

ProOrg Work package 3 (WP3) | Deliverable 3.1

Case Study Design & Selection of SMEs

April 2019

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1. Introduction – setting the scene

1.1. Background

Organic food market has been experiencing a stable growth in the past two decades (FiBL Statistics, 2019; Dangour et al., 2009). However, it was observed that in some European markets, i.e., the Netherlands, Denmark, and France, the growth has been stabilizing (van den Berg, 2019). One potential cause of the stabilization could be that some European countries might be reaching a limit of consumers who are willing to buy organic food (van den Berg, 2019). On the other hand, conventional products that are produced in more sustainable ways and that offer higher level of quality (i.e., “beter leven” products in the Netherlands) have started appearing on the European market (van den Berg, 2019). Consumers choose organic food because they believe in its higher quality, compared to conventional food (Kahl et al., 2012). With the appearance of conventional products of high quality, added value of organic foods might not be immediately evident to some consumers (van den Berg, 2019). This could potentially draw some consumers towards choosing conventional instead of organic products (van den Berg, 2019; Albert Heijn, 2019).

To make the higher quality of organic products more evident, organic food producers have been adding statements such as healthy and natural on the packaging of their products (van den Berg, 2019). Moreover, to attract more consumers, food companies have been diversifying their portfolios, and nowadays it is easy to find organic alternatives of the majority of conventional products in supermarkets.

1.2. Foreground

The majority of organic food products on the market are processed products (van den Berg, 2019). However, some of these products undertake extensive processing (e.g., highly processed products such as sterilized milk, chocolate, cookies). According to the Regulation (EU) 2018/848 on organic production and labelling of organic products, organic food production needs to follow high production standards. More specifically, “processed organic products should be produced using processing methods, which guarantee that the organic characteristics and qualities of the products are maintained through all stages of organic production” ((EU) 2018/848). Moreover, organic processing should combine practices that preserve natural resources and have little impact on environment and climate.

Some principles of organic food processing were already set in EU Regulation (EC) 834/2007, and the first Code of Practice for Organic Food Processing (Beck, 2006). However, Kahn et al. (2014) pointed out that clear principles and criteria for evaluating organic food processing and the extent to which it preserves a high quality of raw materials have been missing. Unfortunately, this gap has not been addressed in the Regulation (EU) 2018/848 and there are still no clear criteria for evaluating if organic food processing is performed under high standards. ProOrg project aims at addressing this issue by developing an updated Code of Practice (CoP) with an Assessment Framework (AF), which would contain strategies and tools that would help organic food processors to select appropriate food processing technologies in line with organic principles.

The updated CoP will primarily be used by organic food processors. With the help of the AF, organic processors should be able to choose the best processing method to produce products of high nutritional quality, low environmental impact, and high degree of sensory quality. To develop an effective AF, involvement of food companies in the process of its development is imperative. To assure a high efficiency of the AF and satisfaction of the users with the AF,

once the document is developed, usability evaluation needs to be performed. Therefore, the first version of the AF will be tested with selected food companies to evaluate its usability. In the following sections, the theory of usability evaluation will be explained in more detail, followed by specific details of usability evaluation of the AF.

1.3. Study approach

1.3.1. Case study design

The WP3 aims to contribute to the development of an AF by performing case studies with (organic) food processors. In the process of case studies, the first version of the AF will be tested for its usability via selected case studies for vegetable, dairy and fruit product groups. The case studies will be planned and carried out using a usability evaluation approach. This includes performing usability tests with food processors using the first version of the AF. The output of the usability testing will be used to provide feedback to perform revision of the AF.

1.3.2. Overall approach

An overview of the activities an approximate timeline are shown in Figure 1. The main phases of the case study design are: preparing case studies (selecting companies, preparing material for usability evaluation), performing usability tests, performing focus groups or interviews, analysing data and giving recommendations for AF improvement.

1.3.3. Strategy for selection of companies

Selection of the companies has been performed in two phases:

Phase I: stakeholder associations have been approached (Bionext/BioNederland (NL), Organic Denmark (DK), and Synabio (F)) with the aim to establish contact with the member companies in these associations.

Phase II: companies from existing networks of WP3 members will be approached (e.g., existing contacts, contacts obtained at BioFach in Neurenberg and BioBeurs in Zwolle, and other relevant contacts obtained).

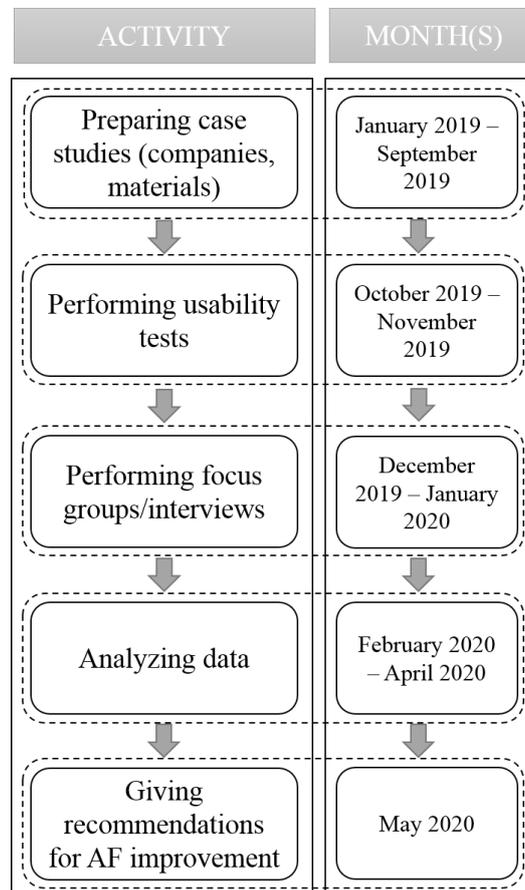


Figure 1: the process and timeline of performing case studies

In the following text, the theory of usability evaluation will be explained in section 2, followed by further details regarding execution of different phases of the usability evaluation.

2. Usability evaluation of documents – definitions and process

Usability is “the extent to which a ... product ... can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO, 2018). Usability evaluation aims at identifying and fixing deficiencies that could

potentially arise during the use of a document (de Jong and Schellens, 2000). The three main conditions that need to be specified prior to the usability evaluation are users of the document, context of use and goals or criteria of usability evaluation. According to ISO 9241-11, users are people who will interact with a document, i.e., the AF from the Code of Practice, while goals are intended outcomes of such interaction. Context of use is a combination of users, goals and tasks that users perform when using the document, together with resources and environment in which tasks are performed (ISO, 2018).

Different types of usability tests can be performed in different stages of document development. Exploratory tests are performed in the beginning of the development cycle to evaluate preliminary design (skeleton) of the document (Rubin, 1994). Assessment tests are performed in the middle of the development cycle to evaluate how well users can perform tasks described in the document (Rubin, 1994). Moreover, validation or verification tests are performed in the end of the document development to evaluate how well the document meets some predetermined performance standards (Rubin, 1994). As part of the ProOrg WP3, assessment usability test of the Assessment Framework of the Code of Practice will be performed, and specific usability testing methods, which aim at detecting and diagnosing problems in using the document, will be assessed.

According to Rubin (1994) and ISO 9241-11 (2018), usability testing has the following basic elements:

1. Definition of usability test objectives;
2. Choice of a representative sample of document users;
3. Context of using the document;
4. Representation of the tasks to be performed when using a document;
5. Collection of qualitative and quantitative performance measures;

6. Recommendations for improvement of the document.

Below, each element of usability evaluation of the AF will be described in more detail.

3. Usability evaluation of the Assessment Framework

3.1. Defining test objectives

To ensure that the AF accomplishes its intended purpose, usability evaluation will be performed with two main objectives: to study its *comprehension* and *application*.

Comprehension means that readers should correctly understand the information in the document. Minor comprehension problems can decrease users' appreciation of a text, while major problems could cause that a wrong message or no message is communicated (De Jong and Schellens, 1997). *Application* entails that users need to be able to apply the information from the document in a realistic setting (De Jong and Schellens, 1997). Therefore, usability evaluation of the AF will be performed to test if users comprehend the document, and if they can apply the document as a tool to choose a processing method, which would be in line with organic principles.

3.2. Choosing a representative sample of users and defining context of use

Since the AF is intended to be used by organic food producers, companies that produce organic processed food, or are planning to start producing it, will be selected for participation in the case study. Particular focus will be on small and medium companies from WP3 partner countries (The Netherlands, Denmark and France) that produce fruit, vegetables or dairy products. People who make choices regarding processing methods will be selected to undertake specific usability tests, i.e., product developers, production managers, quality assurance managers. Teams of people from each company will participate in the study, unless there are companies where individuals make decision regarding the choice of processing

methods. Both *team* and *individual assessment* have different advantages. Individual assessment allows users to form their own evaluations without being influenced by others. On the other hand, teams of people can help each other notice problems that might not be seen individually (Mack and Nielsen, 1994).

3.3. Defining tasks to be performed when using a document

Two main tasks will be performed by users: completion of the *comprehension questionnaire* and of the *application protocol*. Comprehension questionnaire will be based on comprehension tests. A comprehension test involves a variety of questions, which aim at summarizing the essential information on a certain topic or part of the document (De Jong and Schellens, 1997). Moreover, open or multiple-choice questions can be used to check whether specific information is understood by users (De Jong and Schellens, 1997). Some examples of questions in the comprehension test related to the AF re in figure 2.

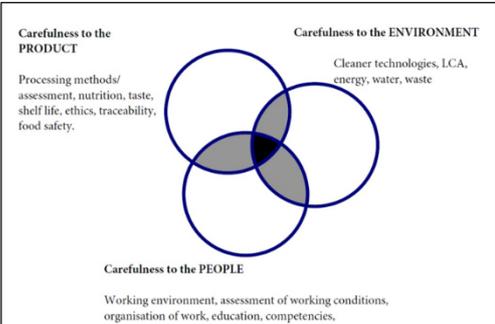
OPEN-ENDED QUESTIONS	MULTIPLE CHOICE
<p style="text-align: center;">QUESTION</p> <p style="text-align: center;">What aspects does careful food processing include? OR What is the paragraph “Careful food processing” of the Assessment Framework mostly about?</p>	<p style="text-align: center;">QUESTION</p> <p style="text-align: center;">Which of the following are nutritional indicators?</p>
<p style="text-align: center;">ANSWER</p> <div style="border: 1px solid black; padding: 10px; text-align: center;">  </div>	<p style="text-align: center;">ANSWERS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Protein <input type="checkbox"/> Beta-lactoglobulin <input type="checkbox"/> Sensory quality <input type="checkbox"/> Vitamins

Figure 2: examples of questions in the comprehension questionnaire

Application protocol will be based on the main tasks of the assessment process from the AF. Namely, users will have to fulfil all the tasks of the assessment process for a specific product and processing method (see figure 3): 1) establishing the context; 2) characterization of relevant assessment criteria; 3) selection of indicators and parameters; 4) analysis of indicators; 5) evaluation of indicators; 6) overall evaluation of organic food quality for the organic food product (Meier et al., 2019). Given the complexity of the assessment protocol, it is expected that users will need multiple weeks to finalize the assessment.

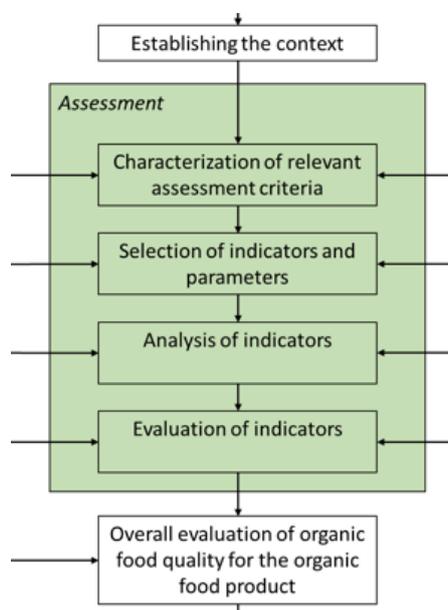


Figure 3: tasks of the application protocol that Assessment Framework users need to complete for a specific product and processing method(s)

Prior to usability testing, a briefing sessions with the team of scientists will be organized. In the briefing sessions, participants will get the chance to familiarize themselves with the sequence of tests, they will be instructed to read the test instructions and they will get a chance to ask any questions about the test (Velotta, 1995).

3.4. Collecting qualitative and quantitative performance measures

To assess usability of the AF, its effectiveness, efficiency and satisfaction need to be determined. For example, *effectiveness* can be assessed by quantitative measures such as number of successfully completed tasks, and number of critical and non-critical errors (Figure 4). *Efficiency* can be measured by determining the time needed for each task. Moreover, *satisfaction* of users can be determined by using qualitative measures based on Likert scale, e.g., overall satisfaction with the AF, ease of use, or ease of finding information (Figure 4). Moreover, after the usability testing, a debriefing session will be organized in the form of focus groups or individual interviews. In the debriefing session, users will be asked to explain the problems they encountered and how they tried to overcome those problems (Velotta, 1995).

QUANTITATIVE MEASURES	QUALITATIVE MEASURES
<p>Effectiveness: successful task completion, critical errors, non-critical errors</p> <p>Efficiency: time on task</p>	<p>satisfaction, ease of use, ease of finding information, likes, dislikes (measured on a 5-point Likert scale)</p>

Figure 4: examples of quantitative and qualitative measures for the Assessment Framework performance

3.5. Giving recommendations for improvement of the document

After the usability testing is finalized, a test report will be developed and shared with the developers of the AF. The report will contain summary of the evaluation testing, profiles of the users participating, the list of encountered problems and other data related to performance

of the AF, and any other observations that might facilitate designers in improving the document (e.g. Velotta, 1995).

4. Future work

Firstly, we will continue approaching companies that could potentially participate in the study. Initial progress on this task has been established by approaching companies at BioBeurs and BioFach organic food fairs and by connecting with BioNext and BioNederland. Moreover, WP3 members will use their business networks to find eligible companies. Secondly, each element of the usability evaluation needs to be further refined by studying relevant literature, and materials to perform usability testing need to be developed (e.g. questionnaires, protocols, data analysis plan and structure of the test report).

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