before: Several participants in Germany and Spain reported they had seen the energy label on appliances while shopping, e.g. on washing machines, refrigerators or vacuum cleaners:

German participant: 'For the vacuum cleaner it was placed on one side. But you are also aware of it from shops or from TV, it can be seen quite often.' (referring to the energy label)

Further sightings were reported on TV or in magazines of consumer organizations.

3.2 Knowledge of the energy label

Two example energy labels were shown to the participants: one of a washing machine and one of a TV. Participants were asked what information they were able to understand and apply from these two labels (Figure 2).

There was some uncertainty with regard to the meaning of the energy efficiency classes: Some participants believed the classes refer to the absolute energy consumption of the appliance.

German participant: 'The upper one, this A+++, this is in fact the lowest energy consumption. That's why it is coloured, so that everyone can see it right away. This is also important when you purchase it, if the appliance consumes a lot of energy, if you want to avoid follow-up costs or to keep them low.'

It was further assumed that the water consumption of, e.g. a washing machine, is also included in the energy efficiency class. In contrast, others were aware that the energy efficiency classes only indicate the energy efficiency of an appliance.

Some wondered about the range of differences between the energy efficiency classes:

German participant: 'Actually, I do not really know if A++ or A+++ makes that big a difference.'

However, they assumed that there is a relationship between the energy efficiency class and the purchase price, i.e. more efficient goods are more expensive. Further uncertainties occurred in relation to the range of the energy efficiency classes: The participants speculated whether there are still appliances rated C to F in the shops.

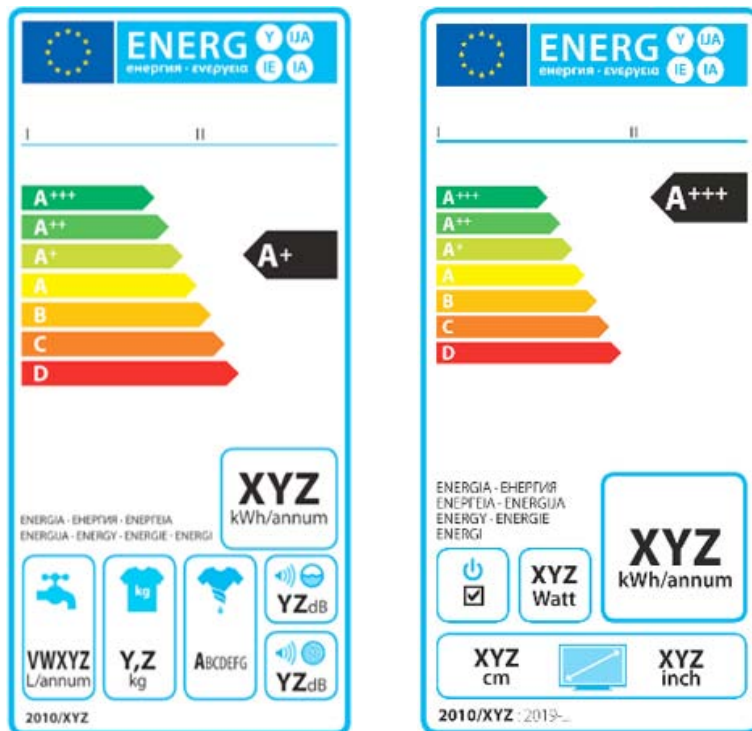


Figure 2: Example energy labels (washing machine and TV)¹

With regard to the additional information besides the energy efficiency classes, several German participants stated that they do not know what the decibel value means, so they could not interpret this information. Some of the Spanish consumers were not sure about the meaning of the symbols on the label (e.g. the symbols for load capacity on the label for washing machines) or the meaning of “kWh/annum”. They were missing a reference point in order to interpret this information. One participant said:

Spanish group: ‘Unfortunately I do not know this parameter kWh/annum. I think that this could be the consumption in a year of a TV or refrigerator, but it is difficult to compare this to other appliances because I do not know if consumption is high or low.’

The participants in both Germany and Spain were not sure whether all kinds of electric appliances are labelled or only some of them. They wondered about the labelling institution and the conditions of the certification process, i.e. if the energy consumption is defined when the appliance is operated in eco-mode.

3.3 Evaluation of the energy label

Those who were aware of the energy label were also asked to rate its usefulness (Figure 3); most of the participants (14/22) rate it as very useful, but the remaining third indicated lower levels of usefulness, none of them rated it as not useful at all.

¹ For the focus groups example real labels were used including numbers.

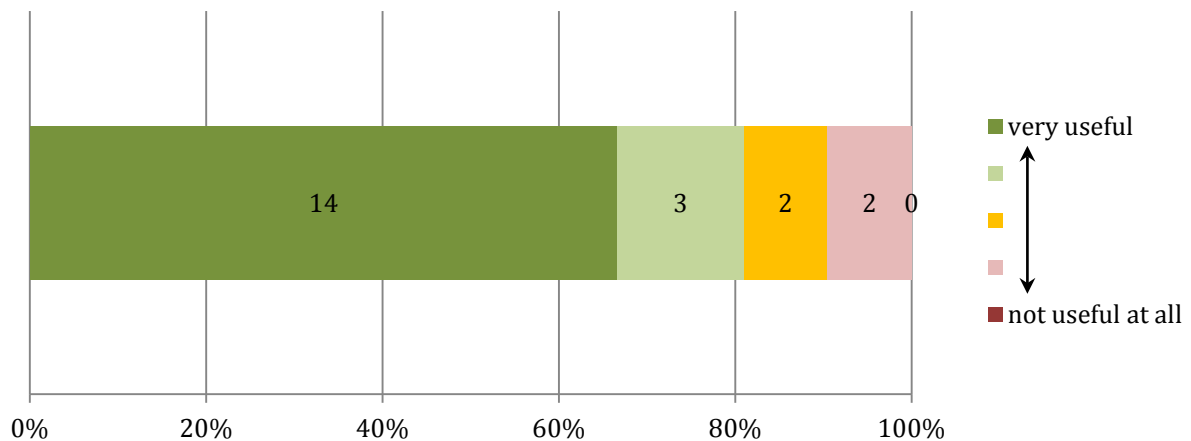


Figure 3: Participant’s perspective on the usefulness of the European energy label from the questionnaire

This rating was detailed in the group discussion: Several German participants stated that the energy efficiency classes are the most important element of the energy label for them. The additional information, e.g. the decibel value, is not very relevant, because they could not interpret it. The absolute values, e.g. the water consumption or the energy consumption per year were considered not useful in both groups. They proposed adding a reference value or a range similar to the energy classes:

German participant: ‘Well, for me, it is informative only if I know that these 74 dB are a limit or how wide the range is, where its starting point and its end point are. A+++ I know, the energy efficiency is super. 74 dB I have no idea.’

The Spanish group proposed including the energy consumption per use, e.g. for a washing machine the energy consumption per cycle.

Spanish participant: ‘This parameter is not useful if we do not compare the energy consumption of one appliance with a different appliance. I would like the energy label to show the energy consumption per use, for example in a washing machine the energy consumption of a cycle.’

In addition, the Spanish group proposed inserting the energy cost as planned in PocketWatt. Other participants were missing information on how the values displayed were calculated:

German participant: ‘So to me, absolute values are relatively meaningless. I would not rely on them. For example, 8,000 litres water consumption per year does not mean anything to me, because this requires a fictitious user, who does a certain number of washing cycles per week. Ok, for a TV, diagonal 80 centimetres, you can measure it, the same applies to the capacity of a washing machine. But when it comes to the noise or the energy consumption per year, I am convinced that many consumers do not know at all what kilowatt hours per year means.’

Furthermore, participants criticized the test conditions for the energy label as not realistic, e.g. in daily life the eco mode often cannot be chosen because it requires more time.

With regard to the assumed differences between the energy classes, some assumed that adjacent classes do not imply a big difference. Others disagreed with this and stated that this is important over the lifetime of the appliance and that the energy classes also have an influence on the purchase price:

German participant: ‘When it comes to the price, I believe it makes a difference if I only have a + or if I have three +’

Spanish participant: 'I bought a new refrigerator and there was a difference of 215 euros between an A++ and an A+++.'

To sum up, the consumers demanded more information about the meaning of the energy efficiency classes, e.g. the differences between the classes, which are obviously important with regard to the purchase price of the appliance.

The consumers evaluated it positively that the label displays all the key facts about an appliance at a glance. This was rated as useful for the easy comparison of appliances:

Spanish participant: 'I think the energy label and energy consumption is for the comparison of several appliances, it is a useful tool for consumers in the shops.'

3.4 Last purchase of appliances

Table 3: Background information on participants' appliance purchases

Number of...	Germany	Spain
...participants	10	12
...participants who recently bought an appliance	10	8
... participants involved in decision making for household appliances	10	10
...consumers in big electronic retail stores	9	9
...consumers in small electronic retail stores	1	5
...online shoppers for appliances	5	3

As pointed out in chapter 2, one goal was to include as many participants as possible who had recently bought an appliance. In total, all the German participants had purchased at least one appliance, with a total of 16 appliances purchased in the last six months. In the Spanish group, eight of the twelve participants had purchased appliances, with a total of 14 appliances bought in the last 15 months. Participants were asked in the questionnaire they received prior to the group discussion whether and how much they are involved in the decision making process for an appliance in their household and where they typically buy it (see Table 3). Most of the participants are either the decision maker or make the decision together with others, usually also from their household. Appliances are typically purchased at big retail stores, but also in smaller ones and online.

Participants were also asked about their information search behaviour before buying an appliance. All the Spanish and most of the Germans stated they look for information before choosing an appliance and use online sources most regularly for this purpose (see Table 4 for details).

In the workshops, the participants discussed the relevance of the energy label for the most recent appliance purchase. Several participants from both groups stated that the energy label was considered among other features. These participants purchased a TV, a vacuum cleaner and a fridge-freezer. The energy label was not relevant for other participants from the German group. Of these, two had purchased a TV, and stated that other features were much more important for this type of appliance than energy efficiency. For them, energy efficiency is more important for white goods than for brown ones.

Table 4: Participants' information search behaviour when buying an appliance

	Germany	Spain
<i>Number of participants per country</i>	10	12
Looking for information before buying an appliance	8	11
Press-media	1	1
Online (all sources)	7	10
Online product ratings	5	3
Manufacturers	2	2
Retailers	3	3
Consumer websites	6	2
Social media	0	1
Friends, relatives, colleagues	2	4
Sales staff at retailer	4	4
Retailer information	4	7

3.5 Evaluation of PocketWatt

3.5.1 Accessing the tool and product page

Table 5: Participants' smartphone ownership, QR-code usage and usage while shopping

Number of...	Germany	Spain
<i>...participants</i>	10	12
...smartphone owners	8	11
...(frequent) QR-code user	3	2
...participants using smartphone while shopping for appliances	4	4

The proposed digital tool is intended to be accessed using a QR-code at a retail store or an internet link. Participants were asked about their relevant habits (Table 5). It turns out that, with a few exceptions, most own a smartphone, but only a few of them have installed a QR-code reader *and* regularly use it. Some of the participants say that they access information in other ways on their smartphone while shopping for appliances.

Nevertheless, the Spanish and some of the German participants liked the idea of access via the QR-code, because this can be used while shopping. They also think QR-codes are a tool a lot of people are aware of. These participants suggested placing the PocketWatt symbol next to the product information or next to the energy label:

Spanish participant: 'I think that it should be located next to the energy label.'

Another Spanish participant: 'I agree with her.'

Third Spanish participant: 'I agree, next to the energy label'

Some participants liked the idea of scanning the products in the shop and using this as a source of information at the point of sale. This makes spontaneous purchases possible.

German participant: 'In this case it can even be helpful, for example, my iPhone is broken, I can go to a shop, access the tool, compare appliances with each other, then it tells me, this is the best one, ok, fine, I'll take it, I'll buy it. Thus, it can be advantageous.'

Other German participants did not like scanning the QR-Code to get to the tool. They say the smartphone screen is too small to comfortably use the tool. Others stated they would not use the tool while shopping, because they do not want to spend that much time in shops. They prefer to access the tool at home via a website prior to the purchase. Furthermore, some shops only have a poor internet connection which makes it hard to use the tool.

Some of the Spanish participants proposed access to the tool should be either via a QR-Code or a website:

Spanish participant: 'Information via the smartphone and internet will be very useful.'

This possibility would mean that people not familiar with QR-codes or not owning a smartphone could still access the tool. The link to the tool could be placed on websites of online shops or product comparison platforms. Some suggested placing it on websites used to compare electricity tariffs as well.

Several participants from Germany and Spain proposed retailers should provide access to PocketWatt, e.g. by providing small screens in stores where consumers can access the tool.

3.5.2 Energy efficiency information

The following screenshot of PocketWatt shows what consumers see when they scan the QR-code in a shop. It provides information on the energy efficiency of a specific appliance. This screen was also shown to the participants and discussed afterwards in the group.

The majority of the participants in Germany and Spain considered the information on the annual running costs to be useful.² Several consumers said it would be good to customize them to individual household sizes and/or usage patterns. Alternatively, they wanted additional values, e.g. a table for the running costs differentiated by household size. This is particularly relevant for appliances for which the frequency of use depends on household size.

German participant: 'Maybe it would be enough to have a small table with the category "persons in household" and also another criterion, which might also be decisive, e.g. how often you use the appliance and so on and then you can say 'ok, fine, for me this and this is most relevant', so that you can make a rough estimate.'

The category energy classification rates the energy efficiency class of an appliance according to the available classes for this appliance. However, this was not clear to the German participants so they felt that the energy classification information is redundant and that the information on the energy efficiency class is sufficient. Instead of this, an overview of all classes with the different colours could be integrated, for example behind the question mark.

Several people in the German group were confused about the definition of energy efficiency classes: They lacked a reference point for the annual energy consumption, e.g. average consumption. Furthermore, they wanted information on the size or range of each energy efficiency class:

German participant: 'In this case I would like to have for example an average value, i.e. the consumption of all appliances; to have a reference, [...].What you were saying before with regard to the costs, for example, 39 and 43, okay, 10 percent difference, but maybe 10 percent is not that much, because the next

² Some consumers suggested including the annual water costs for e.g. washing machines.

class is already 60 or 70 Euros and so on, so that you can build up a feeling for it in the first place, i.e. is this really good now or is it rather average?’

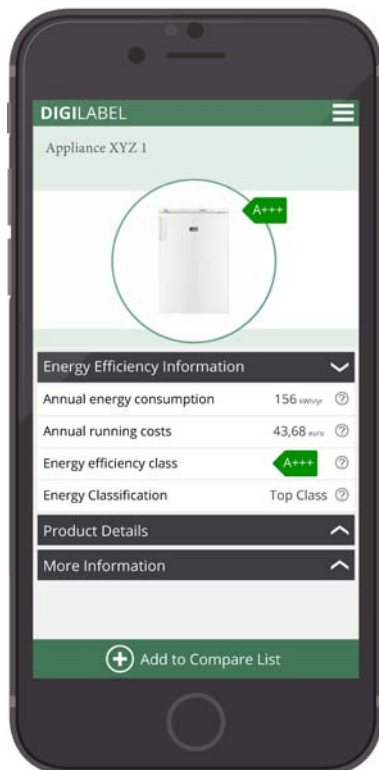


Figure 4: Screen shot of the PocketWatt (former name: Digilabel): Energy efficiency information.
Note: The appliances and data shown are fictitious.

With regard to the user interface, a white picture of the appliance on a white background was considered suboptimal.

The tool can add products to a comparison list and then rate them simultaneously. The idea behind this is that consumers scan, e.g. all the washing machines they are interested in, and then compare models. When presented with two appliances in the comparison list during the group discussion, the participants wondered about the differences in annual energy consumption and annual running costs within the same energy efficiency class.³ They wanted more information on how the annual running costs are calculated. This could be included behind the question mark.

In the Spanish group, some considered the information about possible energy savings more important than the information on energy costs. Potential savings are believed to be more appealing to consumers than costs.

Spanish participant: 'It is important to focus on the savings and not on the cost to promote the purchase of energy efficient appliances.'

Other participants suggested including information about the payback time.

³ An example of different freezers in the 'my compare' list was presented to the group. In this example, the two freezers with the energy efficiency class A+++ showed differences with regard to the annual energy consumption (156 and 132 kWh) and the annual running costs (43.68 and 36.96 euro).

3.5.3 Product details

To be able to visualize the tool with regard to the product details included, the following screen shot of PocketWatt was presented to the participants and afterwards discussed in the group (Figure 5).

The participants wanted more information like the size of the appliance (height, length, width). This is especially important for refrigerators and freezers. Section 3.5.6 gives more details about the further information the participants wanted to be included in the tool. Others evaluated the product details as useful.

3.5.4 Compare list and product search

Compare list

The following screen shot of PocketWatt showing the comparison list was then presented to the participants and afterwards discussed in the group (Figure 6).

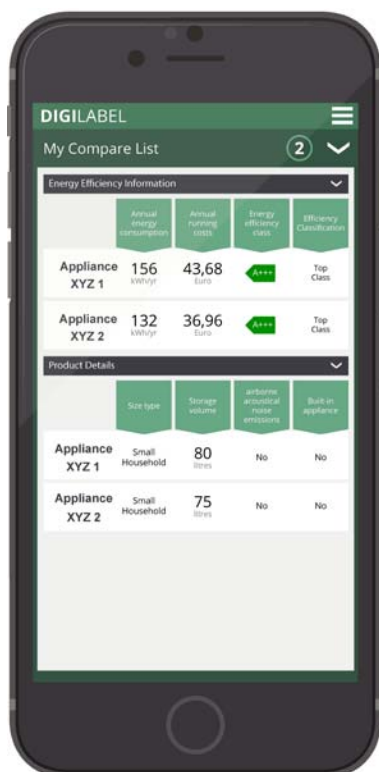


Figure 5: Screen shot of PocketWatt: Comparison list. Note: The appliances and data shown are fictitious.

In general, the 'my compare' list was seen as useful by both the German and Spanish groups. This function makes it possible to compare appliances.

German participant: 'The compare list, this is actually crucial for me, because I can compare; I have for example two appliances, this [make A] and [make B]. The [make A] costs 800 euros, the [make B] costs 1,000 euros.'

The participants suggested including a sorting function, for example with regard to the running costs of the appliances. They also suggested including pictures of the appliances in the compare list, so

that it is easier to recognize them. The model name did not seem to be sufficient and not really helpful.

German participant: 'I also think, if you had the icon again, i.e. a small picture of the appliance, if you had such a compare list, not only the name, because you might not remember it and might not know which appliance is which one again.'

However, many participants also stated that there should not be too much information in the comparison list. The idea behind it is that consumers can process the information at a glance. Thus, they opted to not include mandatory pictures but only when clicking on the appliance name.

Finally, to support the purchase decision, the database of appliances in the tool should be as complete as possible.

Product search

PocketWatt also allows its users to manually search for products or to browse through product categories, e.g. washing machines. It includes several filter functions to limit search results.

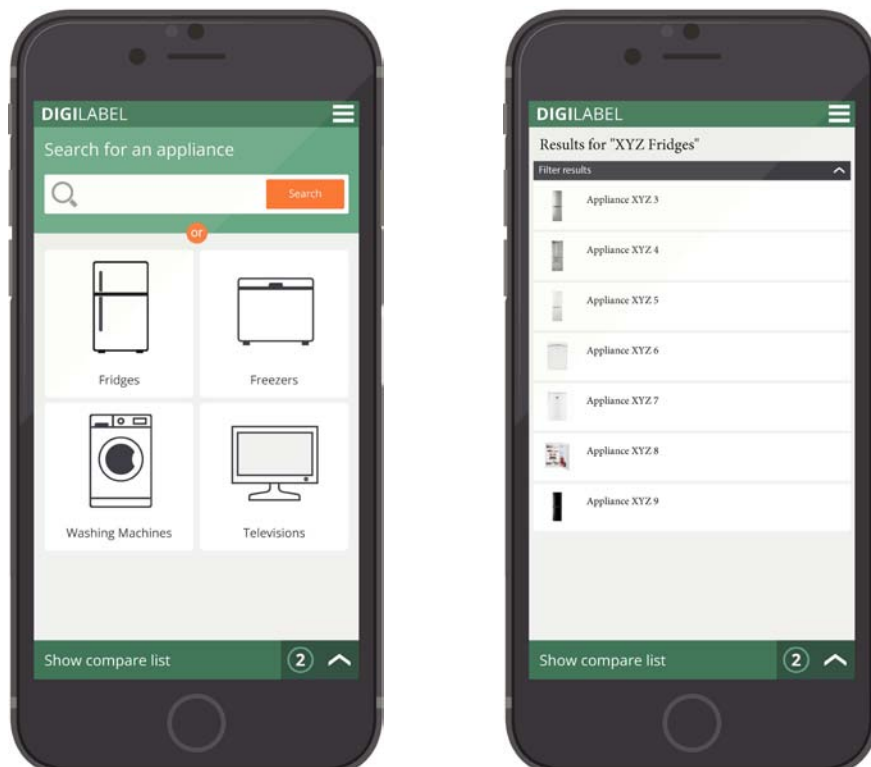


Figure 6: Screen shot of PocketWatt: Product search. Note: The appliances and data shown are fictitious.

The Spanish and German consumers rated the product search as useful.

Spanish participant: 'I like the search button of the app.'

They appreciated that it allows appliances to be ranked with regard to certain product characteristics. For the German participants, the product search function is useful prior to visiting shops to make a first selection of appliances. For example, appliances can be compared with regard to household

size, volume and size of appliance. The participants liked the filter function as part of the product search. The filter option is useful for them to become aware of all the potential different characteristics of an appliance that might be important for the individual household. The German consumers especially opted for filters with regard to household size, volume and size of appliance:

German participant: 'Exactly, to choose a two-person household as the reference and find out what the best appliances are here. There are also different volumes; there are slim washing machines, there are big washing machines. If I live in a two-person-household, I do not really need [...] an industrial washing machine.'

Others suggested also including the brand, the date of its market introduction, the purchase price and differences in purchase prices at different retailers.

The German participants wanted a sorting function as well: The user should be able to sort the results of the product search according to specific aspects. For some participants, it would be sufficient to have a sorting function with regard to running costs, energy consumption and energy efficiency class. Others also want to be able to sort the results by purchase price.

It was remarked that the display of the product search results could be more user-friendly. Displaying only the model name of the appliance was not considered very informative for the users.

The picture of the appliances was evaluated as important and it was proposed to include a zoom function as well as the possibility to look at different sides of the appliance and its interior.

In sum, the participants visualized the product search supporting purchasing decisions in a quick and easy manner:

German participant: 'Exactly, bing, bing, bing, bing, what do I want and then it tells me, okay, buy this and this and this. Fine.'

However, an important prerequisite for the product search to be useful is that ideally all appliances in the tool are also available at the retailers and vice versa. Some – German as well as Spanish – participants questioned the completeness of the database. In the Spanish group, some remarked that implementing the database might be more difficult for brown appliances than white ones, because of the huge variety of models available on the market.

Spanish participant: 'It is difficult to make a comparison of TVs because there are a lot of models.'

It was discussed whether the tool should also propose highly efficient products to consumers, e.g. point out the most efficient model if someone searches for a washing machine. However, the German group did not like the idea of including this. They perceived this as annoying and like an advertisement.

3.5.5 Evaluation of possible further features of PocketWatt: Possibility to give feedback and to save and print the results

The participants were asked what they thought about the possibility to give feedback in the tool – on the appliances or the tool itself. Giving feedback with regard to the appliances was not considered necessary by the German group. Commonly cited reasons were that consumer feedback on appliances can be found elsewhere, that this is often very subjective and that integrating this in the tool would be too extensive to use comfortably on the smartphone screen. Others evaluated the option to give feedback as useful, provided that it is objective and there were no requests that annoy users. The Spanish group shared this opinion.

Feedback with regard to the tool itself was considered not necessary by some participants, because they are not interested in giving feedback and find the invitations of certain websites to give feedback annoying. Others evaluated this option as useful, but emphasized that it should be voluntary and not annoying for the users.

The possibility to save and download the results of the product search or the compare list, to print them and to send them via email to users was assessed positively. This could be especially useful if there is poor internet connection in the shops – with this option the results are available offline:

German participant: 'Also the printing function. As said before, you go to Mediamarkt and maybe have no internet connection. Or as an alternative, you can save it, so that you can look at it offline.'

Spanish participant: 'I think it would be very useful to download the information in the smartphone.'

3.5.6 Further information required

Some participants agreed that energy efficiency has only minor relevance for the purchase decision. Consequently, it should not be the only information in PocketWatt:

German participant: '[...] energy efficiency is one criterion amongst maybe ten which I have with regard to a product. Thus, I think I wouldn't do it (access and use the tool) for the energy label alone. To compare different appliances, I would like to have the main functions which are important for me, like for example the installation dimensions of a refrigerator, how much storage volume I have or for a TV, the size.'

The majority of German and Spanish participants proposed including the size and – where applicable – the volume and weight of the appliance. These additional product details should be selected depending on the type of appliance. Some asked for the inclusion of other product characteristics, e.g. specific washing programs for washing machines. One participant suggested including product ratings of consumers. Others suggested including the design or different variations of the appliance. They want the PocketWatt tool to compare different appliances with regard to all or the most important characteristics. One possible solution to this could be the inclusion of a link to dedicated websites with product comparisons.

Several participants in both countries asked for the purchase price of the appliance to be included, because they consider it very important for the purchase decision. Because prices vary at different retailers, some Spanish participants suggested consumers could add the purchase price themselves.

Spanish participant: 'About the purchase price, maybe the app could include a "favourite section" where the consumer could include the price.'

In the Spanish group, some suggested inserting information on the efficient use of an appliance.

In general, many participants of the Spanish group thought that the tool should be kept simple so that consumers understand it better. This result is described in more detail in the next section.

3.5.7 Overall evaluation

In the German group, several participants evaluated PocketWatt as a useful tool for comparing the most important characteristics of appliances. The tool can give them an initial impression of the range of products available in a certain category and provide some orientation. However, PocketWatt is not considered as providing real support with regard to the purchasing decision, because it cannot provide the information on all the product's characteristics (e.g. specific washing programs) like dedicated product comparison platforms:

German participant: 'For me this is no price- or product comparison platform like there are in the internet, e.g. "Idealo", where I can say, the appliance has this function, this function, this function, this function. I think the tool is just not able to provide this. But I find it really good to compare the key facts, because it does so simply.'

Consequently, the tool was evaluated as not essential, but as “nice to have” by the German group. Those who do not consider energy efficiency a decisive criterion in the purchase decision did not

evaluate the tool as useful. Some stated that the tool is not needed, because all the information it contains can be found elsewhere, e.g. in the internet. Others prefer to seek advice from sales staff instead of using the tool. The Spanish participants were more positive about the tool and evaluated it as useful, e.g. because it provides additional information to the energy label. Whereas some assessed the tool as useful for all kinds of appliances, others perceived it as more useful for white appliances than for brown ones.

With regard to the features of PocketWatt, several German participants suggested keeping it simple, i.e. it should focus on the information on energy efficiency and not attempt to give recommendations for appliance purchases.

Some German and some Spanish participants appreciated that the tool provides immediate and up-to-date information on appliances – this is especially important with regard to the rapid development of technologies.

Spanish participant: 'I think that this app provides very immediate information.'

Several participants from both countries said that the tool needs to be trustworthy. If it is provided by manufacturers, it is not trustworthy. Providers considered trustworthy include research institutions, government ministries or consumer organisations. Some said the providers of PocketWatt should collect the data for the tool themselves to ensure trustworthiness, others considered this too time-consuming.

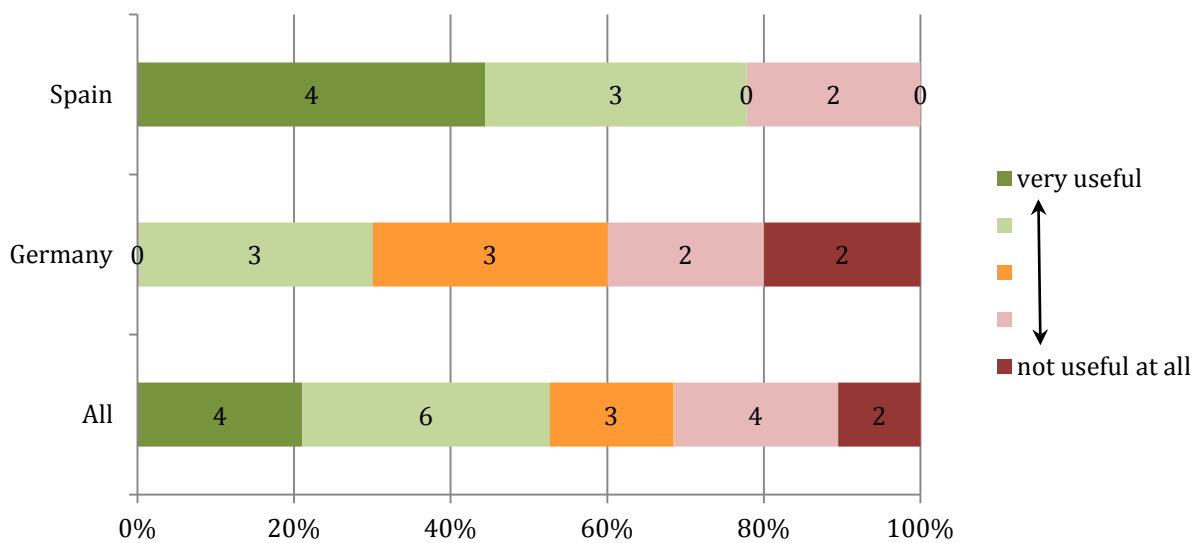


Figure 7: Evaluation of the PocketWatt tool in the questionnaire

The questionnaire handed out after the group discussion also asked for an overall evaluation of the usefulness of the information provided by the PocketWatt tool (Figure 8). It turns out that the feedback from the participants ranges from very useful to not useful at all, with around half of all participants rating the tool positively. A closer look shows that the German group is much more critical – a difference that is also statistically significant (using the Mann-Whitney U test⁴).

⁴ The Mann-Whitney U test is applied to test whether the distribution of one variable is stochastically greater than another; in our case, we wanted to find out whether the ratings of the Spanish participants are different from those of the Germans, or whether the observed difference is due to chance. The Mann-Whitney U test is suitable for non-parametric variables, i.e. where ratings signify a ranked order.

Furthermore, the majority of participants expected that using the PocketWatt tool would influence their purchase decision (Figure 9). The most likely influence concerns paying more attention to energy issues, but a significant group states the PocketWatt’s influence would probably depend on the respective appliance (e.g. TV vs. washing machine).

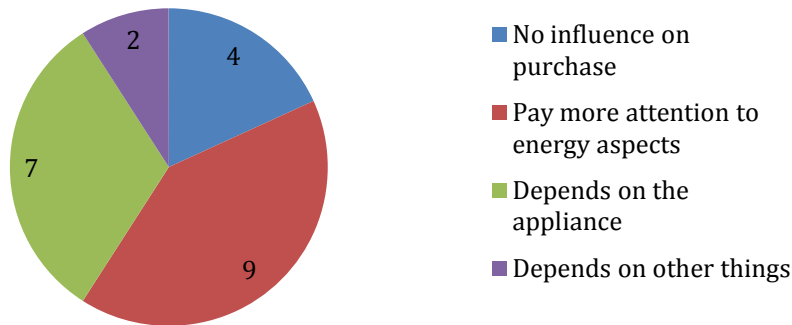


Figure 8: Influence of PocketWatt tool on purchase decision

3.6 Future behaviour

These mixed evaluations are also mirrored in the behavioural intention to use the tool stated by the participants. In the German group, the majority said they do not think they will use it with the exception of two participants, while the reverse was true in Spain, where all but one participant said they were likely to use it (Figure 10). This difference is also significant in a statistical sense (Mann-Whitney-U-test).

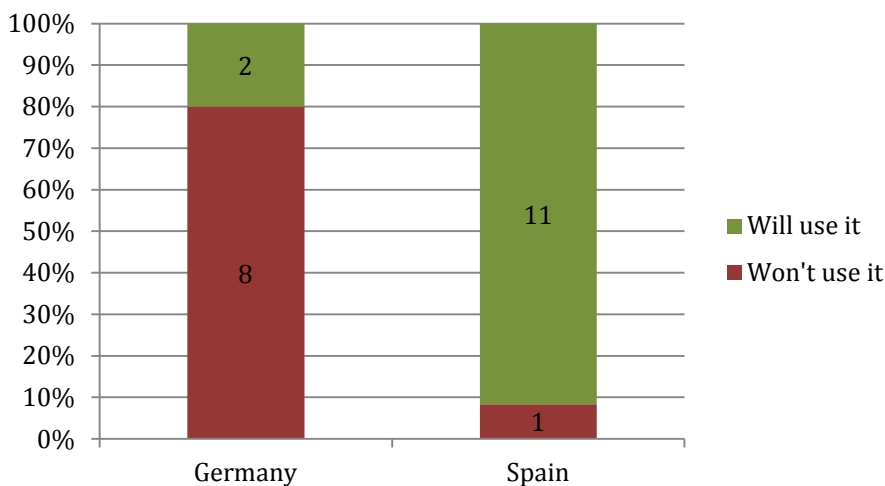


Figure 9: Future intention to use the PocketWatt tool

This pattern had already become apparent during the group discussion when many German participants said they had no intention of using the PocketWatt tool. One reason given is the expected complexity of using the tool, the technical focus and the fact that it provides too much information. Some expected the tool to be too difficult to use and instead prefer personal advice in the store:

German participant: 'This is way too technical for me, maybe because I am old already, not part of the younger generation. I wouldn't enjoy it. I am someone who looks at brochures now and then and then just strolls through shops and gets advice from nice people, so that I can see right away whether I like it or not.'

This was mentioned especially by middle-aged to older women. Subsequently, these participants suggested that the tool might be interesting for younger people:

German participant: 'I think, all this searching etc. – this was, I think, mentioned before – a problem of generations. I wouldn't do it, but when I see how my granddaughter or in general my grandchildren handle it, for them this is a piece of cake.'

It is assumed that younger people will learn easily how to handle the tool, because they are more used to information and communication technologies. Furthermore, they might prefer online shopping and searching for product information online. Other potential target groups might be men, who are assumed to show more interest in technology or people who generally like to compare different products or who are interested in energy-related topics.

Others believed that using the tool will take a lot of time – in many cases purchase decisions are taken very quickly, especially when white appliances break down. However, the tool might be more helpful for brown appliances, e.g. TVs. One participant explained that as energy efficiency is not such a relevant purchase criterion for these products – the tool would only be used if it provided information on all the relevant product characteristics similar to product comparison platforms. Moreover, the information about energy efficiency is already included in the energy label. Others argued that the information in PocketWatt could also be retrieved elsewhere on the internet and – contrary to what was stated earlier about interactive features - one participant stated that he would like consumer feedback on the products.

Others expressed an intention to use the tool as an additional source of information, e.g. in addition to advice from sales staff – on the condition that it is not provided by manufacturers:

German participant: 'I would use it as an additional source of information if I could be sure, well in quotation marks can be sure, that it is not supplied by a certain provider or controlled by advertising and that I really have reliable and trustworthy information [...]'

However, the tool cannot be used as the single source of information and purchase decisions cannot be entirely based on the information provided by the tool. Instead, it is seen as an additional information source. One participant stated intending to recommend the tool to friends and relatives.

In the Spanish group, all the participants were interested in the PocketWatt tool and satisfied with the information provided. Most of them say they would use the app once it is available and agreed that it would help them in their future selection of appliances.

Spanish participant: 'I can use it at home and I have more time to consider the purchase and to compare different appliances.'

The questionnaire also asked those intending to use the tool when they thought they would access it (Table 6). It turns out that more people expect to use it at home to get information than while shopping (see also section 3.5.1).

Accessing the PocketWatt tool via the QR-code was nevertheless confirmed as the preferred access point (14 of 22 participants); some interest was also shown in accessing it directly via an internet link (8 of 22 participants).

Table 6: Opportunities to use PocketWatt

When I use the PocketWatt I will use it...	
...at the retailers	6
...when shopping online	2
...at home before the actual purchase	9

4 Discussion and conclusions

This report details the findings of a consumer study on a digital solution to support consumers in making an energy efficient choice when purchasing an appliance, the PocketWatt tool, which will be developed and tested in the Digi-Label project. The main aim of this study is to obtain early feedback from consumers on the proposed solution so that it can be adapted to meet consumer needs and so that consumer recommendations can be considered when developing strategies for the pilot and roll-out period which is also part of this project. The study included a survey of and discussion session with two groups of consumers from Germany and Spain, comprising 22 individuals in total. The participants were a heterogeneous group with diverse socio-demographic attributes, but, the Spanish group was more homogeneous than the German one and also more aware of the research topic as several of them were professionally involved in related fields. This has two implications: The Spanish group were able to integrate more expert knowledge into the discussion, and were also more likely to more easily understand the attributes of the proposed solution than the majority of consumers who might not be as familiar with the topic of energy efficiency. Most of the participants and the entire German group had recently bought one or more appliances subject to the European energy label. Thus they had recent memories to draw on with making a purchasing decision.

There is a high level of awareness of the European energy label among the participants, and most regarded it as useful. However, when details of the label were discussed, gaps in their knowledge and understanding were detected. This is in line with findings in the literature which suggest that 80 % of consumers are familiar with the label, but that not all elements of the label are well understood (see Kardel 2016). The energy label plays a minor role in the purchase decision of appliances for the majority of participants.

The draft PocketWatt tool received mixed feedback from the participants regarding the information included and its usefulness. In the end, around half the participants said they would welcome its support when buying an appliance while the other half said that they do not intend to use it. The reasons given for not intending to use it focused mainly on the necessary effort involved (time, complexity) and that energy issues are not always regarded as a critical element in a purchase decision for appliances. However, those consumers motivated to use it were positive about the following attributes and functionalities:

- Possibility to access it in stores and via a QR-code;
- Immediate and up-to-date information in a consistent format on the products they are considering;
- Information about energy costs, especially running costs;
- Ability to compile a comparison list of products; and
- Product search functions (incl. filter function).

They did, however, raise the following issues as challenges that the Digi-Label Team may wish to address when further developing the PocketWatt tool:

- Difficult to absorb the information provided on the small screen of a smartphone while shopping;
- If a product price is included, it might be challenging to ensure this is always correct.
- Desire to include additional product information without overburdening the tool with too much detail;
- Providing average values (e.g., electricity price) for an abstract / base case;

- The meaning of the energy classification in addition to the energy label is not well understood (see section 3.5.2); and
- The appliance database needs to be complete and up-to-date, including all the models on offer in the store.

This consumer focus group research provides the following guidance for the Digi-Label team:

- Include being able to save, print or email a list of identified appliances;
- The internet version for use at home is also important, so consumers can be informed before shopping;
- Access via devices like tablets at the retailers;
- Providing customized information, e.g. for different household types or in an interactive format;
- Adding a point of reference to help interpret quantitative data;
- Add a sorting function to the comparison list;
- Add in the possibility of accessing search / comparison results offline;
- Interactive functionalities and product proposals are of little interest to most participants;
- Offer assistance with using the tool, e.g. by shop employees;
- Make it clear that the tool focuses on energy and is not a general shopping tool;
- Do not overload the tool as the input provided is already complex; and
- Emphasize the non-profit character/purpose of the tool to underline its trustworthiness.

Overall, participants provided several ideas on how to further develop the PocketWatt tool and confirmed the need consumers have for more current and accurate information than is provided by the European energy label to make an informed decision and compare several appliances. However, they also pointed out the need to motivate people to actually use such a tool and the challenge posed by the fact that energy issues are only one criterion among several when selecting an appliance.

In addition, while the majority appreciated the possibility to access the tool via QR-codes, only a few of the participants actually use QR-codes frequently, at least so far. This points to a further barrier which could lower the usage rate. In the end, more consumers stated that they would use the tool at home prior to shopping rather than using it in stores. This points to the special need for the Digi-Label project to develop promotional strategies to ensure that the tool is actually accessed.

Conclusions and recommendations

The study on the PocketWatt tool with consumers from Germany and Spain revealed that the tool can improve the understanding of the energy label. The participants provided valuable insights into how to improve the tool within the project to increase its attractiveness and also approved several of the features incorporated into the draft version.

However, the study also points to more general challenges regarding an information-based approach to increase the purchase of more energy efficient appliances: First of all, the energy consumption and the energy efficiency of an appliance is – not very surprisingly – only one aspect among others when choosing an appliance. The relevance of energy also varies; in the group discussion we saw variation between participants but also between product categories. Thus, if someone is less interested in energy issues in general or in a certain product, it is not very likely that he or she will take such information into account – regardless of how easily accessible or comprehensible this information is. While raising the awareness of energy costs might contribute to overcoming this challenge, this issue cannot be fully resolved. Second, even those consumers who care about energy issues will need to be motivated to use the PocketWatt tool. This starts by directing their attention to it, but also by showing at a glance how the tool will support them. This also includes practical issues, like providing devices in-store to access the tool for those without a smartphone or an internet connec-

tion, and a download for a QR-code scanner for those who do not have one etc. Thus, the project's success not only depends on the development of an attractive tool, but also on the way the tool is implemented and promoted.

5 Annex

5.1 References

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5.2 Screening questionnaire

Screening questionnaire before workshop

Gender	<ul style="list-style-type: none"> ▪ Female ▪ Male
How old are you?	<p>_____ years</p> <p>If under 18 years of age → Thank you for your interest in our study, but you do not qualify for the target group</p>
Please indicate the highest level of education that you have completed?	<ul style="list-style-type: none"> ▪ <i>Country specific: Levels of formal degrees in Germany / Spain</i> ▪ Other: _____ ▪ I do not wish to answer
Are you ... ?	<ul style="list-style-type: none"> ▪ Employed ▪ Unemployed
<p>Did you buy any of the following new goods for your household in the last six months?</p> <p><u>Information:</u> If you bought one or more of these goods as integral / fixed parts of a kitchen package offer, please do not take these into account here.</p>	<p><i>Multiple answers allowed</i></p> <ul style="list-style-type: none"> ▪ No, I did not buy any of these goods myself → Thank you for your interest in our study, but you do not qualify for the target group ▪ Yes, a refrigerator and / or freezer: approx. ... months ago. ▪ Yes, a TV: approx. ... months ago ▪ Yes, a washing machine and/or dryer: approx. ... months ago. ▪ Yes, a dishwasher: approx. ... months ago. ▪ Yes, an air conditioner: approx. ... months ago. ▪ Yes, an electric oven: approx. ... months ago. ▪ Yes, a vacuum cleaner: approx. ... months ago. ▪ Yes, a range hood: approx. ... months ago. ▪ Unsure.
Where did you purchase this appliance?	<ul style="list-style-type: none"> ▪ In a local retail shop (e.g. consumer electronics store / centre) ▪ Online retailer / internet ▪ Unsure.
Counting yourself, how many people live in your household?	_____ persons
Do children under 18 years live in your household?	<ul style="list-style-type: none"> ▪ Yes ▪ No

5.3 Questionnaire before group discussion

Questionnaire *before* group discussion

Please provide your first name: _____

1. Do you own your dwelling or rent it?
 - Own
 - Rented
 - Unsure

2. What kind of household do you live in?
 - Single
 - Together with family / partner and our household consists of (incl. myself) _____ adults and _____ children
 - I live in a shared flat with _____ persons
 - My household is different, please explain: _____

3. Considering your monthly “disposable” income: Where would you roughly place your household? (Disposable income is the money your whole household earns and which can be spent on entertainment / consumption or can be saved).
 - Rather low monthly income
 - Medium monthly income
 - Rather high monthly income
 - I do not wish to answer

4. Do you have a smartphone which you use regularly?
 - Yes (if more than one, how many? _____)
 - No

5. If you are living together with others – how many smartphones are there in your household?
 - _____
 - I am not sure

If you use a smartphone, please answer the next questions. Otherwise, please go on with No. 9. If you have more than one smartphone please think about the one which you use most often for your personal affairs.

6. Which operating system does it have?
 - iOS (Apple)
 - Android
 - Other (specify _____)
 - Unsure (please identify manufacturer of smartphone _____)

7. Do you have a QR-code scanner on your smartphone?
 - Yes, but have never tried it
 - Yes and use it regularly
 - No
 - I am not sure



QR Code

8. Do you use your smartphone outside your home to research appliances, e.g. while shopping?

- Yes, and I prefer it to talking to retail assistants
- Yes, in addition to talking to retail assistants
- No
- This depends on the appliance, i.e. _____

9. Please tell us about the appliances in your household

Appliance	Present in my household	If present, then please answer:		
		How many?	How old is the newest?	Regularly used by yourself?
Refrigerator and / or freezer	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
TV	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Washing machine	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Tumble dryer	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Dishwasher	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Air conditioner	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Electric oven	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Vacuum cleaner	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know
Range hood	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know	_____ <input type="checkbox"/> Don't know	<input type="checkbox"/> < 1 year <input type="checkbox"/> 1-5 years <input type="checkbox"/> > 5 years <input type="checkbox"/> Don't know	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know

10. If your household purchases a new appliance – who usually makes the decision which one to buy?

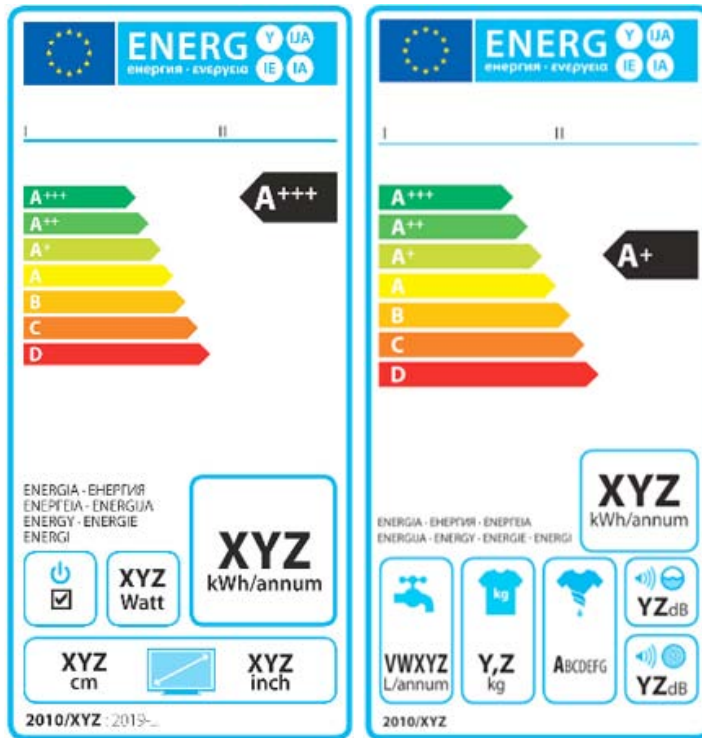
- I on my own
- Myself together with others. Who is involved? _____
- Not myself. Who then? _____
- It depends. Please explain:

11. Where have you (often) purchased appliances so far? Multiple answers allowed

- Large consumer electronic retail stores (e.g.)
- Smaller, specialist electrical shops
- In kitchen / furniture shops
- Online / internet
 - From specialist retailers
 - From big shops (Amazon, Ebay etc.)
- Used / second hand.
- Unsure.

12. Do you usually conduct any product or market research prior to purchasing an appliance?
Multiple answers allowed

- No
- If yes, how?
 - Through press / media (e.g. magazines, which ones? _____)
 - Yes, on the internet
 - Online product ratings
 - Website of the manufacturer / online product brochures
 - Consumer websites
 - Social media
 - Other internet channels, _____
 - I ask friends, colleagues or relatives
 - I ask for advice from sales staff
 - I read product brochures / energy label / product fiches available in the shop
 - Differently / through other sources. Please explain: _____



13. Have you ever seen the European Energy Label for appliances (see picture above for the label for refrigerators / freezers and the label for televisions)?

- Yes
- No
- Unsure

14. How useful is the information on the label for you?

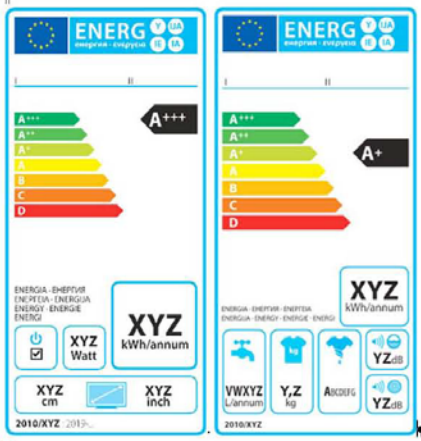
Very useful *Not at all useful*

5.4 Guideline for group discussion

Workshop

Introduction and greetings

- **We would like to cordially welcome you to this workshop. Thank you very much for participating in our study on the European Energy Label and ways to apply digital solutions to improve and enhance the customer experience. This study is part of a project funded by the European Commission, and involves several partners from across Europe.**
 - Provide some additional information about the digi label project, your organization, additional actors involved today etc. (max. 5min)
Digi-label is funded by the European Union - April 2016 to March2019 - 11 European partner organisations – research instituts, consultants, NGOs. The aim ist o develop a digital energy label to support consumers to choose energy efficient products to save money and energy. At the moment, this label is under development and will later be tested in shops and on the internet.
 - Introduce yourselves (moderator / assistant)
- **To begin, we would like to give you some basic information about this workshop. First, we would like to discuss energy labels for appliances. We would like to hear your ideas about a way to apply digital technology to advance and improve the effectiveness of this label.**
- **The workshop will last 2,5-3 hours, and there are beverages and snacks - so please help yourself. In addition, you will receive compensation for participating in this focus group. The compensation will be given to you by XXX today / later / transferred to banking account**
- **We would like to record today's workshop. Has everyone agreed to this by signing the data protection sheet? Are there any questions about this? The information gathered will be analyzed anonymously, thus the report on the results will not include any personal data, nor will any comments or inputs be attributed to any participant or organisation. To protect your privacy we will only use first names during the discussion. Are there any questions about this issue? [switch on audio device]**
- **And finally, did everyone fill out the questionnaire about your appliances etc? Thank you for that. After the discussion there will be another, much shorter questionnaire.**
- **We would like to start with a short tour de table. Would you please tell us your name and tell us which appliance(s) you recently bought and where? Please shortly without too many details as we will come back to that.**
Preparing name tags (only first names) to correctly address people should be provided.

Topic	Roles / documents	Duration (min) / time to begin with	
<p>0. Numbered questions = main question for respective topic</p> <ul style="list-style-type: none"> Additional questions on this topic, only necessary to ask if the discussion is not taking this direction anyway [additional info for conducting the discussion] 			
<p>Awareness regarding energy label</p> <p>[Showing energy label]</p>			
 <p>1. Have you noticed this before (besides in the questionnaire) <i>[If not mentioned anyway ask further questions:]</i></p> <ul style="list-style-type: none"> Where have you seen it? Where do you know it from? (shops, internet, media, friends & family) 	Showing energy label on poster or as part of ppt	5-10	17:45

Topic	Roles / documents	Duration (min) / time to begin with	
Knowledge			
<p>2. What do you think it is for? <i>[If not mentioned anyway ask further questions:]</i></p> <ul style="list-style-type: none"> • Which appliances do have an energy label? • What is the meaning of the energy efficiency classes on the label? • What is the meaning of numbers about kWh per annum? • What is the meaning of the other symbols? <p>[If not mentioned by the participants provide additional information or correct information at the end of this step – but only after some discussion has taken place.]</p>		10 please limit discussion	17:55
Last purchase			
<p>3. You recently have bought an appliance. How did you choose it? <i>[If not mentioned anyway ask further questions:]</i></p> <ul style="list-style-type: none"> • Did the energy label or energy related issues play a role in your choice? • If so: how did you find information about energy issues? • Did you look for information about the label? How and where? <p>[Depending on group interaction and time-frame: either you ask everyone to answer to these questions or you let some explain in more detail (e.g. one for every appliance that has been bought) and then just ask others if they have something to add]</p>		15	18:05

Topic	Roles / documents	Duration (min) / time to begin with	
<p>Evaluation of digi label</p> <p>As mentioned at the beginning, in this project we are developing a digital energy label. This label can be accessed via an app by scanning a QR code which is supposed to be displayed at products in shops in addition to the current energy label. Alternatively it can be accessed via an internet page. We would now like to show you the digi label app.</p> <p>[Hand out or present QR code, provide smart phone or ipad/tablet pc] We would like to ask you to now scan the label with your smartphone or the devices provided by us.</p> <p>[Let participants try to access digi label app and to look at it; give them a few minutes time and make sure everyone has had his / her try.]</p> <p>So far, the app is only available in English, but it will be available in other language including Spanish</p> <p>We would now like to present the digi label app in more detail. We will first explain it to you and then go through it step by step with you and gather your comments and questions.</p> <p>[Show ppt]</p> <p>4. Before we start the discussion: Do you have any questions? Is there anything that is not clear to you so far? [Time for Q&A] Please feel free to ask anything that is not clear also later on.</p>	<p>Material: - Mocked-up label</p> <p>- DigiLabel-Prototype-App → access through QR-code which is provided</p> <p>- Present digi label based on ppt</p>	15	18.20

<p>5. This is what you see first when you scan the QR code [show in ppt]. How do you like it? What do you think about the information provided?</p> <ul style="list-style-type: none"> Is this helpful? Does it look pleasantly? Is it clearly arranged? Do you miss something? <p>6. The first slider / register includes information about energy efficiency of the appliance [show in ppt]. How do you like it? What do you think about the information provided?</p> <ul style="list-style-type: none"> Is this useful for you? Did you notice that it includes additional information to the current energy label (annual costs)? What do you think about this? <p>7. The second slider / register includes product-related information [show in ppt]. How do you like it? What do you think about the information provided?</p> <ul style="list-style-type: none"> Is this useful for you? Did you notice that it includes additional information to the current energy label (household size etc.)? What do you think about this? 	<p>Write down suggestions on a poster / flipchart</p>	<p>40</p>	<p>18.35</p>
<p>8. The app includes the possibility to add appliance to a comparison list [show in ppt]. What do you think about this possibility, to compare different appliance regarding energy efficiency and product information?</p> <ul style="list-style-type: none"> Is this useful for you? Are you likely to use this list? What do you think that these criteria for comparison are? Are there further criteria which are relevant to you? <p>9. There is also the possibility to do a product search [show in ppt] to look for specific appliances, e.g. different washing machines. How do you like this possibility?</p> <ul style="list-style-type: none"> Is this search function useful for your? What do you about the possibility to use filters? 		<p>15</p>	<p>19.15</p>

<p>10. What is your overall evaluation of the digi label?</p> <ul style="list-style-type: none"> • What do you think what you can learn from the digi label? • Do you trust the information provided? Under which conditions do you trust it? <p>11. What further information / features would be useful for you as part of the digi label?</p> <ul style="list-style-type: none"> • Individualised information, e.g. estimating your specific energy costs with an appliance given your electricity tariff, household size / usage patterns? • Information on how to estimate energy costs? • Informationen about running costs, life cycle costs? • If the app proposes products which are similar to the chosen one? • Would you like to have additional filters or sorting functions? Which ones? 			
<p>12. Would you like to give feedback about the digi label tool or to leave comments about appliances?</p> <ul style="list-style-type: none"> • Feedback about products for manufacturers or for app developers? Should this feedback be public for other users? 		5	19.30

<p>13. What features of the digi label are you likely to use?</p> <ul style="list-style-type: none"> • What do you think about the possibility to access the app by scanning the QR-code? • Where should this QR-code be placed? What info should be presented with the QR code? • What do you think about the possibility of accessing the digi label with your smartphone? • Would you like to have additional possibilities of accessing the digi label at the retailers? (e.g. via ipads/tablet computers provided by the retailer) • Would you like to access the digi label at home? (Website) <p>14. Where at the retailers would you like to find information about the digital label?</p>		10	19.35
<p>15. Do you think that the digi label will be more useful for certain types of appliances than for others?</p>	stickers	5	19.45
<p>Past and future behaviour</p>			
<p>16. Do you intend to use the digi label when purchasing an appliance in the future? What would be a motivation to do so?</p> <ul style="list-style-type: none"> • Why or why not? • Do you think using the digi label would make you buy a more efficient product? 		10	19.55

5.5 Questionnaire after group discussion

Questionnaire *after* group discussion

Please provide your first name: _____

1. How useful is the information from the digi label⁵ for you?

Very useful *Not at all useful*

2. What information and features from the digi label are most useful from your perspective (please state max. 3)?

3. Do you think, you would use the digi label once it is available?

I don't think I would use it.
Why not?

- Yes, while I am at the shop / retailer
 Yes, before I order online
 Yes, at home, before I purchase an appliance

4. How would you like to access the digi label?

- I don't think I would use it.
 Via the QR-code
 Via a bar code
 Through an internet page
 Differently, _____

5. Do you think the digi label would influence your choice of appliance?

- I do not think it would influence my choice.
 I think I would pay more attention to energy issues.
 This depends on the appliance, i.e. _____
 It depends, e.g.

⁵ That the tool is named Pocket Watt had not been decided when the consumer workshops took place.