The Food Safety Market: An SME-powered industrial data platform to boost the competitiveness of European food certification

D6.1 - Piloting Scenarios & Evaluation Plan

DELIVERABLE NUMBER	D6.1
DELIVERABLE TITLE	Piloting Scenarios & Evaluation Plan
RESPONSIBLE AUTHOR	Hans Marvin (WFSR)

Co-funded by the Horizon 2020
Framework Programme of the European Union

GRANT AGREEMENT N.	871703
PROJECT ACRONYM	TheFSM
PROJECT FULL NAME	The Food Safety Market: An SME-powered industrial data platform to boost the competitiveness of European food certification
STARTING DATE (DUR.)	01/02/2020 (36 months)
ENDING DATE	31/01/2023
PROJECT WEBSITE	www.foodsafetymarket.eu
COORDINATOR	Nikos Manouselis
ADDRESS	110 Pentelis Str., Marousi, GR15126, Greece
REPLY TO	nikosm@agroknow.com
PHONE	+30 210 6897 905
EU PROJECT OFFICER	Stefano Bertolo
WORKPACKAGE N. | TITLE	WP6 | Pilots
WORKPACKAGE LEADER	WFSR
DELIVERABLE N. | TITLE	D6.1 | Piloting Scenarios & Evaluation Plan
RESPONSIBLE AUTHOR	Hans Marvin (WFSR)
REPLY TO	hans.marvin@wur.nl
DOCUMENT URL	
DATE OF DELIVERY (CONTRACTUAL)	31 January 2021 (M12)
DATE OF DELIVERY (SUBMITTED)	31 January 2021 (M12)
VERSION | STATUS	V1.0 | Final
NATURE	Report
DISSEMINATION LEVEL	Public
AUTHORS (PARTNER)	Hans Marvin, Yamine Bouzembrak, Leonieke Van den Bulk, Anand Gavai, Wouter Hoenderdaal, Ningjing Liu (WFSR).
CONTRIBUTORS	Anna Kasimati, Alina Petri, Iffigeneia Mpokogianni (Agroknow); Tanja Matosevic (Agrivi d.o.o.); Tima Anwana, Ziga Skorjanc, Sarah Lucas (UNIVIE), Kostas Mavropoulos, Anduela-Ellie Vaggeli, Stylianos

	Vaporidis, Gkiokas Konstantinos (TUV AU HELLAS); George Gheorghiou (TUV AU ROMANIA) ; Francesca Romero, Andrea Zaffonato, Anna Polloni, Sandra Furlan (VALORITALIA) ; Sousanna Charalambidou (TUV AU CERT)
REVIEWER	Kostas Mavropoulos, Anduela-Ellie Vaggeli, Stylianos Vaporidis, Gkiokas Konstantinos (TUV Austria Hellas)

VERSION	MODIFICATION(S)	DATE	AUTHOR(S)
0.1	WFSR input	15/11/2020	Marvin, H, Bouzembrak, Y, Anand, G, Liu, N, Van den Bulk, L, Hoenderdaal, W. (WFSR)
0.6	WFSR-input	15/12/2020	Marvin, H, Bouzembrak, Y, Anand, G, Liu, N, Van den Bulk, L, Hoenderdaal, W. (WFSR)
0.7	Suggestion from WP6 partners	07/01/2021	Marvin, H, Bouzembrak, Y, Anand, G, Liu, N, Van den Bulk, L, Hoenderdaal, W. (WFSR); Anna Kasimati, Alina Petri, Iffigeneia Mpokogianni (Agroknow); Tanja Matosevic (Agrivi d.o.o.); Tima Anwana, Ziga Skorjanc, Sarah Lucas (UNIVIE), Kostas Mavropoulos, Anduela-Ellie Vaggeli, Stylianos Vaporidis, Gkiokas Konstantinos (TUV AU HELLAS); George Gheorghiou (TUV AU ROMANIA) ; Francesca Romero, Andrea Zaffonato, Anna Polloni, Sandra Furlan (VALORITALIA) ; Sousanna Charalambidou (TUV AU CERT)
0.9	Internal TheFSM review	18/01/2021	Kostas Mavropoulos, Anduela-Ellie Vaggeli, Stylianos Vaporidis, Gkiokas Konstantinos (TUV Austria Hellas)
1.0	Final Version 1	31/01/2021	Hans Marvin, Yamine Bouzembrak (WFSR)

PARTNERS		CONTACT
Agroknow IKE (Agroknow, Greece)	Agroknow	Nikos Manouselis (Agroknow) nikosm@agroknow.com
SIRMA AI EAD (SAI, Bulgaria)	ontotext	Svetla Boytcheva (SAI) svetla.boytcheva@ontotext.com
GIOUMPITEK MELETI SCHEDIASMOS YLOPOIISI KAI POLISI ERGON PLIROFORIKIS ETAIREIA PERIORISMENIS EFTHYNIS (UBITECH, Greece)	UBITECH ubiquitous solutions	Danai Vergeti (UBITECH) vergetid@ubitech.eu
AGRIVI DOO ZA PROIZVODNJU, TRGOVINU I USLUGE (Agrivi d.o.o., Croatia)	AGRIVI	Tanja Matosevic (Agrivi d.o.o.) tanja.matosevic@agrivi.com
PROSPEH, POSLOVNE STORITVE IN DIGITALNE RESITVE DOO (PROSPEH DOO, Slovenia)	tracelabs originTrail Core Developers	Ana Bevc (PROSPEH DOO) ana@origin-trail.com
UNIVERSITAT WIEN (UNIVIE, Austria)	universität wien	Elizabeth Steindl (UNIVIE) elisabeth.steindl@univie.ac.at
STICHTING WAGENINGEN RESEARCH (WFSR, Netherlands)	WAGENINGEN UNIVERSITY & RESEARCH	Yamine Bouzembrak (WFSR) yamine.bouzembrak@wur.nl
TUV- AUSTRIA ELLAS MONOPROSOPI ETAIREIA PERIORISMENIS EUTHYNIS (TUV AU HELLAS, Greece)	TÜV AUSTRIA HELLAS	Kostas Mavropoulos (TUV AU HELLAS) konstantinos.mavropoulos@tuv.at
TUV AUSTRIA ROMANIA SRL (TUV AU ROMANIA, Romania)	TÜV AUSTRIA ROMANIA	George Gheorghiou (TUV AU Romania) george.gheorghiu@tuv.at
VALORITALIA SOCIETA PER LA CERTIFICAZIONE DELLE QUALITA'E DELLE PRODUZIONI VITIVINICOLE ITALIANE SRL (VALORITALIA, Italy)	VALORITALIA	Francesca Romero (Valoritalia) francesca.romero@valoritalia.it
TUV AUSTRIA CYPRUS (TUV AU CYPRUS, Cyprus)	TÜV AUSTRIA CYPRUS	Sousanna Charalambidou (TUV AU CYPRUS) sousanna.charalambidou@tuv.at

ACRONYMS LIST

DMHP	Data Management Handling Plan
EU	European Union
FAIR	Findable, Accessible, Interoperate and Reusable
SUS	System Usability Scale
TheFSM	The Food Safety Market

EXECUTIVE SUMMARY

This document provides an overall guidance methodology for the pilot execution in TheFSM project. It sets out the whole process of developing and conducting a pilot and provides for each step a guidance on how to execute these activities in an optimal manner. A pilot consists of the following different steps: i) creation of a pilot plan, including a Data Management Handling Plan (DMHP), ii) preparation of the pilot, iii) deployment and testing of the pilot, iv) evaluation of the pilot results, v) making adaptations to the product tested in the pilot, vi) piloting the new revised product and vii) finalisation of the product. Each of these steps is described in detail including materials that are needed and made specific for the applications to be tested in the pilots. In addition, for each pilot and application a local DMHP will also be developed. An outline for such a DMHP is provided and it describes how relevant data during the pilot should be collected, processed or generated, how it should be curated and preserved, etc. This document also includes templates which should be completed for each pilot and application being tested. Finally, some supplementary materials are provided in the appendix.

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1 INTRODUCTION

Recently, "The Food Safety Market" project (TheFSM) was granted in the EU H2020 programme (Grant Agreement number: 871703). This project aims to deliver an open industrial virtual data platform that will facilitate the exchange and connection of data between different food safety actors who are interested in sharing information critical to certification. To this end, extensive piloting is foreseen to test the applications and services developed by the project partners that will be supported and channelled through the infrastructure of the TheFSM. The primary purpose of a pilot is to demonstrate that the design and products work in the production environment as the designers expected, that users can utilize the system effectively and that the business requirements are met. Furthermore, it reduces the risk of encountering problems during the full-scale deployment. Pilots are foreseen in many countries during the project duration (i.e. Greece, Netherlands, Italy, Romania, Austria, Croatia, Hungary, Poland, Cyprus, Egypt, Jordan) and to ensure optimal pilot execution and product development, a guidance for the participants is essential.

Within WP6 of TheFSM project, such guidance documents will be prepared entailing a methodology that focuses on specifying the business settings and evaluating scenarios that will be implemented in all countries where pilots will be run. The process will be iterative, agile and lightweight and will specify for each pilot the new workflows that will be taking place, the local business partners to be involved and how they will be involved, as well as the methodological guidelines and necessary materials (questionnaires, etc.) that the involved partners will use. A local Data Management Handling Plan (DMHP) will also be developed for each pilot that outlines how relevant data during the pilot should be collected, processed or generated, how it should be curated and preserved, etc. The pilot methodology will be revisited every year, in order to ensure that it is up-to-date and covering the needs and particularities of each pilot.

This document presents the main methodological guidelines for the pilot execution in TheFSM project including the template for DMHP and contains general information on how the pilots should be carried out. The application-specific information can be found in separate documents for each application.

2 OVERVIEW OF DESIGNING A PILOT PROJECT

A pilot is the last and major step in the deployment of services before it can be offered to users. Therefore a good set-up and design of the pilots is essential to make sure it delivers the information needed for the project to optimise the products being deployed. Within a pilot the product and services are tested in a controlled environment in which the users perform their normal business tasks using the new application. A pilot should demonstrate that the design works in the production environment as expected, that users can utilize the system effectively and that it meets the business requirements. A pilot consists of the following different activities: i) creation of a pilot plan, including a Data Management Handling Plan (DMHP), ii) preparation of the pilot, iii) deployment and testing of the pilot, iv) evaluation of the pilot results, v) making adaptations to the product tested in the pilot, vi) piloting the new revised product and vii) finalisation of the product. These steps are shown in the flow diagram in Figure 1. Each step will be explained in detail in the sections below.

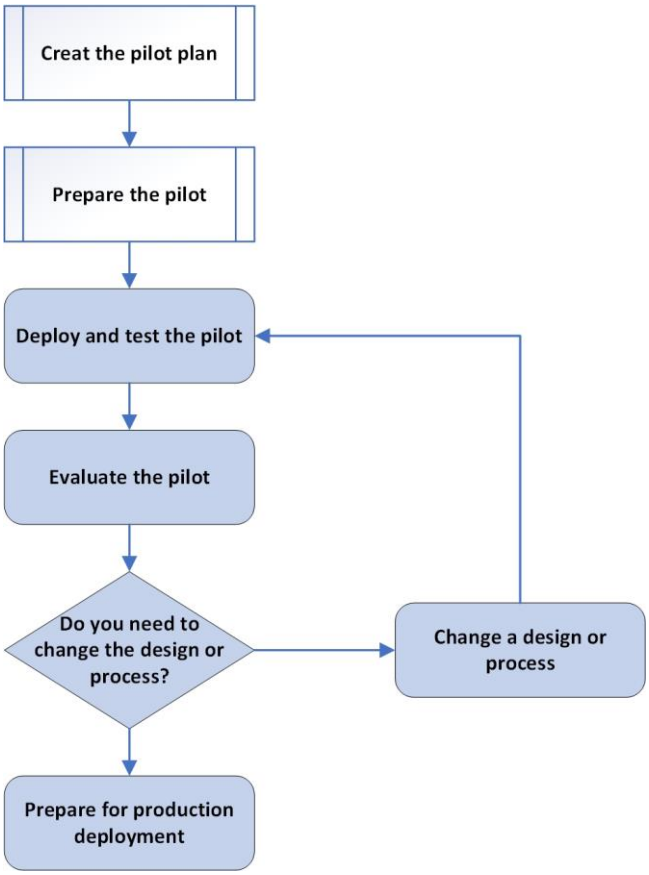

Figure 1: The various steps in a pilot

3 THE VARIOUS STEPS IN A PILOT

3.1. STEP 1: Creating a Pilot Plan including a DMHP

The first step in any pilot is to design a pilot plan. The pilot plan defines the scope and objectives of the pilot, identifies pilot participants, where the pilot will be conducted and the duration. It includes a schedule for deploying and conducting the pilot and plans for training and communicating with pilot participants, evaluating the pilot, identifying risks and contingencies, and other key activities that occur during a pilot deployment. The expected contributions and responsibilities of the pilot participants, including confidentiality and ownership should be made clear in a simple legal agreement.

In TheFSM project, we will conduct multiple pilots, with separate pilots for FOODAKAI2.0, AGRIVI2.0 and FoodInspector. The pilots will be implemented in all countries where we have partners (i.e. Greece, Netherlands, Italy, Romania, Croatia, Hungary, Poland, Cyprus, Egypt, Jordan) during the project period. For each pilot a dedicated pilot plan and materials are needed and will be based on the specificity of the case and products being tested. Based on the results and needs, it could be that the same case and products are being tested in different countries. In this case a separate dedicated pilot plan and materials are needed. All pilot plans will be based on this master guidance document describing all elements that should be considered, but not necessarily all features need to be included in each pilot. This will depend on the needs and requirements of each specific pilot. To create a pilot plan three distinct activities have to be performed, which are shown in Figure 2. These are A) Define the pilot scope and objectives, B) Define the pilot group, C) Create pilot plan documents. These elements will be elaborated in more detail in the following sections.

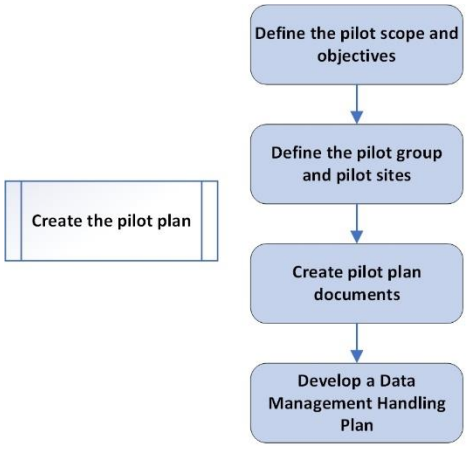

Figure 2: Creating a pilot plan

3.1.1. STEP 1A: Defining the Pilot Scope and Objectives

The first step in planning a pilot is to define the objectives and the scope of the pilot. Defining the purpose and goals for a pilot project is essential to its success. A well-defined pilot project will make the evaluation of its success an easier task to accomplish.

Defining Pilot Objectives

Table 1 presents the goals of TheFSM project. This table should be filled in for each specific application in their separate documents.

Table 1: Goals of TheFSM Platform

Goals of TheFSM Platform
1. Food safety data interoperability and semantics: TheFSM will incorporate advanced semantic technologies that can enable highly sophisticated data interoperability and integration capabilities.
2. Multilinguality support for localized food safety applications: TheFSM will offer advanced multilinguality for both textual information and data ontologies, based on the expertise and technology stack of the partners.
3. Automated and smart contracts for food safety data transactions: TheFSM will offer a multi-sided data brokerage service, where actors like farmers can act as "traders" of their data, that can be used for purposes of certification, product risk assessment and verification.
4. Real-time processing and big data storage & visualization: TheFSM will incorporate big data indexing, processing and visualization capabilities to support real-time data processing and food risk model execution.

To achieve the goals for TheFSM pilots (as expressed in Table 1) we will have to:

- Ensure that the system works properly in the business environment.

- Ensure that the design meets the business requirements.
- Ensure pilots are carried out according to plan in an organized and constructive fashion.
- Create comprehensive pilot plans for the system and the applications fine-tuned for all combinations of partners and countries.
- Ensure that the pilots are designed and implemented to test to what extent the system and applications meet the business and functional requirements.
- Ensure TheFSM and the applications meet the baseline business and functional requirement targets that were assessed in testing.
- Conduct the pilot programs in an iterative fashion in which previous findings and feedback are incorporated in the next pilot.
- Test the deployment process.
- Gather information for estimating future support requirements.
- Gather information for estimating actual hardware requirements.
- Develop and test end-user training materials.
- Train the installation, support and help desk teams.
- Build user support for the TheFSM deployment project.
- Market TheFSM system to potential users.

Defining Pilot Scope

Define the scope of the pilot by clearly stating which services and features will be included and which will not. When you list the services and features you plan to include in the pilot, also state how you expect them to perform, and how you expect to measure that performance in the pilot. Describe the areas of functionality that the pilot implementation affects, and note to what extent they are affected, and in which situations they are affected. Other elements to consider are the following:

1. If you are going to deploy the applications FOODAKAI2.0, AGRIVI2.0 or Food Inspector on an international scale in which users do not all speak one language, be sure to address international language issues in the pilot.
2. Do not expect to test every feature or service during the pilot. Focus on the most important business and functional requirements, processes that present the greatest risk, and events that are most likely to occur.
3. Prioritizing the features to be tested in the pilot is particularly important if your team plans to conduct multiple pilots.
4. If certain aspects of your design cannot be covered by the pilot, describe them.
5. Also specify the duration of the pilot, in terms of either time or of the criteria to be met.
6. Be sure to describe how you expect to proceed after the pilot is complete. If you plan to keep some functions in place and remove others for the full production rollout, identify the features that will be removed.

3.1.2. STEP 1B: Defining the Pilot Group and Pilot Sites

The pilot group should include end-users who are typical of those in your organization. This might include a wide range of users, some of whom are technically proficient and others who are less comfortable with technology. If you plan to conduct multiple pilots, the type of user you select might vary as the pilots progress. For an early pilot, however, good candidates have some of the following traits:

- Are able to derive tangible benefit from the tested TheFSM application.
- Play a noncritical role in day-to-day operations.
- Represent the target environment.
- Are enthusiastic about the TheFSM project.
- Are comfortable with technology.

The group should be able to absorb some downtime or reduction in performance if problems occur. Choose groups or sites that do not have unique requirements or operating environments, because the pilot should predict how your design and rollout will work in your organization at large. Most pilot participants should have the same technical expertise as the average user in your organization. Being comfortable with technology is not an essential attribute for pilot participants. However, if participants are comfortable with technology, they tend to be more patient with problems that occur during a pilot, and they are more likely to test the limits of the application. This type of participant, however, might accept problems that should be reported. Encourage participants to report every problem they encounter.

You can identify candidates by conducting interviews, issuing and evaluating questionnaires, or requesting volunteers. Volunteers, in particular, can be very helpful, because their offer to participate indicates an interest in the TheFSM framework. You might also consider soliciting recommendations for users who might be good candidates for the pilot; for example, you might ask supervisors to identify power users of a particular technology that is going to be deployed.

The selection of a pilot site or sites often depends on the type and location of the pilot participants who have been selected and the number of support staff available to help them. Determine the number of pilot sites and the size of the pilot users group based on:

- The objectives of the pilot.
- The number of functions and features you are testing.
- The size of your support staff.
- Specific technology requirements that can be piloted only by using particular sites or user groups.

Choosing suitable pilot groups and sites helps to ensure a successful pilot project. Including several departments and offices in your pilot will ensure that problems encountered in one (such as an increased workload that does not permit staff to devote the time needed to the pilot project)

will not bring the pilot to an immediate halt. Anomalies as to types of file formats used/not used (or accessed) will be lessened by involving several areas of the agency in your pilot. Table 2 presents an overview of each of the participating countries and their respective TheFSM partners. It was identified which application will be tested in what country and which pilot group will be used.

Table 2: An Overview of the Services and Pilot Groups per Country

Nr	Pilot Countries	Responsible Partner	Food Inspector	Foodakai 2.0	Agrivi 2.0	Total Companies
1.	Greece	TÜV AU HELLAS	1	3	1	5
2.	Netherlands	WFSR	1	3	1	5
3.	Italy	Valoritalia	1	3	1	5
4.	Romania	TÜV AU Romania	1	3	1	5
5.	Croatia	Agrivi	0	0	5	5
6.	Hungary	Agrivi	0	0	5	5
7.	Poland	Agrivi	0	0	5	5
8.	Cyprus	TÜV AU Cyprus	1	3	1	5
9.	Egypt	TÜV AU HELLAS	1	3	1	5
10.	Jordan	TÜV AU HELLAS	1	3	1	5
Total			**7**	**21**	**22**	**50**

Type of companies	Food Companies for certifications	Food Companies	Food Processors with their suppliers	

3.1.3. STEP 1C: Creating Pilot Plan Documents

The pilot plan includes a number of documents that provide procedures for successfully rolling out the pilot in a business environment. The pilot plan includes the following documents:

1. **A training plan** that describes what the pilot participants need to know before they begin the pilot and describes how you plan to train them.
2. **A support plan** that describes how problems that arise for participants during the pilot will be resolved.
3. **A communication plan** that explains how you will keep participants informed about what is happening in the project.
4. **An evaluation plan** that describes how you plan to obtain feedback from participants.
5. **A risk and contingency plan** that describes potential risk factors and how you plan to assess and diffuse them.
6. **A backup and recovery plan** that describes how to back up data and system configurations, how to test those backups, and how to roll back to previous

   configurations if problems arise that might affect business operations or participants'

   access to data.
7. **A schedule that includes milestones** at which you plan to evaluate and make necessary changes to the pilot.

Below a more detailed description of these plans is provided.

Document 1: Pilot Training Plan

A training plan describes what the pilot participants need to know before they begin the pilot and describes how you plan to train them. It should include:

- Which features of the new system the participants need to be trained on, the form training will take, and when training will occur.
- A plan to provide training for the support and operations teams, which might need to be

more detailed than the training presented to pilot participants.
- An estimation of how long it will take and when to begin. Many organizations find that it works best to provide training just prior to pilot installation.
- Remember to include training in the pilot plan schedule.

Document 2: Pilot Support Plan

The support plan identifies who will provide support for pilot participants, the level of support required, and how users can report problems.

Defining Support Team Roles

As a first step the support teams should be defined. Table 8 presents an overview of the information that is required. For each pilot, we identified who will support participants: project team members such as developers and testers were chosen.

Table 3: An Overview of the Support Teams per Country

Pilot	Country	TheFSM Resp	Support team	Support team role
P1	Greece	TÜV AU HELLAS	Mavropoulos Konstantinos, Stelios Vaporidis, Ellie Vaggeli, Giokas Konstantinos	Head of pilots, Pilots project management, Pilots project management, Consulting Pilots
P2	Netherlands	WFSR	Yamine Bouzembrak, Hans Marvin	Project manager, Support project management
P3	Italy	Valoritalia	Francesca Romero, Cristina Micheloni, Andrea Zaffonato, Anna Polloni, Sonia Gastaldi	Use Case Leader, Technical manager, Technical Manager, Technical Manager, Technical Manager
P4	Romania	TÜV AU Romania	George Gheorghiu, Iuliana Demeter, Aurelia Grecu	Head of pilots, Pilots coordinators
P5	Croatia	Agrivi	Tanja Matosevic, Tanja Folnovic	Project manager, Support team lead
P6	Hungary	Agrivi	Tanja Matosevic, Tanja Folnovic	Project manager, Support team lead

P7	Poland	Agrivi	Tanja Matosevic, Tanja Folnovic	Project manager, Support team lead
P8	Cyprus	TÜV AU HELLAS - TÜV AU CYPRUS	Sousanna Charalambidou	Pilots project management
P9	Egypt	TÜV AU HELLAS – TÜV AU EGYPT	Mavropoulos Konstantinos, Stelios Vaporidis, Ellie Vaggeli, Giokas Konstantinos	Head of pilots, Pilots project management, Pilots project management, Consulting Pilots
P10	Jordan	TÜV AU HELLAS – TÜV AU JORDAN	Mavropoulos Konstantinos, Stelios Vaporidis, Ellie Vaggeli, Giokas Konstantinos	Head of pilots, Pilots project management, Pilots project management, Consulting Pilots

**emails and phone numbers are not shared in this table (GDRP).*

An online contact list for support staff that includes the names, phone numbers, and e-mail addresses of all support staff members for TheFSM was developed. The list can be found here: https://drive.google.com/file/d/1yqZ5N9L3RQzbIRa-qxbNH1SOTtpXe8OT/view?usp=sharing

Problem Tracking and Resolution

When problems arise during pilot testing, participants must have a way to report them to the team. The incident tracking system, problem escalation process, and issue resolution process your team develops should identify:

- Where participants post their problems.

  Can they report problems to an existing incident-tracking system, or does the team need to develop a new mechanism, such as a Web site, for participants to use to log their problems?

- How problems will be reviewed, prioritized, and fixed and in what timeframe.
- The escalation process the team will use to notify the appropriate team members.
- How change requests are submitted, approved, tested, and implemented.

Note that the procedures for resolving a problem that arises during the pilot might vary significantly from those used during full production deployment.

Document 3: Communication Plan

The communication plan describes how the communication will be with participants in the pilot, both before the pilot begins and during the pilot. The communication plan is used to identify the type of information that will be communicated, to whom it will be communicated, by what means, and how often. Table 4 presents an overview of the information that is required. This table should be filled with each activity that needs communication during the pilot.

Table 4: Communication Plan (to be completed)

Activity	Participants	Communication Channel	When	Responsible

Mechanisms for communicating information about the pilot are: Emails, websites, frequently asked questions (FAQ) pages, presentations, procedures, and status reports. As you determine how you will communicate with participants during the pilot, begin creating the required mechanisms necessary for this type of communication. The first communication should happen soon after selecting the participants, come in contact with them to:

- Obtain their commitment to the pilot.
- Provide them with a timeline for the pilot.
- Clarify participants' responsibilities.
- Describe the type of testing they are to perform.

Pilot participants need to understand what the pilot entails. Ensure that they understand how the pilot might affect their work. Be sure to address any concerns they might have about the pilot or their role in the deployment process. Furthermore, you should:

- Discuss communication mechanisms that have been established and how they should be used by participants.
- Discuss the level of support you plan to provide.
- Clarify problem reporting and issue resolution procedures.
- Discuss rollback plans.
- Select a user liaison.

Although pilot participants will continue to perform their daily business tasks, you might want to specify certain areas they should focus on. In that case you will need to provide test plans for any special tasks they are to perform.

As the pilot plans develop, the user liaison can keep the release management team informed of the participants' concerns and the participants informed about new developments.

As the training plan progresses, tell participants about the type of training they will receive and when they can expect it. When the support plan is finalized, explain to participants how and when they should request support. Also explain the mechanisms provided for reporting problems or issues.

As the pilot deployment date approaches, the release management team should provide participants with the following information:

- Scheduled dates for training and for upgrading computers
- Procedures they need to follow before their computers are upgraded
- Contact names and numbers for support

Regular and comprehensive communication with pilot participants helps to ensure that participants are committed to the success of the pilot project.

Document 4: Evaluation Plan

The evaluation plan describes the way the feedback from the pilot participants will be collected and assessed. This feedback can be used to evaluate design changes that might be required before the deployment is rolled out to the rest of the organization.

The evaluation plan contains information on the sources of feedback and how to collect this feedback. It then continues with a section on how to analyse the results and concludes with a discussion on how to decide to continue with the pilot. For more information on how to evaluate a pilot and the documents that should be included in the evaluation plan, please see 'Step 4: Evaluating the pilot'.

Document 5: Risk and Contingency Plan

The risk and contingency plan describes the risk factors that could prevent the pilot from being deployed successfully and how to assess and diffuse them. Risks might include the pilot team or developers being behind schedule, required hardware or software being unavailable, or participants working on other projects or needing additional training.

Properly addressing risk factors that could prevent a successful deployment in a pilot environment reduces the likelihood of encountering those same problems when you deploy into your production environment.

Document 6: Backup and Recovery Plan

The backup and recovery plan establishes guidelines and procedures to prevent problems that might cause data loss or interruptions to your organization's operations, and to allow recovery as quickly as possible if such events do occur. The backup plan should define procedures for backing up the most recent system and user data. Furthermore, it should define how the restore process

using the backup files is tested and executed. In addition, the backup plan should identify who is responsible for performing backups, and should include the schedule for all periodic backups and periodic testing of backups, as well as instructions for labeling and storing all backup files.

Document 7: Pilot Schedule

One of the earliest activities in planning a pilot is to draft a schedule, which is usually included in the master project schedule. When drafting the pilot schedule, be sure to schedule time for:

- Planning the pilot and writing the pilot plan.
- Recruiting participants.
- Training participants, support staff, and the installation team.
- Creating an inventory of pilot sites.
- Developing the support and communication mechanisms you identified during planning.
- Deploying the pilot.
- Testing by pilot participants.
- Evaluating the pilot.
- Processing the feedback.

After you have drafted the pilot schedule, review it with management and all affected users. After you deploy the pilot, update the master schedule based on your installation experience so that it more accurately reflects the time that will be required for installation during the full deployment.

3.1.4. STEP 1D: Developing a Data Management Handling Plan

For each application to be tested (i.e. FOODAKAI, Agrivi and Food Inspector) a Data Management Handling Plan (DMHP) has to be prepared. In this master guidance document we provide a template for these DMHP documents.

The objective of a DMHP document is to gather information that will assist Consortium Partners in accessing the privacy and confidentiality of the applications. This document will establish the legal and ethical standards for data generation, use, storage and sharing on the FOODAKAI, Agrivi and Food Inspector applications.

This template is formulated in alignment with the European commission's open data policy and its objective to make research findable, accessible, interoperate and reusable (FAIR). The template is based upon the Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020, detailing:

(a) How project data will be handled;

(b) What data will be collected, processed or generated;

(c) What methodology & standards will be applied; and

(d) Whether data will be shared /made open access/ how data will be curated and preserved.

The following tables aim to gather information on the key feature of the life cycle of data including collection, storage, preservation and archiving. Each representative for FOODAKAI, Agrivi and Food Inspector is requested to complete each table.

Table 5: Data Production and Storage

DATA PRODUCTION AND STORAGE	
Types or categories of data generated/collected	
Personal or non-personal data	
Data formats	
Reproducibility of data	
Data size	
Software tools for creating/processing/visualising data	
Use of pre-existing data	
Data storage and backup strategies	

Table 6: Organisation, Documentation and Metadata

ORGANISATION, DOCUMENTATION AND METADATA	
Standards for documentation of metadata	

Best practice/guidelines adopted for data management	
Tools for formatting fata	
Directory and file naming convention used	

Table 7: Data Access

DATA ACCESS	
Risks to data	
Risk management	
Data access & requirements for access	
Correct execution of the data access process	
Procedures to follow in the event of a data breach	

Table 8: Data Sharing and Reuse

DATA SHARING AND REUSE OF DATA

Organization/labelling of data for easy identification	
Data sharing & audience for data sharing	
Data sharing requirements	
Re-use of data	
Audience for reuse	
Restrictions on the re-use of data	
Publication of data	

Table 9: Data Preservation and Archiving

DATA PRESERVATION AND ARCHIVING	
Archiving of data for preservation and long-term access	
Time period for data retention	
File formats of retained data	

Data archives	
Long-term maintenance of data (systems and procedures)	

3.2. STEP 2: Preparing for the Pilot

As shown in Figure 1, after the creation of a pilot plan, the second step in a pilot is its preparation. The outline of this step is shown in Figure 3.

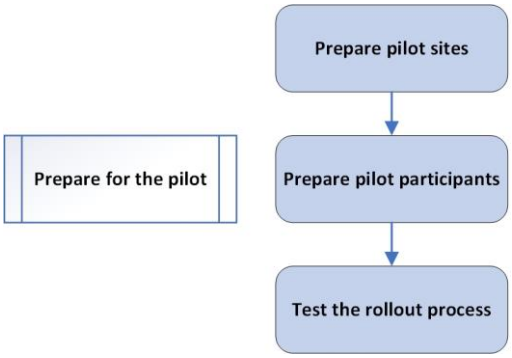

Figure 3: Preparing for the Pilot

After the pilot plan has been written, it is time to start the preparation for the deployment of the pilot. Make sure that all the pilot plans (training plan, support plan, communication plan, evaluation plan, risk and contingency plan, backup and recovery plan and a schedule) have been finalized before you continue.

3.2.1. STEP 2A: Preparing Pilot Sites

As a first step, the pilot sites need to be prepared. This needs to happen in advance of the pilot to be able to make an inventory of the computers and network equipment that are used at the pilot sites and determine if any changes need to be made in order to run the pilot successfully. Check if the computers and network equipment meet your minimum supported hardware

configurations (including memory, hard disk capacity, processor speed etc.). Furthermore, it is important to identify if there are any special security measures, like firewalls or threat protection software, that can block your participants from entering theFSM application. After the required upgrades have been pinpointed, make sure to have the new components tested before the pilot is scheduled to begin.

3.2.2. STEP 2B: Preparing Pilot Participants

The next step is the selection of the participants based on the pilot group that was defined in the pilot plan. From the defined pilot group you can request volunteers, send around a questionnaire or conduct interviews to identify the type of users with the right traits and expertise, and ask supervisors to recommend candidates. One should aim to acquire at least 3-5 companies/organisations (preferable with more than 1 person per company involved) and anticipate for at least one dropout participant during the pilot. Note that recruiting participants can take quite some time, so make sure that you plan sufficient time from the time you start recruiting to the time you want to deploy the pilot.

Once you have selected the pilot participants, communication with the participants should be established as early as possible. Your initial contact should open the channel of communication and set participants' expectations. It is important to inform them of the goal of the pilot and to establish clearly what is expected of the participants and what their responsibilities are. Ensure that they understand how the pilot might affect their work. Furthermore, it is often necessary that a participant fills in a consent form in accordance with the General Data Protection Regulation. You might also want to include a non-disclosure agreement if sensitive data is accessed by the participants. Overall, early communication should:

- Obtain their commitment to the pilot.
- State the goal of the pilot.
- Clarify participants' responsibilities.
- Provide them with a timeline for the pilot.
- Describe the type of testing they are to perform. (Although pilot participants will continue to perform their daily business tasks, you might want to specify certain areas they should focus on. Provide test plans for any special tasks they are to perform.)
- Discuss communication mechanisms that have been established and how they should be used by participants.
- Discuss the level of support you plan to provide.
- Clarify problem reporting and issue resolution procedures.
- Discuss rollback plans.
- Provide them with a consent form, and optionally a non-disclosure agreement, with instructions on how to fill and send it in.
- Select a user liaison.

As the plans for the pilot develop in the period to the pilot deployment, the user liaison can keep the pilot team informed of the participants' concerns so that they can be addressed accordingly by the pilot team in their next communication. The user liaison can also update the participants of any new developments.
As the start date for the pilot approaches, prepare participants for their role by keeping them apprised of pilot deployment plans, target dates and the training plan. Provide participants with the following information:

- Scheduled date for the start of the pilot and the deployment plans.
- The type of training the participants will receive and the scheduled date(s).
- Procedures the participants need to follow on their computers to be able run the pilot.
- Contact names and numbers for support
- The (personal) log-in codes, if necessary.

The training of the participants should happen just before the pilot is scheduled to start. The duration and type of training you provide depends on the scope of the pilot, as determined in the training plan. Training might be required for both support staff and pilot participants. If so, train the support staff before the pilot participants, so that the participants can have assistance as soon as the pilot begins if they need it.

If participants need log-in codes to use the platform, make sure to send these to the participants before the training starts.

3.2.3. STEP 2C: Testing the Rollout Process

Although the lab environment will be sufficient to debug most problems with the pilot deployment, the pilot provides an opportunity to assess the accuracy of deployment procedures in the actual production environment. Schedule time during the testing phase for the pilot team to develop, document and test the rollout procedures. Preparing the pilot sites can also provide valuable information about the rollout process, such as the time required to upgrade each computer with the right software or other information about other upgrade tasks necessary for the pilot to work.

Procedures and resources required for deploying TheFSM applications on various types of computers should be carefully documented throughout the planning, testing, and developing phases of the project. These documents will form the core of the official installation guidelines and should include:

- A list of the required tools, supplies and software and information on how to install them.
- How to get TheFSM application installed and accessed on any computer.
- The operational procedures that installers and administrators must perform (for example, resetting permissions, changing passwords, and restoring user data).

Use the created documentation to create a checklist of deployment tasks that can be used to ensure that all necessary steps have been completed.

3.3. STEP 3: Deploying and Testing the Pilot

The third step in developing a pilot is its deployment and testing. The outline of this step is shown in Figure 4.

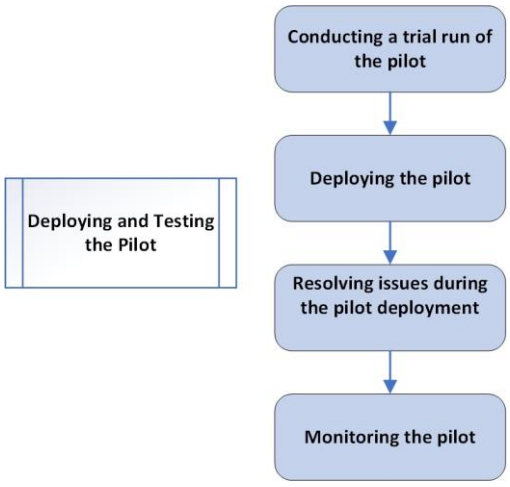

Figure 4: Deploying and Testing the Pilot

After the pilot plan and pilot preparations have been finalized, it is time to start deploying the pilot. Start this process with a trial run of the pilot and make sure to keep tracking the pilot after deployment to monitor its progress closely.

3.3.1. STEP 3A: Conducting a Trial Run of the Pilot

When the pilot is ready to be deployed, it is important to test the deployment of the application with the pilot team first. Performing this trial run of the pilot ensures that any problems with the deployment will be identified before the application has to go live. A trial run should test all elements that will be executed during the official deployment.

3.3.2. STEP 3B: Deploying the Pilot

After any problems identified during the trial run have been solved and a successful trial run has been executed, it is time to deploy the pilot. Make sure to make a back-up of the current system and store it safely. Document the deployment process and use this information to update the pilot plans to do with future rollouts.

3.3.3. STEP 3C: Resolving Issues during the Pilot

During the pilot, the participants perform their regular tasks and they should be able to report any problems they encounter when using the application. They should be able to do so using an incident-tracking system. For more information on how to adopt an incident-tracking system, see 'Step 4A: Obtain Feedback'. Problems that are reported by the participants should be reviewed, prioritized, and fixed according to procedures outlined in the issue resolution plan. Problems can

be resolved either by further development of the application and a rollback of the pilot or by incorporating the resolution or workaround as extra information in the training material and by informing the support staff of the resolution or workaround so they can assist the participants to resolve this problem. Note that if a rollback is required, clear communication with the participants is essential of how and when this will happen.

If multiple pilots are scheduled, make sure to evaluate the results of the current pilot and to resolve the problems found before beginning the next pilot.

3.3.4. STEP 3D: Monitoring the Pilot

During the pilot, the release management team should continually monitor the pilot looking for bottlenecks and areas that need to be fine-tuned. The more information you collect during the pilot, the more accurately you can evaluate its success and recommend how to proceed with the full deployment to the entire business environment. Have the team check problem reports frequently and look for trends and for problems in the application performance, such as:

- Mention of degradation in performance, such as slower response time.
- Mention of tasks that could be performed before, but not after, rollbacks.
- Mention of tasks that can be accomplished only by using a workaround.

It is important that the pilot team communicates with the pilot participants periodically. Talking with users frequently reveals issues or problems that might otherwise go unnoticed.

As the pilot team receives feedback, they will need to assess problems that pose risk to the overall project. Specifically, they should look for situations that might result in:

- Scope changes
- Cost increases
- Interoperability problems
- Unanticipated downtime

Assessing the severity of these issues allows the release management team to make informed decisions about whether to proceed with the production deployment.

3.4. STEP 4: Evaluating the Pilot

As shown in Figure 1, the fourth step in the pilot is its evaluation. The specific activities in this step are shown in Figure 5.

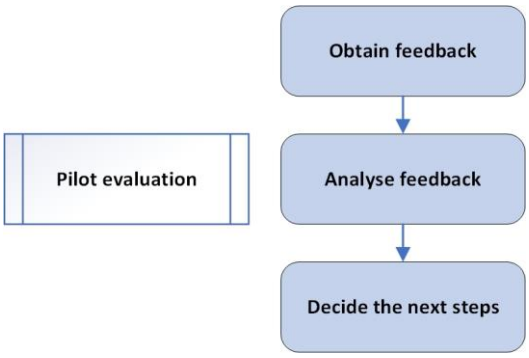

Figure 5: Evaluating the Pilot

During the pilot, participants will provide feedback about how well the design and features are working. This feedback is crucial because based on this information the decision will be made to change the design or process and conduct further piloting tests, or alternatively to continue towards production deployment.
In this evaluation plan the following topics will be discussed:

- How to obtain feedback from the pilot participants.
- How to analyse the feedback.
- Strategies to decide the next step.

3.4.1. STEP 4A: Obtaining Feedback

In the sections below the various sources of feedback will be discussed, followed by a description of the different methods that can be used to collect feedback. Finally, guidelines on how to store the data will be described.

Sources of Feedback

The primary source of feedback will be the user, which in the case of the TheFSM is a group of individuals with a wide variety of occupations, computer skills and experiences. Because of the variety in the kind of user, it is important to collect three types of information:

- Background information on the user.
- Usability experience.
- Information on specific problems, see the Incident-tracking system in the next section.

For both the background information and the usability experience, questionnaires will be used. To measure usability experience the SUS (System Usability Scale) will be applied. It consists of a 10-item questionnaire with five response options for respondents; ranging from Strongly agree to Strongly disagree. To get more information out of the respondents concerning their usability experience, several open-ended questions will be asked. These questions more specifically address the objectives of the pilot as described in table 1 (see Step 1: Creating a Pilot Plan) and may differ per application and country.

The background information questionnaire will have to be filled in before the pilot begins. See Appendix A below for this questionnaire. Based on the type of users and pilot objectives related to the specific applications and countries, additional questions will be added that address these issues. The SUS questionnaire can be found in Appendix B. To prevent any confusion, the actual SUS questions are in RED and the additional questions are in BLACK. Finally, besides background information and usability experience, it is important to get information on specific problems during the pilot. To this end users should be encouraged to report any problems, both big and small. There are several options available for users to provide this feedback, see the Incident-tracking system in the next section.

Methods for Collecting Feedback

Questionnaires

To make it easy for respondents to fill in the usability questionnaire (the SUS) and the background information questionnaire, they should be accessible online. Participants will receive two separate emails with a brief introduction to why they are asked to fill in this questionnaire and why it matters (see Appendix D for an example email). These emails will include a link to the questionnaire. Follow-up emails will be sent in case of the absence of a response within two weeks (see Appendix E for an example follow-up mail).

For the analysis of the SUS it is important that all questions (1 to 10 in appendix B) are answered (this excludes the additional questions at the end). In developing the online webform make sure that participants can only submit their questionnaire when these questions have in fact an answer.

To get information on specific problems that users encounter, an 'Incident-tracking system' should be in place. As a general rule, the kind of incident-tracking system chosen should depend on how it:

1) Facilitates the collection process.
2) Aid the analysis of the collected information.

The first point is very important, because reporting problems (or successes) is the first obstacle participants and pilot team members encounter in providing feedback. If participants experience this as cumbersome and tiring, it will definitely diminish how much and how well they provide feedback.

The second point should also not be forgotten, because if the feedback that is collected is ambiguous or difficult to analyse it will be hard to draw conclusions.

Incident-tracking system

The preferred way to collect information on specific problems during the pilot is to set up a website in which users can fill in a standard template for reporting problems (see Appendix C). Alternatively, if this method is not feasible, a general email account can be set up and users can fill in the standard template and send it to that email address. Users should receive some training to fill in the standard template. Instructions will also be sent through email (see Appendix F for an example email with instructions).

Metrics on TheFSM's architecture and findability of information

If based on the three types of information above (background information, usability experience, reported problems) specific issues stand out that require further testing, several options are available depending on the nature of the problems. Below these options are listed.

- Problems related to TheFSM's architecture: If serious problems or much of the negative feedback from participants point to the design and layout of the website, Treejack (https://www.optimalworkshop.com/treejack/) or similar tools can be used to assess this issue. Treejack provides a paid service in which we can give participants specific tasks and Treejack will then monitor completion time, success rate, and metrics on directness (do participants need to backtrack a lot or was it a direct success).
- Problems related to findability: If users seem unable to find things on TheFSM, tools such as Chalkmark (https://www.optimalworkshop.com/chalkmark/) can be used. Chalkmark works similar to Treejack but is more specific to testing whether users can find something quickly or not.

Metrics on Task Performance

If there is a need to delve deep into a specific problem that cannot be solved by the options presented above, specific tasks that address this issue can be assigned and given to participants in a more controlled environment. An example would be to invite a group of participants to a location where they together will perform certain tasks with TheFSM. During these tasks their performance will be measured.

The following metrics should be analysed when participants are given a timed task:

- Number of errors
- Percentage of the task completed successfully
- Number of hints/prompts needed to complete the task
- Time to complete the task
- Major problems/obstacles associated with each task

Other optional metrics are:

- Time to achieve a certain level of competence
- Time spent reading/searching vs. working
- Time to recover from an error

It is advised to develop an automated logger to measure completion times, mouse clicks and search patterns.

The tasks should be carefully constructed to match the objectives of the pilot. The right metrics should be chosen that will answer these questions. For instance, if you want to know how easy it is to perform a specific task with TheFSM, use a metric such as the error rate and time to completion. If you want to assess how effective a tutorial is in teaching a specific task, compare error rates and completion times between participants who used and not used the tutorial.

Storage of Feedback

The results from the questionnaires and the reported problems should preferably be stored in a database, Excel or other similar format. Make sure to create backups in case of technical problems.

Keep track of respondents that have not yet filled in their questionnaire. For analysis, see next section, use tools such as Excel, R, Python and SPSS.

3.4.2. STEP 4B: Analysing Feedback

After having collected and stored the feedback, the next step is to analyse it. The underlying goal here is to transform the feedback into the metrics and standards used to assess the usability of the FSM and the objectives of the pilot.
The analysis of the SUS will be described first, followed by the background questionnaire, reported problems and finally, if applicable, specific metrics.

Analysis: SUS

To analyse the SUS, make sure you have the complete dataset in a well-organized structure within your analysis environment (e.g. Excel, R, Python, SPSS). The scoring and interpretation of the SUS is not complicated, but requires careful analysis.
First, it is important to filter out dubious questionnaires. Sometimes respondents rush through a questionnaire and just select answers randomly. This can easily be detected in the SUS based on the organization of the questions:

- All even numbered questions (2, 4, 6, 8 and 10) are negative, meaning that a high score on these questions (e.g. a score of 5 'strongly agree') refers to a negative usability experience.
- All odd numbered questions (1, 3, 5, 7, 9) are positive, meaning that a high score on these questions refers to a positive usability experience.

If respondents score both high on even and odd numbered questions, or show low scores on both types of questions, it may point to an inconsistency in how they filled in this questionnaire. There is no standard for when to remove a respondent who shows such inconsistencies, but as a general guideline when 2 such inconsistencies are present this respondent should be removed from the analysis.
The actual scoring of the SUS should be conducted as follows:

- For each of the odd numbered questions, subtract 1 from the score.
- For each of the even numbered questions, subtract their value from 5.
- Take these new values which you have found, and add up the total score. Then multiply this by 2.5.

The result is a score between 0 and 100. This is NOT a percentage, but simply a raw score. The average SUS score is 68. SUS scores above this number are considered 'above average' and scores below 68 are 'below average'. The table below can be used to further interpret the SUS score.

Table 10: Interpreting the SUS

SUS score	Grade	Rating

> 80.3	A	Excellent
68 - 80.3	B	Good
68	C	Okay
51-68	D	Poor
< 51	F	Awful

Calculate a SUS score for each respondent and then average over these SUS scores to get the final SUS score for the group.
Added to the SUS are several questions on positive and negative experiences using TheFSM. Analyse these responses carefully and relate them to the background questionnaire and the reported problems to gain further insights into both strong and weak points of TheFSM.

Analysis: Background Questionnaire

Questions 1 and 2 can be used to divide users based on experience. Average SUS scores should be calculated for each of the three groups mentioned in question 2 to gain insight into the relationship between computer experience and usability. Additionally, based on the age information the user group can be divided in two subgroups, namely 40 years or younger and older than 40 years. Average SUS scores for these groups can again be calculated to gain insight into the relationship between age and usability.
Questions 3 and 4 need to be carefully analysed to gain insight into what users like and dislike. The results of question 3 should be cross-checked with the reported problems from the SUS to see if these are consistent.

Analysis: Reported Problems

Every reported problem should be carefully analysed to find out what the actual problem is. Reported problems should be linked to the listed objectives of the pilot (see Table 1 in Step 1: Creating a Pilot Plan).
Reported problems can be categorized and these categories can then be counted to get insight into where the weaknesses and problems of TheFSM applications are located. More specific analysis of the individual reports can then point to specific problems, which then have to be prioritized. Problems that are both severe and frequent are critical problems that should get a priority and should be included in the preliminary report.

Analysis: Specific Metrics

When specific metrics are collected to gain insight into specific problems, use statistics such as the mean, median, the min and max, and standard deviation to get insight. Data can be grouped

over different conditions to make comparisons, for instance did the group that got the tutorial perform better than the group that did not?

Report Findings

Directly after the pilot a first preliminary analysis can be conducted that gives insight into the larger trends and patterns. This analysis can take place in the days following the end of the pilot and results should be sent to the relevant people after at maximum 3 days. The goal here is to identify hot spots (worst problems) that have to be fixed and communicate these (and only these) findings to the development team so they can work on these issues immediately without having to wait for the final report.

A second and more comprehensive analysis can then be finished in 2-4 weeks following the end of the pilot. This final report includes the preliminary findings plus all other relevant material that were not previously covered.

Reported problems can be categorized and these categories can then be counted to get insight into where the weaknesses and problems of TheFSM application are located. More specific analysis of the individual reports can then point to specific problems, which then have to be prioritized. Problems that are both severe and frequent are critical problems that should get a priority and should be included in the preliminary report. The pilot may also reveal a need for additional technical staff and/or user training before production deployment can be established.

3.4.3. STEP 4C: The Next Step

After the feedback has been collected and analysed, the very important decision has to be made what to do next. If the evaluation process has been conducted well, there will be sufficient information to evaluate whether the delivered design meets the design specification, as well as the business requirements.

Depending on how well the pilot meets the success criteria, there are a number of strategies that can be employed at this point in the pilot deployment:

- Stagger the pilot forward. If the pilot was deemed partially successful, deploy the pilot to the next pilot group or, if your team has planned to conduct multiple pilots, proceed with the next pilot.
- Roll back the pilot. When the pilot is not completely successful, it is often necessary to roll it back so that issues can then be resolved. Typically, a rollback is required when:
    - The production environment contains invalid or problematic data that was not discovered in testing and that caused the deployment to fail. Roll back the pilot to the configuration used before the pilot began, clean up the data, and redeploy the pilot so that the pilot group can continue with its work.
    - Production configurations and settings, such as Group Policy settings or security restrictions, cause problems with the deployment that could not be detected in the test lab. After rolling the pilot back to the configuration used before the pilot began, resolve the problems with the conflicting configurations or settings and redeploy the pilot.
- Suspend the pilot. If the pilot is not successful and issues cannot be resolved easily, suspend the entire pilot, halting all pilot testing until the issues have been resolved and

the pilot can be redeployed. This requires rolling the pilot back to the configuration used before the pilot began.

- Patch the pilot and continue. If the pilot is not successful, but the issues raised are easily fixed, issue the same pilot group a "patch," a fix to existing code.
- Proceed to the production deployment phase. If the pilot is deemed successful and ready for production, you can proceed with your plans for full deployment.

The pilot is not complete until the team ensures that the proposed solution is viable in the production environment and that every component of the solution is ready for deployment.

3.5. STEP 5: Preparing for Production Deployment

The last and fifth step in developing a pilot is the preparation for production deployment. After the pilot team has agreed that the pilot has been successful and has obtained management approval for proceeding, the next step in your deployment project is to fully deploy the system to the outside world.

Each application in TheFSM should follow a continuous integration and deployment procedure to test each of the features provided after production deployment. This is important and must be performed in an Agile framework. An example of such an Agile framework is the Continuous Delivery Pipeline, shown in Figure 6 below, which consists of four parts: Continuous Exploration, Continuous Integration, Continuous Deployment and Release on Demand. Continuous Deployment is the crucial aspect of this pipeline, which is a process that takes validated features in a staging environment and deploys them to a production environment ready to be released.

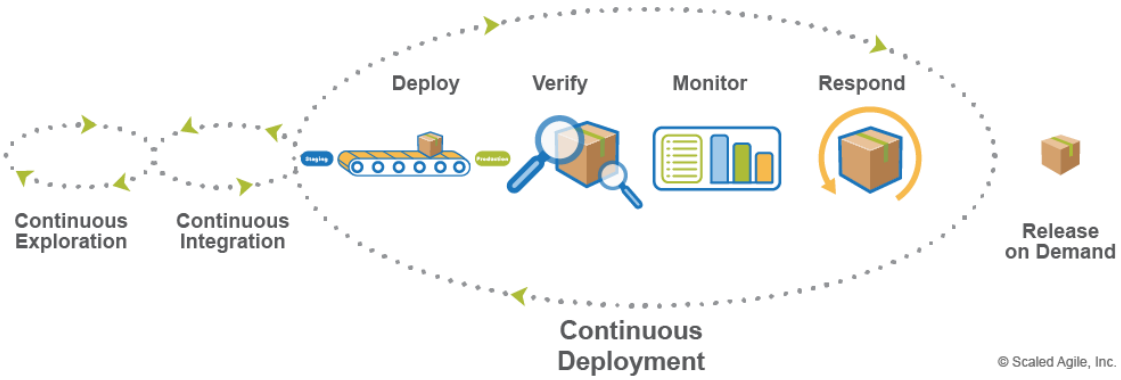

Figure 6: Continuous Delivery Pipeline

Each pilot application (i.e. FOODAKAI2.0, AGRIVI2.0 and Food Inspector) should use such an agile framework to deliver features continuously to their respective applications. The ability to release a feature on demand is crucial to respond to new market opportunities in the shortest possible time and at a rate that is permissible to TheFSM users to comprehend the new functionality. The optimal process for this to separate the deployment process from release so that the deployed changes are moved to production in such a way that it does not hamper the currently running

system. It is advised that small incremental changes are made to production in a continuous fashion.

Each application should follow a design oriented process in form of the following steps:

- Targeting functionality specific to each end-user: Each feature deployment must be assessed for its impact on the current system and each group of users.
- Promoting experimentation such as A/B Testing: Testing two different scenarios with a different group of users before implementing the version with the more optimal user experience.
- Promoting deployments in small batches: Automated testing scripts should be part of each feature release and each deployment should consist of small changes.
- Release based on needs: Release of new features must be consistent and also take into consideration any eventualities that go in deploying a complex process.

These steps promote continuous deployment and form a routine for each pilot participant.

4 SUPPLEMENTARY MATERIALS

4.1. Appendix A: Background Questionnaire

Background Questionnaire

Thank you for taking the time to participate in our usability test. Your participation will provide valuable feedback about your experience using <name application>.

Before we begin, we would like you to fill out this brief questionnaire so that we will have more information about your experience using the Internet and, more specifically, going through the process of certification.

Name:

Age:

Occupation:

1. How often do you use the Internet?

a. Every day
b. Every other day
c. A few times a week
d. Rarely
e. Almost never

2. How experienced are you in using computers and the internet?

a. Highly experienced, I am at the level of a computer programmer
b. Somewhat experienced, I frequently use computers or the internet
c. Not experienced, I rarely use computers or the internet

3. Which features frustrate you the most when you use a website?

a.

b.

c.

4. Which features make you happy when you use a website?

a.

b.

c.

4.2. Appendix B: System Usability Scale

SUS — System Usability Scale

Name:	
Age:	
Occupation:	

1. I think that I would like to use this system frequently

STRONGLY AGREE 1 2 3 4 5 STRONGLY DISAGREE

2. I found the system unnecessarily complex

STRONGLY AGREE 1 2 3 4 5 STRONGLY DISAGREE

3. I thought the system was easy to use

STRONGLY AGREE 1 2 3 4 5 STRONGLY DISAGREE

4. I think I would need the support of a technical person to be able to use this system

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

5. I found the various functions in this system were well integrated

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

6. I thought there was too much inconsistency in this system

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

7. I would imagine that most people would learn to use this system very quickly

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

8. I found the system very cumbersome to use

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

9. I felt very confident using the system

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

10. I needed to learn a lot of things before I could get going with this system

STRONGLY						STRONGLY
AGREE	1	2	3	4	5	DISAGREE

List the most negative aspect(s):

1.

2.

3.

List the most positive aspect(s):

1.

2.

3.

Other Comments:

4.3. Appendix C: Problem Report

Problem Report

Name:	
Date:	
Browser:	

Indicate the severity of the problem

Mildly annoying 1 2 3 4 5 Very frustrating

Summary of the problem:

Screenshot:

What was the expected result?

What was the actual result?

How to reproduce the problem?

Other comments:

4.4. Appendix D: Invitation email to fill in the SUS questionnaire

Dear <name user>,

Are you enjoying <name of the application>? Or is there anything we can do to improve your experience?

We would be grateful if you could spare 10 minutes of your time to answer a short survey and let us know if <the name of the application> actually benefits you and how we can improve further.

Here is the link to the survey: <link>

Thank you!

<Signature>

4.5. Appendix E: Reminder to fill in questionnaire

Dear <name user>,

Two weeks ago you received an email to fill in a short survey about <the name of the application>.

Because we have not yet received your answer, we would like to remind you about it.

We would be grateful if you could spare 10 minutes of your time to answer a short survey and let us know if <the name of the application> actually benefits you and how we can improve further.

Here is the link to the survey: <link>

Thank you!

<Signature>

4.6. Appendix F: Instruction email on how to report problems

Dear <name user>,

In the coming period you will be using <name of the application>. In order to find out if <name of the application> actually benefits you and how we can improve further, we would like to encourage you to report any problem you may encounter during this time. These reported problems will be carefully analysed by the development team in order to make improvements to <name of the application>.

Problems can be reported by going to this link: <link>

Please try to be precise in your descriptions. Screenshots are usually very helpful too!

Try to report one problem at a time. We would like to encourage you to report all problems you encounter, including minor ones.

Thank you!

<Signature>

5 REFERENCES

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