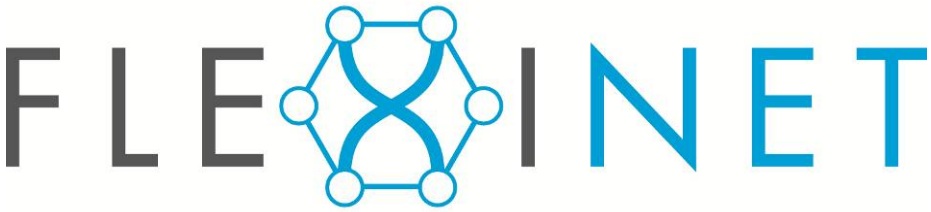

Deliverable D6.3

Results of initial service testing

Workpackage:	WP6 – Service Testing and Customisation
Authors:	Eva Coscia - HOLONIX
Status:	Final
Date:	17/11/2015
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FLEXINET Project Profile

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FLEXINET Partners

Loughborough University	Loughborough University, UK
Coventry University	Coventry University, UK
ITI INSTITUTO TECNOLÓGICO DE INFORMÁTICA	Instituto Tecnologico de Informatica, Spain
Fraunhofer IPK INSTITUTE PRODUCTION SYSTEMS AND DESIGN TECHNOLOGY	Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E.V., Germany
ainia centro tecnológico	Asociacion de Investigacion de la Industria Agroalimentaria, Spain
CONTROL 2K total solutions provider	Control 2K Limited, UK
University of St.Gallen	Universitaet St. Gallen, Switzerland
INDESIT company	INDESIT Company S.P.A., Italy
KSB	KSB AG, Germany
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	Highfleet INC, United States
HOLONIX LIFECYCLE KNOWLEDGE SOLUTIONS	Holonix S.r.l., Italy
technische universität dortmund	Technische Universität Dortmund

Document History

Version	Date	Author (Partner)	Remarks
0.10	15/08/2015	Holonix	Table of Contents
0.20	13/09/2015	Holonix	Initial content for the general parts and for the methodology and material description Structure modified to include a session on the Lab testing and where describing the usage of Redmine
0.30	20/09/2015	Holonix, ITI, IPK, C2K	Integration of contributions for Sections 2 and 3
0.40	15/10/2015	Holonix, ITI, IPK, C2K, AINIA	Integration of contributions on technical validation results
0.50	3/11/2015	Holonix, ITI, IPK, C2K, AINIA	Additional contributions on technical validation and lessons learnt per tool
0.60	13/11/2015	Holonix, ITI, IPK, C2K, AINIA	Final version for internal review
1.00	17/11/2015	Esmond Urwin	Formatting, grammar, spelling and final checks

Executive Summary

This deliverable contains the results of the testing activities conducted by technical staff in FLEXINET with the support of the end users, on the releases of the ERAS, PNES and PSCoMS applications made available at M24.

The main aim of the testing activities in WP6 is to evaluate if the software technology developed in work package 5 performs properly and offers the expected functionalities, thus the scope of WP6 testing is limited to functional and system testing. By contrast, WP7 testing is focused on the evaluation of how useful the technology is for the end users, comparing the situation of these early-adopters of FLEXINET technologies with regard to their baseline by means of KPIs.

Deliverable D6.3 reports both the adopted methodology for the testing, including the involvement of some end users, as well as the results of that exercise and the elaboration of indications for the finalised versions of these results.

The end users participated in the technical validation of all the released applications and provided not only the results of the testing (reporting if the tested functionalities were working) but also their comments and suggestions for future improvements.

As a general comment, the involvement of the end users has been very helpful to identify bugs of the code and problems in the deployment of the applications on the C2K server, to offer each end user a unique access point to all the applications developed in the project. Most of the identified bugs have already been fixed, whereas some of the suggested improvements (those that seems more relevant and whose implementation is feasible during the last part of the project) will be released with the final version of the code.

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1 Introduction

1.1 Purpose and Scope

This technical report provides the description of the methodology applied and the results collected during the testing of the FLEXINET applications and services, as released at M24 of the project, performed by the IT partners with the support of the end users.

1.2 Objectives

The results of the testing activities performed in T6.3 are provided back to the WP5 partners, to offer valuable indications on how the developed software could be improved, basically by removing bugs and adding missing functionalities. In addition, the experience matured in this task as for the involvement of end users working in real industrial scenarios in testing and experiencing the new functionalities offered by the tools, will be used in WP7 when another type of evaluation will be performed.

For example, based on the experience gained in WP6, the way that has been proposed to the end users during this technical testing, to access and use the tools and to report feedback and issues will be analysed and possibly re-elaborated in WP7, when a larger variety of end users, possibly with less basic IT skills but operating in real working conditions will be involved.

1.3 Definitions, Acronyms, and Abbreviations

Table 1: Definitions, Acronyms, and Abbreviations

Term	Definition
Application	A computer program designed to help end users to solve specific activities. In FLEXINET, applications are built on top of the services and can be both desktop applications and web applications. As they offer configuration and personalisation capabilities, the applications are independent from a specific area or company. An example can be an MES.
Functions (F)	Expected behaviour for a given piece of software or application. Functions have been defined in D1.3 per use case.
Mock-up	A mock-up in FLEXINET is a demonstration of an application. The mock-up illustrates or emulates the expected functionality of the application. The main targets of the mock-up are the involvement of the end users and an early check of functionalities. Also workflows and interconnections of applications can be experimented with using the mock-ups
Requirement (R)	A condition or capability needed by a user to solve a problem or achieve an objective (ANSI/IEEE Std. 610.12-1990). The aim of the development team is to

	fulfil requirements by developing the services and applications.
Service	A software support feature, programmed via web services. A set of services can be orchestrated in order to provide more complex and powerful web services. A service is usually designed to provide independence of the end user platform, and has the possibility to be combined with others, so that they can be directly integrated in third party applications. An example can be the order scheduler of an MES.
Functional and System testing	System testing is performed on the entire system in the context of a Functional Requirement Specification(s) (FRS) and/or a System Requirement Specification (SRS). System testing tests not only the design, but also the behaviour and even the believed expectations of the customer. It is also intended to test up to and beyond the boundaries defined in the software/hardware requirements specification. The design will not be tested in FLEXINET.
Test cases	Test cases are individual sets of operations performed over an application to see if it behaves accordingly to expected functions/end user expectations. Test cases will follow the workflow set per application in D5.2 and will check if the given functionalities match the expected functions. Test Scenario = Workflow, it will test a series of test cases.
Test scenario	It is the real life situation in which the end-user/customer uses/interacts with the system and came across various failures (if there are any). Hence we generally used to say Real world scenario. When a user uses the system, then it becomes a scenario. Scenarios will be the context on which the FLEXINET applications are used so as to solve specific activities (searching similar ideas, understanding risks of a new business model, looking for GPN alternatives…).
Testbed	It consists of the settings for executing testing activities in a shielded environment considering real data, processes and IT perspectives of end users.
Unit testing	Unit testing is a software development process in which the smallest testable parts of an application, called units, are individually and independently scrutinised for proper operation. Unit testing is often automated but it can also be done manually. The unitary testing will be developed at service/application level in WP5.
Use Case (UC)	An end user use case provides an end user perspective of an aspect of their business that the systems solution should support, including key performance indicators related to the evaluation of the solution. This aids both the system development and system evaluation processes.
BMAA	Business Model Accelerator Application
BMA-MBV	Business Model Accelerator – morphologic box view (for business models)

BMA-ODIM	Business Model Accelerator – objective, driver, indicator model
BRAA	Business Rules Authoring Application
CE	Collaborative Environment
EWNA	Early Warning Notification Application
GPNCA	GPN Configurator Application
IM	Idea Manager
IRASA	Initial Risk Application Specification Application
KMS	Knowledge Management System
KPI	Key Performance Indicators
OBMC	Operational Business Model Configurator
OBMCA	Operational Business Model Configurator Application
PND	FLEXINET Production Network Design (PND) portal
PSC	Product Service Configurator
SAA	STEEP Analyzer Application
SBME	Strategic Business Model Evaluator
SRAA	Strategic Risk Assessment Application
STEEP	Social, Technological, Economical, Environmental and Political
TEA	Technology Effect Analyzer
UEEA	User Experience Analyzer

1.4 References

Table 2: References

List all of the applicable reference documents. The references are separated into "external" references that are imposed external to the project and "internal" references that are imposed from within to the project.

Ref	Title	Version
[D1.1]	As-Is Models of Industrial Partners Covering Recorded Requirements	1.1
[D1.2]	Requirements Handbook for FLEXINET and FLEXINET	2.0

	General Architecture	
[D1.3]	Use case descriptions for FLEXINET	1.0
[D2.1]	Conceptual-model for business model innovation	1.0
[D5.1]	Specifications of the PND configuration tool and its services	2.0
[D.5.2]	Functional and Modular Architecture of the PND configuration tool	Final reduced
[D5.3-D5.7]	Economic and risk assessment service – release 1 and 2	Final
[D5.4-D5.8]	Production networks evaluation service – release 1 and 2	Final
[D5.5-D5.8]	Product-service life cycle management service – release1 and 2	Final
[D6.1]	Test Bed specifications	Final
[D6.2]	Initial service customisation	Final

2 The methodology

2.1 Methodology presentation

2.1.1 Testing with the end users

This report focuses on the technical validation performed on the latest versions of the applications, made available to the end users after the major release milestone at M24 with the objective of also having their feedback concerning the correctness of the tools. However, it is important to remark that early technical validation, involving people from INDESIT, KSB and Custom Drinks has already taken place in the previous months, as part of a general "agile" approach adopted in the project, in which developments occur in a collaborative and iterative manner so as to utilise suggestions and garner approval from those who will use the results.

The final aim of the activities conducted between M24 and M27 that are reported here, is to integrate the results of technical testing (done by IT partners), with the assessment made by the final users to verify and assess the usability and the coverage of the business processes, eventually reporting missing functionalities, identifying where improvements are needed or recommended

The main steps of the adopted methodology are:

1. Make the tools accessible to the end users so that they can use and validate them;
2. Provide training and support to conduct the validation;
3. Prepare on-line questionnaires to collect the outcomes of the tests;
4. Analyse and report the outcomes per application, by generalising and harmonising the feedback of the three end users

End users can access the tools and the training material necessary to perform the tasks above, through a dashboard made available on the FLEXINET Production Network Design (PND) portal at http://flexinet.biz/.

The dashboard is, for the end users, the single entry point to all the elements they need to go through for the validation exercise, which are:

A. Links to the most recent versions of the (stand-alone) **applications**;
B. **Videos** demonstrating the usage of the applications (where appropriate more than one video for application, each focusing on specific key functionalities);
C. A set of **questionnaires** where they are asked to report about the easiness of usage and completeness of the application; possibly they can suggest missing functionalities and expected improvements. I would remind that specific technical bugs should be reported in detail using the Redmine tool.

For each end user, a predefined login name has been created (see Table 3). A different login name is needed because for most of the FLEXINET applications a separate instance of them has been made available for each end user in order to ensure data separation. The identification of the user makes it possible to display only the hyperlinks pointing to the appropriate instance of each application.

Table 3: Predefined login names for the DashboardEnd user	Login name	PWD
INDESIT	indesit	flexinet
KSB	ksb	flexinet
CUSTOM DRINKS	custom-drinks	Flexinet

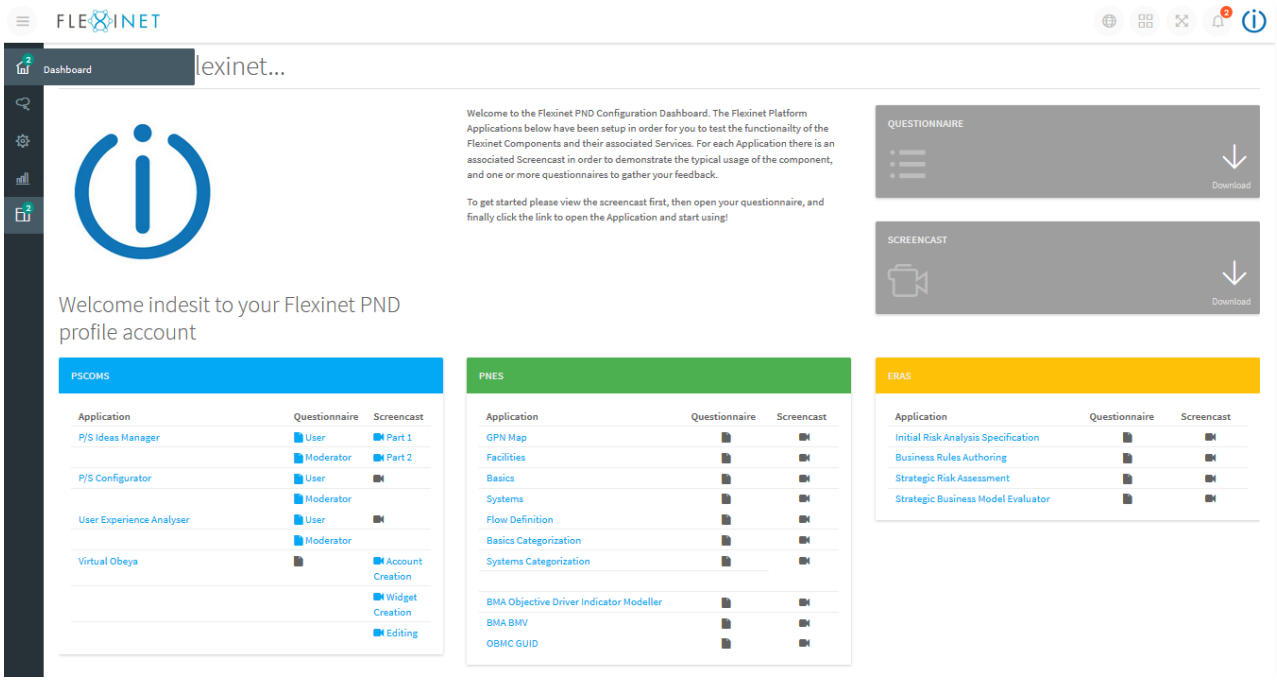


Figure 1: INDESIT Dashboard: example of unique access point to the resources for validation

Figure 1 and Figure 2 show the PND Configuration tool user interface. The navigation which is categorised according to functionality rather than application group enables users to navigate directly to each application. The PND configuration tool UI is fully mobile compatible so that user access to the FLEXINET applications can also be achieved through tablets and mobile devices.

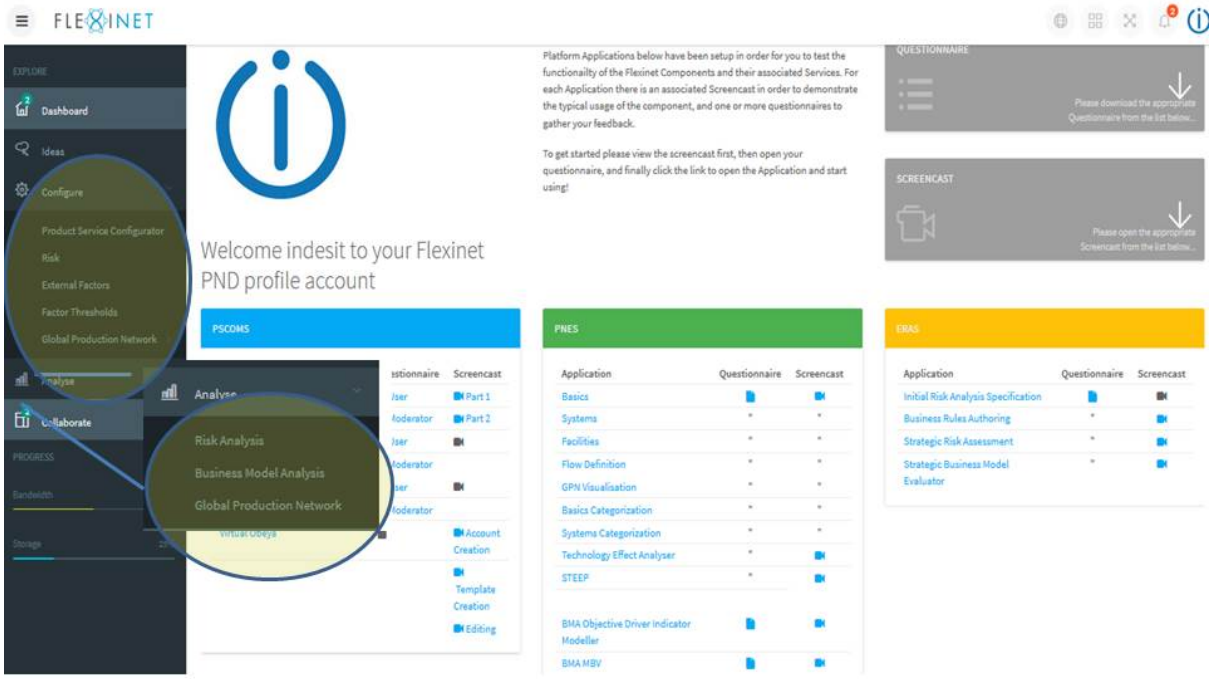


Figure 2: Applications categorised in the side bar for easy access

2.1.2 End User Training

The training for the usage of the applications has been provided to the end users through some planned steps:

1) Preparation of **short screencasts** or **videos** with text or voice, guiding the end user in the interactions with an application; to improve the usability of that material and make easier the consultation, for each applications several screencasts or videos (chapters) are prepared, lasting a few minutes each, and focusing on one of the main functionalities of the application (e.g.: creation of an Idea in the Idea manager).
2) Distribution of the screencasts to the end user companies that will involve a few people for this kind of testing. The selected persons will visualise the material and start experimenting with the tools following the instructions of the screencasts. Unclear points, requests for specific support or additional clarifications will be provided to the application owner before the webinars.
3) A **webinar** has been scheduled for each package (ERAS, PNES, PSCoMS) with the objective of answering the unclear points detected by the end users at point 2). During the webinars, the technical partner developing the application showed how to execute the operations for which end users had difficulties.

2.1.3 Collection of results and feedback from end users

After having used the training materials and attended the webinars, the end users completed the testing of the applications and provided feedback through questionnaires prepared by the technical partners.

The objectives of the questionnaires are

- To ask the end users to execute the main functionalities and to verify that the applications behaved as expected.
- To check that the provided functionalities are easy to be executed and aligned with the expectations of the end users i.e. that the behavior of the application is as expected.
- To collect suggestions for improvements of the functionalities and indications of missing functionality.

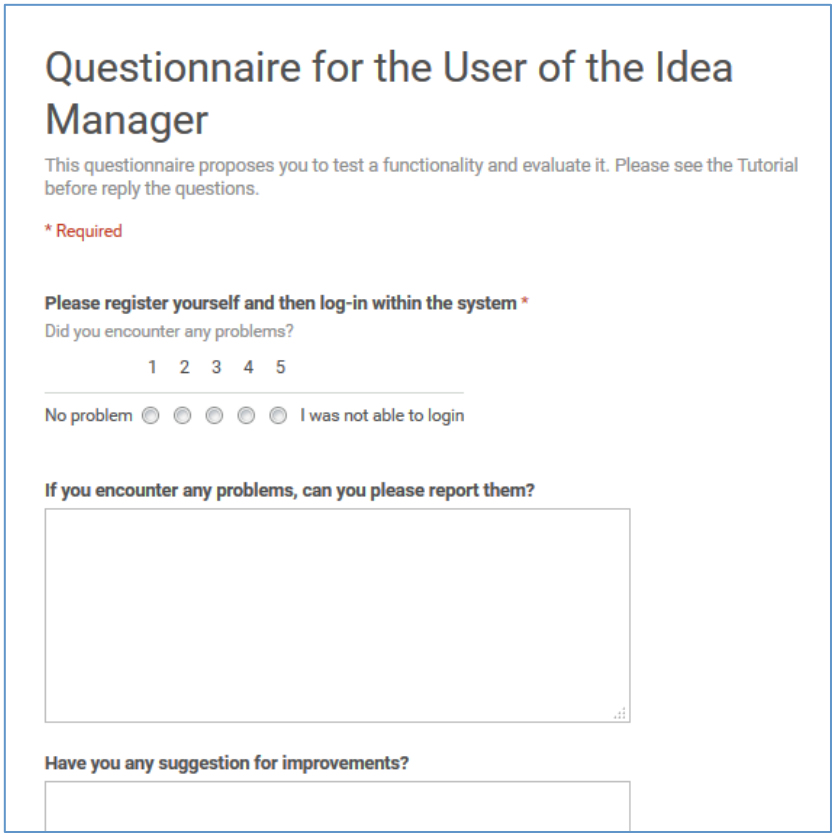
2.1.3.1 PSCoMS Questionnaires

The PSCoMS questionnaires have been implemented as online forms, created with Google Forms, to make access to and filling in very easy for the end users, but also to generate reports automatically.

It has been decided to adopt the following schema, for each main functionality offered by the application, users are requested to:

- Execute the functionality and check what is the output or behaviour of the application.
- Report on how easy and intuitive it was to execute the functionality.
- Report if the outcome was as expected.
- Suggest improvements for the specific functionality.

It has been decided to avoid mandatory questions, so as to give the user the possibility to report also in the case of partial validation. Moreover, two versions of the questionnaires have been created (see Figure 3) one for the tool manager and one for the normal users, so as to collect feedback from users with different roles in the application; in this way, managers and normal users do not have to jump into different sections of the questionnaire to identify and answer only those questions that have been addressed to their specific role.


Questionnaire for the User of the Idea Manager

This questionnaire proposes you to test a functionality and evaluate it. Please see the Tutorial before reply the questions.

* Required

Please register yourself and then log-in within the system *

Did you encounter any problems?

1 2 3 4 5

No problem ○ ○ ○ ○ ○ I was not able to login

If you encounter any problems, can you please report them?

Have you any suggestion for improvements?

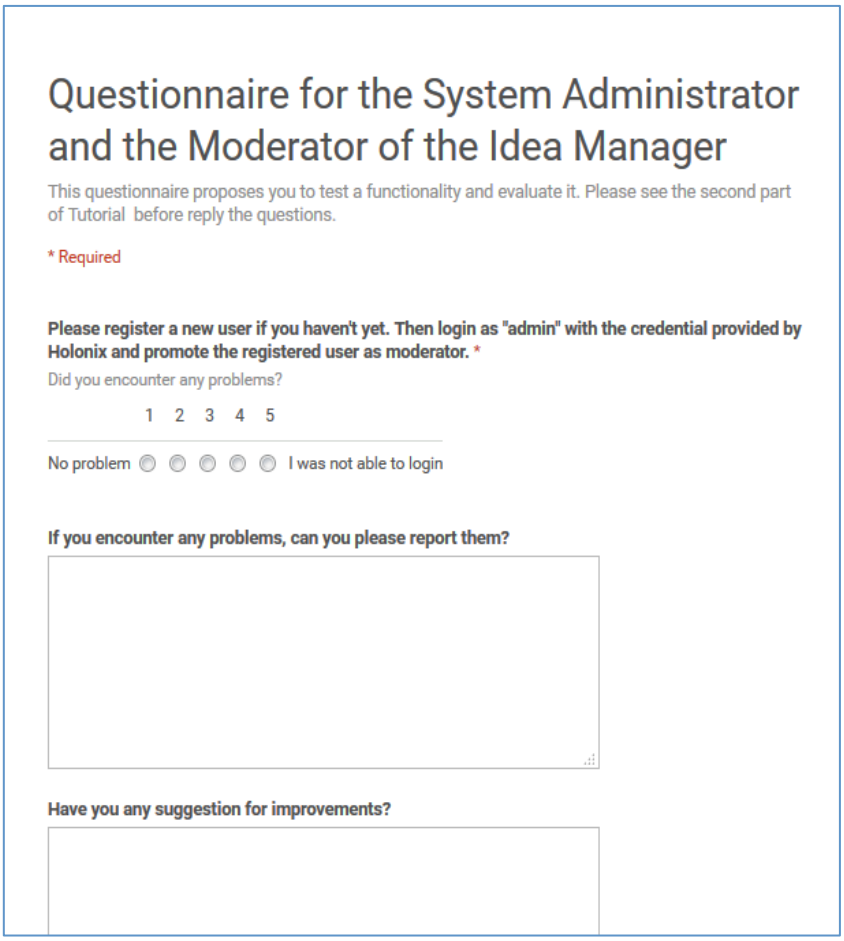


Figure 3: Questionnaires for the User and for the Manager/Administrator of the Idea Manager

2.1.3.2 ERAS Questionnaires

In order to make the completion of the questionnaires as simple as possible, and to aid the collection of them upon submission, the ERAS questionnaires have been implemented as online forms, created with Google Form. In addition, once all feedback has been received this approach allows for summary of results to be reported.

It has been decided to use the following approach for the format of the end user questionnaires:

- Describe the function that is needed for the end user to perform, in a manner that is simple and clear.
- Report on how easy and intuitive was executing the functionality.
- Report if the outcome was the expected one.
- Suggest improvements for the specific functionality.

Each of the four applications are dealt with in a single questionnaire but broken into separate sections to aid understanding of which application they should be focusing on and why. Figure 4 shows an example of the view the end users would see when completing the questionnaire.

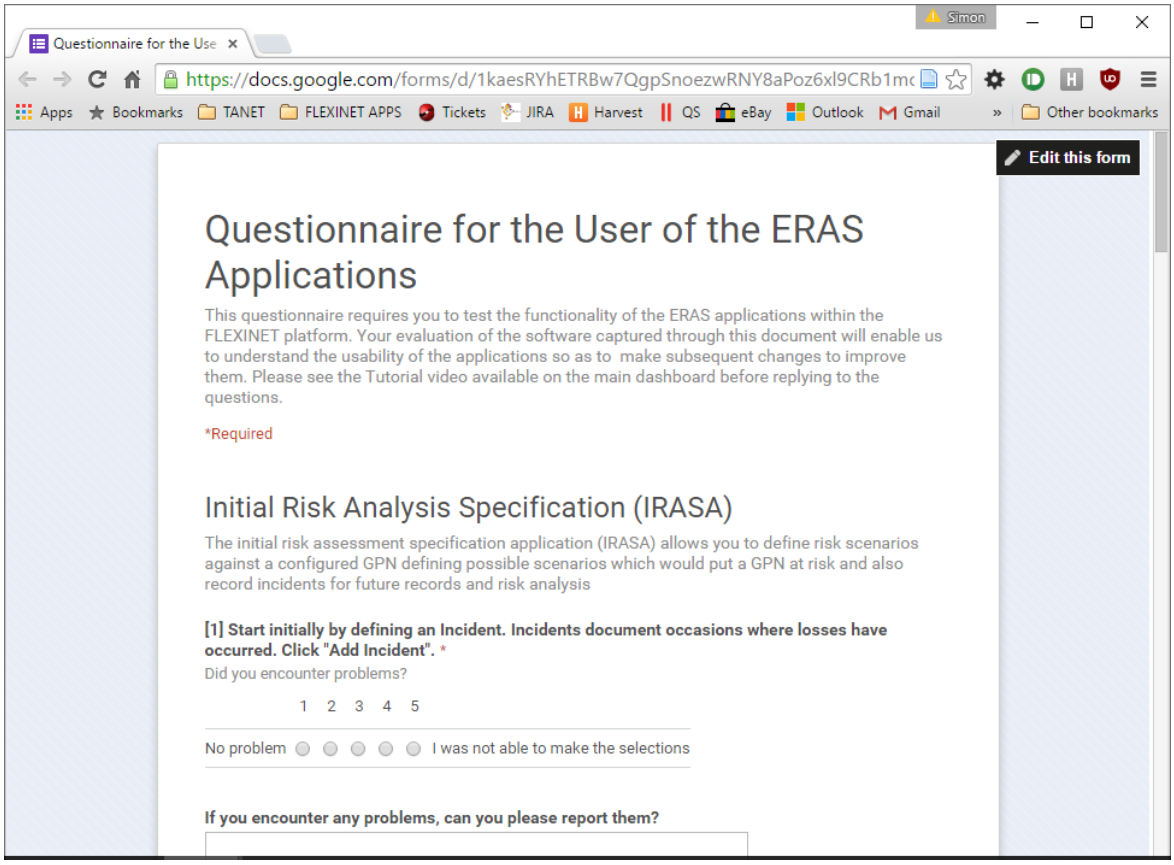


Figure 4: Questionnaire for the User of ERAS Applications

2.1.3.3 PNES Questionnaires

PNES applications related to the GPN perspective, e.g. GPN Configurator, STEEP configurator and TEA Analyser application have been tested by End-Users and evaluated through questionnaires (Figures 5, 6 and 7 present some details of the questionnaires prepared for the three applications).

These questionnaires are intended to validate, from the End-User perspective, the main functionalities provided by PNES applications. Thus, after some specific training for the End-Users, they have evaluated the application and filled in the questionnaires providing the feedback necessary for the final improvements in the final steps of the project.

The questionnaires have been designed in order to be self-contained, guiding the user through the main points to be tested. Thus, questionnaires (see Figures 5, 6 and 7) start with a brief description of the application to be evaluated, the objective of the test and the items to be tested. Additionally, each test provides some descriptions (in italics) with the aim of helping the End-user to answer the proposed questions.

Application	GPN configurator
Description	GPN configurator is the application for configuring the Global Production Network in terms of inputs, outputs, resources and systems. Usually, the user starts by creating the facilityes that form their prodcution network, then including the systems (e.g. processes) for each of these facilityes and then specifying the connections between facilities. These connections are specified as "flows" that take one system's output and transfer it into other system as an input. The user can access to the main functionality through the menu-items provided in the list below. The sections to test are listed here following the natural order that a user would follow in a day-by-
Objective	To test usability and functionality of the GPN Configurator from the user perspective. To this end the user will play with the functionality of the different sections to be tested and will fill this questionary with the results of his/her experience. He can add comments or spot relevant issues (or the lack of them) than can help to improve future relreases of the application.

Items to be tested (ordered)	*Nº*	*Menu Item*	*Description*
	1	Categorization -> Basics	Creation/deletion of categories of Basics
	2	Categorization -> Systems	Creation/deletion of categories of Systems
	3	Basics	Creation/deletion of Basics (based in a categorization)
	4	Systems	Creation/deletion of Systems (based in a categorization)
	5	Facilities	Creation/deletion of Facilities
	6	Flow Definition	Creation/deletion of categorization of Systems
	7	GPN Map	Visualisation of the flow between Facilities.

Test 1		
Menu-Item *Categorization -> Basics*	Create and delete categories of basics.	
Test purpose	Check Functionality and Usability of the menu-item Categorization -> Basics.	
Test Steps	Go to Menu Categorization -> Basics and click on Add button. Follow the instructions and create categories of your interest.	
Expected Results	The basic category created by the user must appear on the screen to be edit, deleted or used by other functionalities.	
User	*[KSB | CD | Indesit]*	
Date	*[Date of the test]*	
Usability	*[1: Easy to Use - 5: Difficult to Use]*	*[Suggestions for improving the use of the application: I would display these or that here and there, I miss a summary of ..., I would include more descriptions in each section...]*
Incidents	*[Any kind of issue occuring during the test: the information was not correctly stored, the button didn't work, it took too long...]*	
Suggestions for Improvement	*[Suggestions - missing information, desired functionality, better naming...]*	

Figure 5: Detail of Questionnaire for GPN Configurator

Application	STEEP Configurator
Description	Steep configurator is a "back-end" application for collecting measures per country from a list of on-line resources. These resources are relevant external indicators from the WorldBank. The user can select the relevant items from a whole list of external factors that include items like average income per country, gross national product per country... The measures for each country and external factor will be gathered from the WorldBank and inserted into the KB to be used later by the ERAS application. Sections expected to be tested are provided in the logical order of use.
Objective	To test usability and functionality of the STEEP analyser from the user perspective. To this end the user will play with the functionality of the different sections to be tested and will fill this questionary with the results of his/her experience. He can add comments or spot relevant issues (or the lack of them) than can help to improve future relreases of the application.

Items to be tested	*Nº*	*Menu Item*	*Description*
	1	Add	Add a new External Factor from a source.
	2	Edit	Edit a an external Factor
	3	Retrieve Data	Retrive the data related to the External Factor showing the data on the screen.

Test 1		
Menu-Item *Add*	Add a new External Factor and send data to the Knowledge base	
Test purpose	Check Functionality the menu-item Add	
Test Steps	Go to Menu Add under the STEEP Analyser tab and click on Add button, follow the instructions and load the data related to the External Factor. To send the data to the ontology click on "Save Configuration" Button at the down side of the screen.	
Expected Results	The External Factor loaded is listed on the current list of external factors.	
User	*[KSB | CD | Indesit]*	
Date	*[Date of the test]*	
Usability	*[1: Easy to Use - 5: Difficult to Use]*	*[Suggestions for improving the use of the application]*
Incidents	*[Any kind of issue occuring during the test]*	
Suggestions for Improvement	*[Suggestions]*	

Figure 6: Detail of Questionnaire for STEEP Analyser

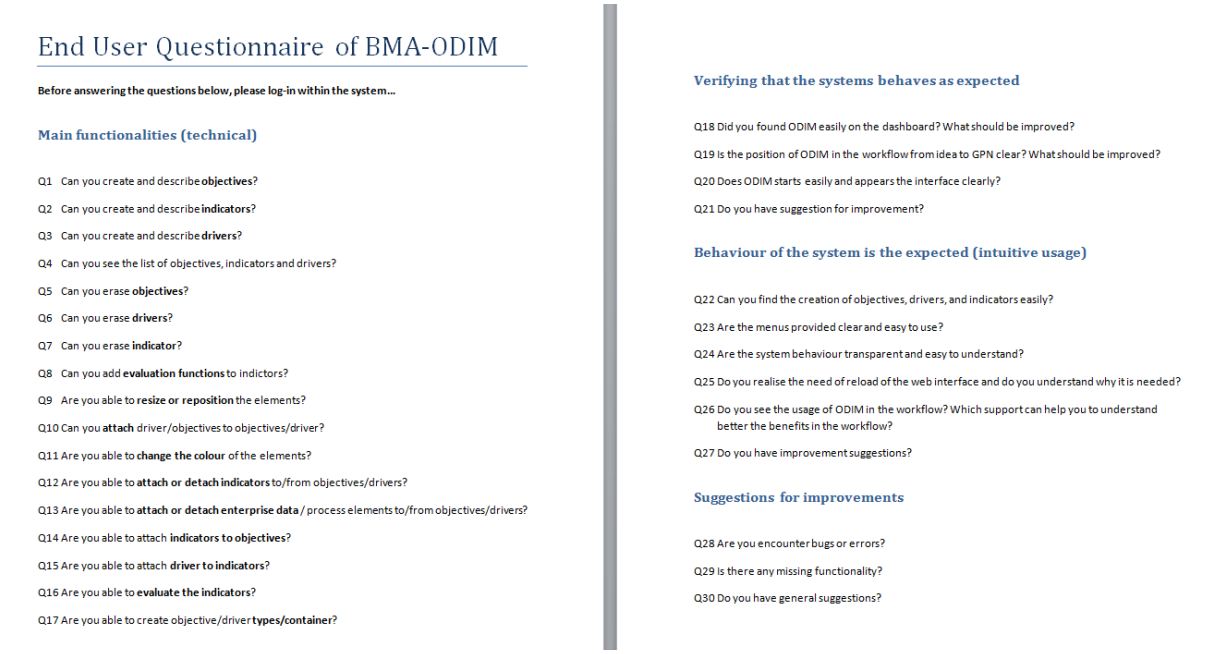
Application	Technology Effect Analyser (TEA)
Description	The Technology Effect Analyser allows the user to check the feasibility of producing a new product/service given the current GPN Configuration. The user can create a "fictional" product/service, characterise it in terms of inputs and resources required, and launch the reasoning. The TEA will come back with possible network configurations to accomodate the new product/service (if any feasible configuration is found). That is, the system that will allow the company to produce it. Some products might require a chain of systems In these cases, the TEA will come back with the flow/flows among facilties/systems.
Objective	To test usability and functionality of the TEA from the user perspective. To this end the user will play with the functionality of the different sections to be tested and will fill this questionary with the results of his/her experience. He can add comments or spot relevant issues (or the lack of them) than can help to improve future relreases of the application.

Items to be tested	*Nº*	*Menu Item*	*Description*
Add New Product Specification	1	Add	Add a new Product Specification to test GPN availability in current GPN configuration
Edit an existent product	2	Edit	Edit an existent product
Delete a product	3	Delete	Delete the product selected by the User

Test 1		
Menu-Item *Add*	Add a new Product Specification to test GPN availability in current GPN configuration	
Test purpose	Check Functionality the menu-item Add New Product Specification.	
Test Steps	Go to Menu Add under the Tech-Effect Analyser tab and click on Add button, follow the instructions and create a new Product configuration of your interest. Launch Reasoning to check the availability of the New Product.	
Expected Results	The new Product is listed on the list of new Products.	
User	*[KSB / CD / Indesit]*	
Date	*[Date of the test]*	
Usability	*[1: Easy to Use - 5: Difficult to Use]*	*[Suggestions for improving the use of the application]*
Incidents	*[Any kind of issue occuring during the test]*	
Suggestions for Improvement	*[Suggestions]*	

Figure 7: Detail Questionnaire for STEEP Analyser

The PNES questionnaires are related to the different components of PNES and especially grouped in questions related to business models for PNES (BMA, OBMC) and the PND configuration. Currently the questions provided by the PND configuration tool are in a Microsoft EXCEL format whereas the business model related questions are based on a Microsoft WORD document format (see Figures 8 and 9). However it is intended with further development to merge the questions together into one format.



End User Questionnaire of BMA-ODIM

Before answering the questions below, please log-in within the system…

Main functionalities (technical)

Q1 Can you create and describe **objectives**?

Q2 Can you create and describe **indicators**?

Q3 Can you create and describe **drivers**?

Q4 Can you see the list of objectives, indicators and drivers?

Q5 Can you erase **objectives**?

Q6 Can you erase **drivers**?

Q7 Can you erase **indicator**?

Q8 Can you add **evaluation functions** to indictors?

Q9 Are you able to **resize or reposition** the elements?

Q10 Can you **attach** driver/objectives to objectives/driver?

Q11 Are you able to **change the colour** of the elements?

Q12 Are you able to **attach or detach indicators** to/from objectives/drivers?

Q13 Are you able to **attach or detach enterprise data** / process elements to/from objectives/drivers?

Q14 Are you able to attach **indicators to objectives**?

Q15 Are you able to attach **driver to indicators**?

Q16 Are you able to **evaluate the indicators**?

Q17 Are you able to create objective/driver **types/container**?

Verifying that the systems behaves as expected

Q18 Did you found ODIM easily on the dashboard? What should be improved?

Q19 Is the position of ODIM in the workflow from idea to GPN clear? What should be improved?

Q20 Does ODIM starts easily and appears the interface clearly?

Q21 Do you have suggestion for improvement?

Behaviour of the system is the expected (intuitive usage)

Q22 Can you find the creation of objectives, drivers, and indicators easily?

Q23 Are the menus provided clear and easy to use?

Q24 Are the system behaviour transparent and easy to understand?

Q25 Do you realise the need of reload of the web interface and do you understand why it is needed?

Q26 Do you see the usage of ODIM in the workflow? Which support can help you to understand better the benefits in the workflow?

Q27 Do you have improvement suggestions?

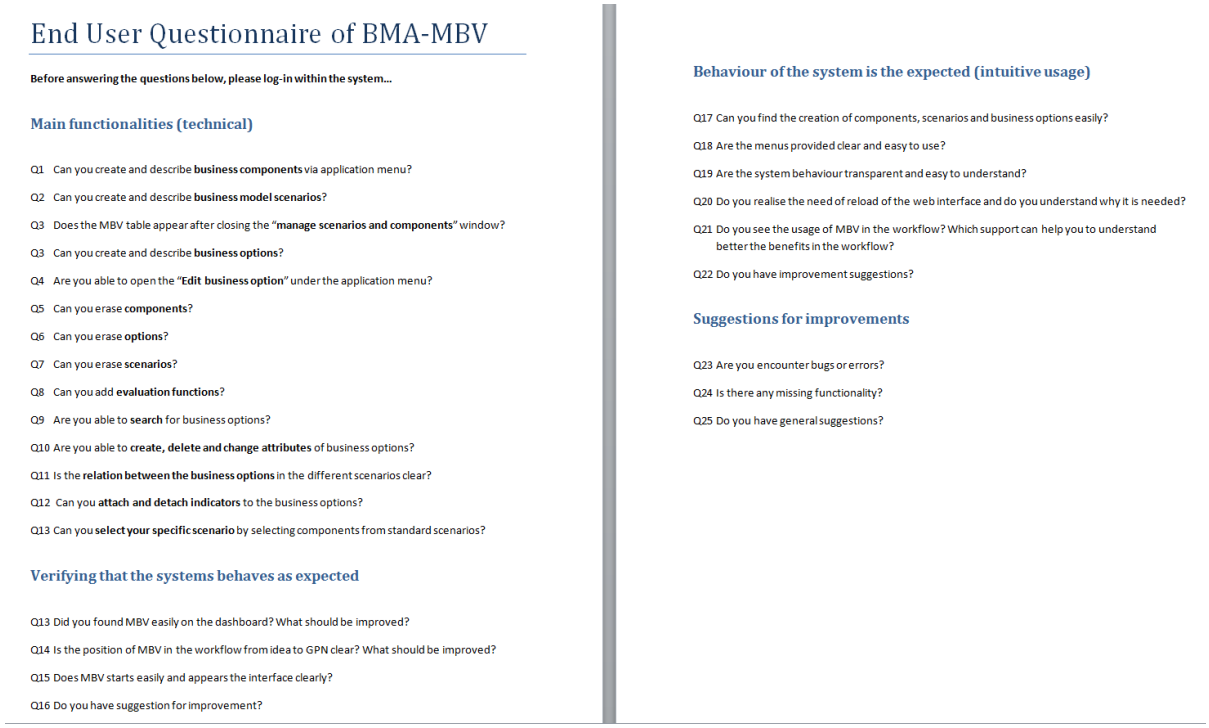
Suggestions for improvements

Q28 Are you encounter bugs or errors?

Q29 Is there any missing functionality?

Q30 Do you have general suggestions?

Figure 8: Questionnaire for BMA-ODIM



End User Questionnaire of BMA-MBV

Before answering the questions below, please log-in within the system…

Main functionalities (technical)

Q1 Can you create and describe **business components** via application menu?

Q2 Can you create and describe **business model scenarios**?

Q3 Does the MBV table appear after closing the "**manage scenarios and components**" window?

Q3 Can you create and describe **business options**?

Q4 Are you able to open the "**Edit business option**" under the application menu?

Q5 Can you erase **components**?

Q6 Can you erase **options**?

Q7 Can you erase **scenarios**?

Q8 Can you add **evaluation functions**?

Q9 Are you able to **search** for business options?

Q10 Are you able to **create, delete and change attributes** of business options?

Q11 Is the **relation between the business options** in the different scenarios clear?

Q12 Can you **attach and detach indicators** to the business options?

Q13 Can you **select your specific scenario** by selecting components from standard scenarios?

Verifying that the systems behaves as expected

Q13 Did you found MBV easily on the dashboard? What should be improved?

Q14 Is the position of MBV in the workflow from idea to GPN clear? What should be improved?

Q15 Does MBV starts easily and appears the interface clearly?

Q16 Do you have suggestion for improvement?

Behaviour of the system is the expected (intuitive usage)

Q17 Can you find the creation of components, scenarios and business options easily?

Q18 Are the menus provided clear and easy to use?

Q19 Are the system behaviour transparent and easy to understand?

Q20 Do you realise the need of reload of the web interface and do you understand why it is needed?

Q21 Do you see the usage of MBV in the workflow? Which support can help you to understand better the benefits in the workflow?

Q22 Do you have improvement suggestions?

Suggestions for improvements

Q23 Are you encounter bugs or errors?

Q24 Is there any missing functionality?

Q25 Do you have general suggestions?

Figure 9: Questionnaire for BMA-MBV

2.2 Methodology execution

This section reports on how the above methodology has been put in place by the IT developers together with the end users.

First, the activities related to the preparation of the validation scenarios by the IT partners are reported upon, then, how INDESIT, Custom Drinks and KSB got involved in the validation, allocating selected people to those activities.

Finally, some considerations are reported about useful outcomes that will guide the next validation activities that are conducted as part of WP7.

2.2.1 Training material and webinars

Several videos have been prepared for all the tools of the ERAS, PNES and PSCoMS packages.

Below in Table 4 is the complete list of the delivered material.

Table 4: Delivered material

Package/Application	Video	Objectives
PSCoMS/Idea Manager	*Part1 Video (see Figure 10)*	*Guiding the external user in working with the Idea Manager for creating, editing and voting ideas*
	Part2 Video	*Guiding the manager in revising, approving ideas and transforming them into concepts.*
PSCoMS/Product Service Configurator	*PSC Video*	*Guiding the user in the navigation of the tabs and in the management of the associated documents*
PSCoMS/Virtual Obeya	*Part 1- account creation* *Part 2- template creation* *Part 3- editing of an Obeya*	*Three different videos to guide the administrator in creating accounts templates and new virtual rooms (Obeyas)*
ERAS	*Business rules authoring* *Strategic Risk Assessment* *Strategic Business Model Evaluator*	*Three videos demonstrating the 3 applications of the ERAS package*
PNES	*Video 1- GPN Configuration* *Video 2 - Technology Effect Analyzer* *Video 3 – STEEP* *Video 4 - BMA Objective Driver Indicator Modeller* *Video 5 - BMA MBV*	*5 videos presenting the GPN Configuration, Technology Effect Analyzer, Steep applications and the modules of the BMA*

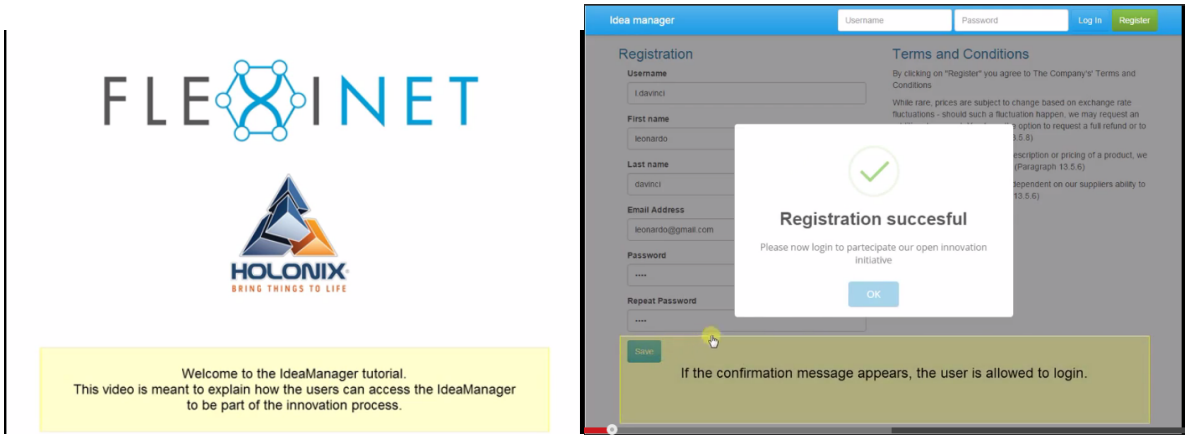


Figure 10: Images from the Video for the User of the Idea Manager

2.2.2 Webinars

Webinars to illustrate the usage of the ERAS, PNES and PSCoMS applications and to clarify any open issues identified by the end users, have been given in September 2015 by the IT developers, using the GoToMeeting facility, these are listed in Table 5 below.

Table 5: Training Webinars

Package	Date	Attended by	Recording
PSCoMS	24.09.15 10:00-12:00	INDESIT, KSB	https://www.flexinet-marketplace.eu/docs/webinars/
ERAS	24.09.15 12:00-13:30	INDESIT, KSB	https://www.flexinet-marketplace.eu/docs/webinars/
PNES	22.09.15 10:00-12:00	INDESIT, KSB	No recording available

2.2.3 Running the methodology

Table 6 below provides information about who has been involved in the technical testing and what has been tested by each end user.

Table 6: End User Technical testing

End User	#people involved	Period	Evaluated Applications
INDESIT	3	14/09-30/10	PSCoMS (all), PNES (all), ERAS (all)
KSB	1	14/09-30/10	PNES (all), ERAS (all), PSCoMS (Idea Manager, PSC, UEA)
CustomDrinks	1	14/09-30/10	PSCoMS (Idea Manager, PSC, UEA)

INDESIT has involved three people that experimented with all the developed tools, utilising the support of Holonix; they all have IT backgrounds and belong to the R&D area. For KSB, one person took part in the technical validation, experimenting with the ERAS and PNES applications using the support of IPK and also evaluated some of the PSCoMS components (Idea Manager, Product Service Configurator and User Experience Analyser, also used to report bugs and problems with the experimented applications) with the support of IPK and of Holonix (extra support was necessary to cope with some problems in accessing web tools from within KSB premises). In CustomDrinks, one person has been involved and he experimented with all the applications, with the support of AINIA.

2.2.4 Lessons learnt on the methodology

The technical validation executed by the end users in T6.3 and reported herein is not the first validation of FLEXINET tools executed during the project, as comments and feedback on mock-ups and prototypes have been requested by the IT providers at an earlier stage within the project. However, in T6.3 that activity has been performed in a more formal way, to collect feedback that will guide the customisation and finalisation of the tools.

In view of the new phase of validation, planned in WP7, some elements that could be of interest have been collected. First, the engagement and training of (new) people is a complex activity that must be planned in advance to be sure to have the necessary time before the start of the evaluation. The reference persons in the end user organisation must coordinate with the IT partners to explain the needs in terms of training and also to quickly communicate to the right IT people any request for further training and instructions.

As for the videos, making them short is mandatory to maintain the attention of the users, but webinars and other interactive activities (like physical training workshops) are even more effective.

Moreover, the lean methodology that is one of the inspiring elements for the Collaboration Environment tool, could be applied to the training itself, in WP7 the web conference tools for webinars could be replaced by the Collaboration Environment itself, to set up and run virtual cooperative meetings during which the usage of the FLEXINET results will be taught within an on-line environment where the tools are widgets embedded in the shared Obeya.

3 FLEXINET results to be tested

At M24 of the project, as documented in D5.7, D5.8 and D5.9, standalone versions of the applications in the ERAS; PNES and PSCoMS package have been released.

After those important milestones, plans on the development side of the project where to complete their integration with the KMS and the customised integration among them, necessary to provide to each end user the FLEXINET trial prototype able to support their specific business process.

But, before that, a validation of these single applications that involved the actual users was necessary and has been conducted between M24 and M27, to guide the tuning of the functionalities of each of the software applications before completing the integration of the different pieces.

The integrated versions of the applications will be available at beginning of December 2015 (M30) and then the final versions will be issued together with D5.10 (M33): for this software, the technical testing will be performed as part of WP7 activities.

Whereas the focus of **D6.3** is on measuring the **correctness** and **completeness** of the applications, the **future (not business) validation in WP7** will be more focused on measuring the **usability** aspects (where the term usability refers to several factors, such as: learnability, adoptability, replicability, etc. of the application, that can be assessed only with the support of end users) and on the **testing of the integration** (conducted by the technical partners).

The next sections present the applications that have been released at M24 and have been provided to the end users for their validation. A more extensive presentation of these applications is in D5.7, D5.8 and D5.9.

3.1 ERAS Applications

For the ERAS application group (see Figure 11), all four applications have been released as prototypes by M24, having been developed and subsequently undergone technical and integration testing. They are now ready for User testing to get feedback on the positive and negative aspects of user experience. This section will briefly outline the applications and what they offer, followed by a summary of the level of completion and outstanding items left to be developed.

Figure 11: ERAS application group

3.1.1 Initial Risk Analysis Specification Application (IRASA)

The Initial Risk Analysis and Specification Application (IRASA) (see Figure 12) provides a facility for selecting applicable risk factors for a GPN, introducing a company specific description of each factor, categorising them, examination of their interdependencies and documentation of historical encounters with them and the relevant outcomes.

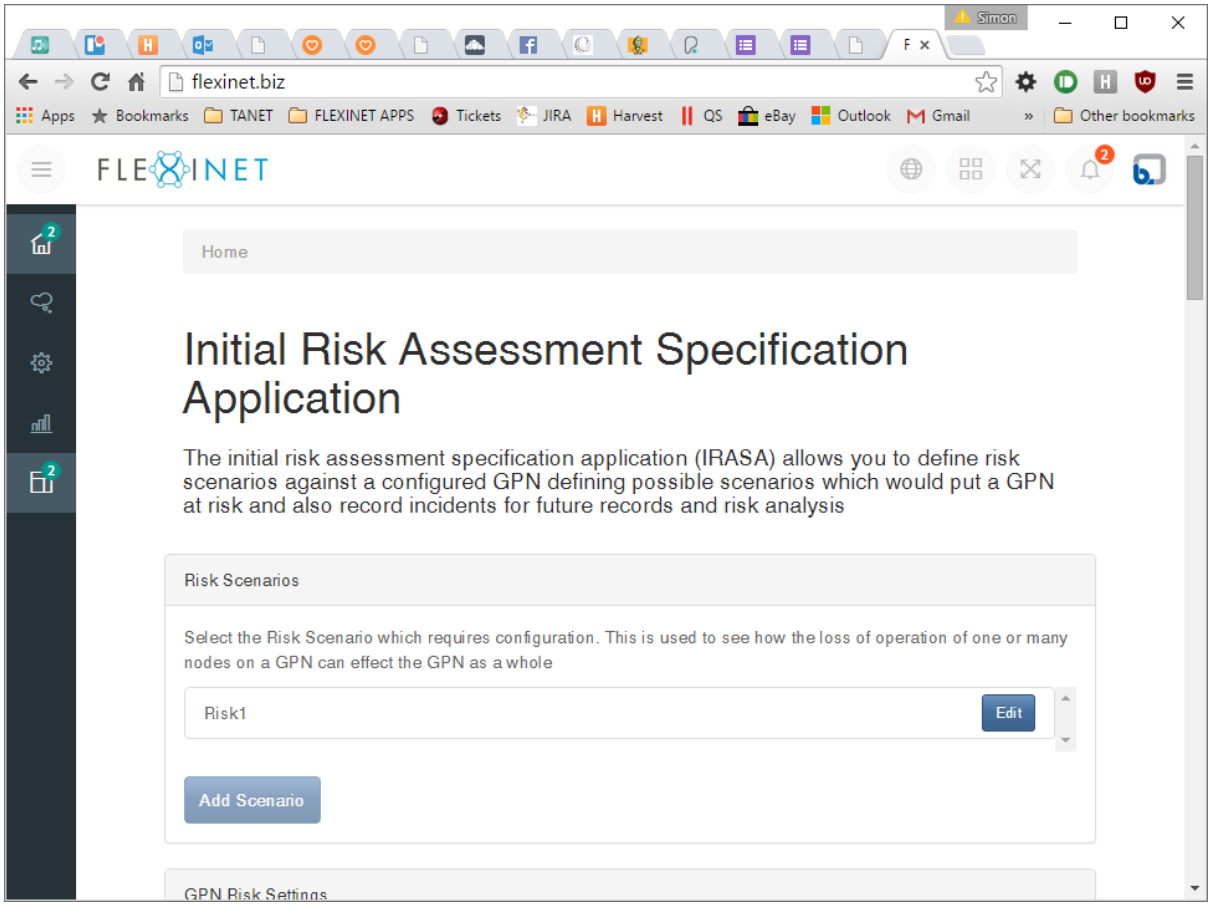


Figure 12: Initial Risk Analysis Specification Application

3.1.2 Business Rules Authoring Application (BRAA)

The Business Rules Authoring Application (BRAA) (see Figure 13) provides a facility for the end user to specify thresholds for external factors that relate to an evaluation criteria (e.g. "Acceptable"). This gets saved in the KMS and is used to assess GPN configurations by allowing nodes within the GPN to be evaluated.

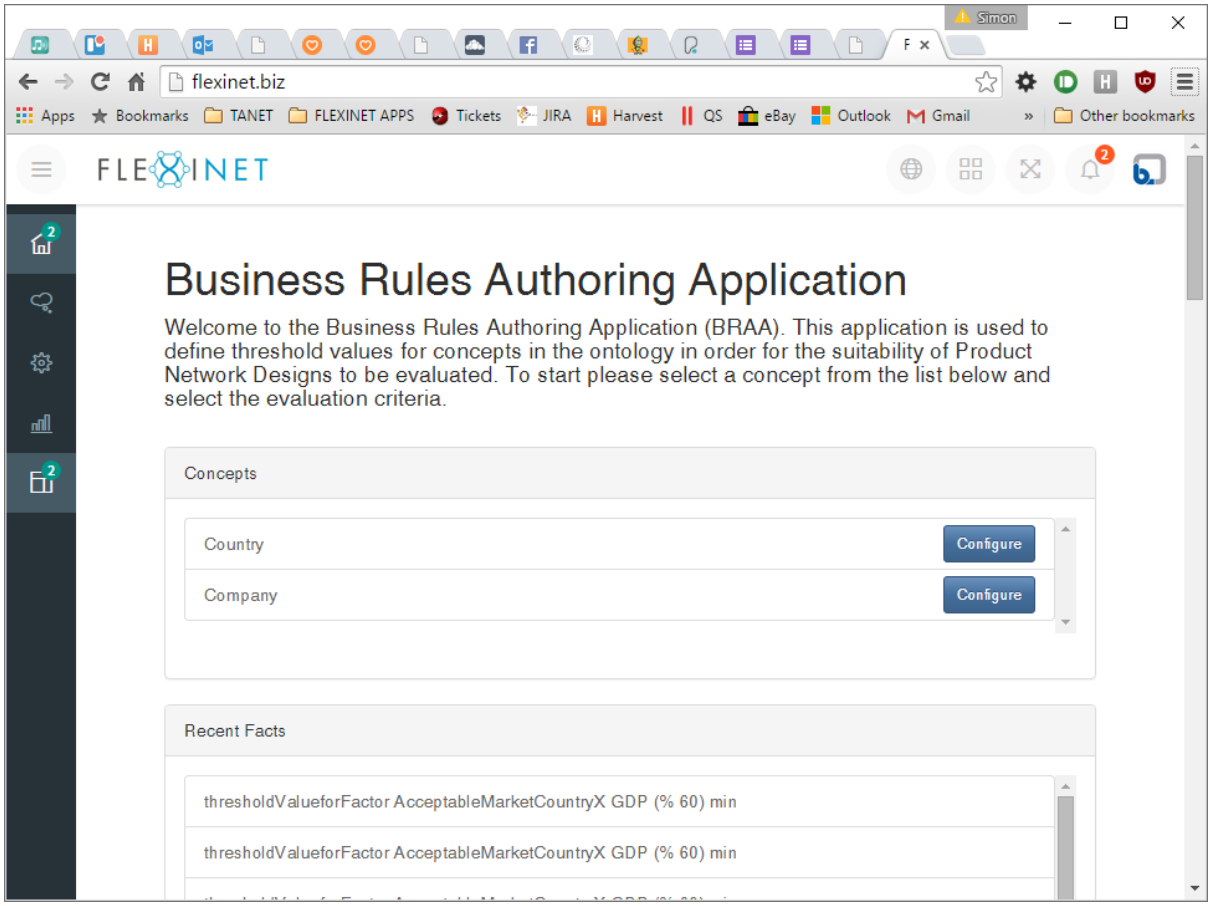


Figure 13: Business Rules Authoring Application

3.1.3 Strategic Risk Assessment Application (SRAA)

The Strategic Risk Assessment Application (SRAA) (see Figure 14) requires a GPN structure to be provided by the user that describes the nodes of the GPN and their relationships. This GPN structure is used to analyse the propagation of risk throughout the network and to determine the expected inoperability of each node. Using this information, it is possible to calculate an economic loss of operation for the proposed GPN structure that is used as an indicator to compare possible alternatives for the GPN. This includes the list of network nodes, their relationships and the perturbations for each risk factor.

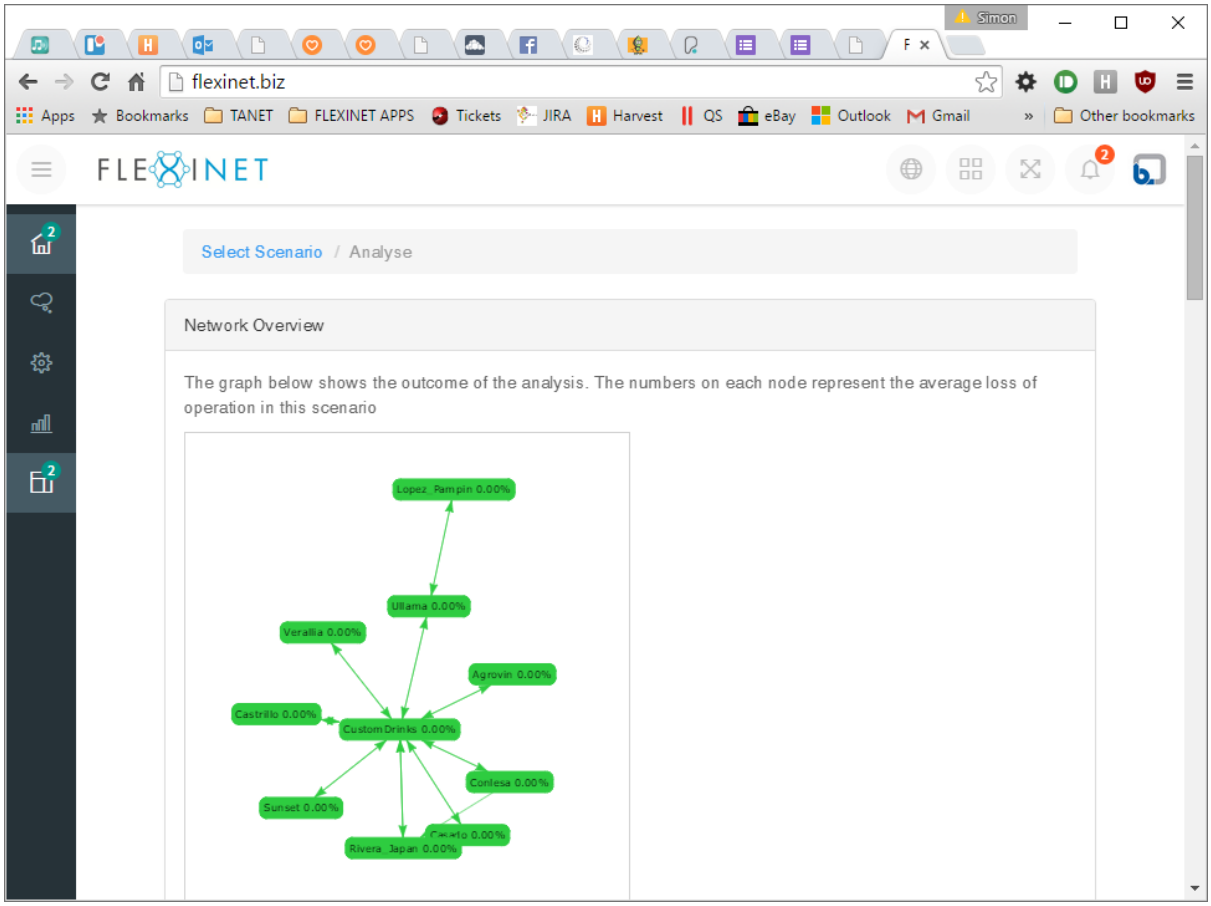


Figure 14: Strategic Risk Assessment Application

3.1.4 Strategic Business Model Evaluator (SBME)

The Strategic Business Model Evaluator (SBME) (see Figure 15) is primarily a method for evaluating early business models for prototypical GPNs. As such it provides a basis for comparison through identifying the importance of defined KPIs within a scenario and also allowing the population of internal factors. Once this is completed we are able to have a high level view of the benefits of a particular configuration and present a decision maker with a clear direction to take.

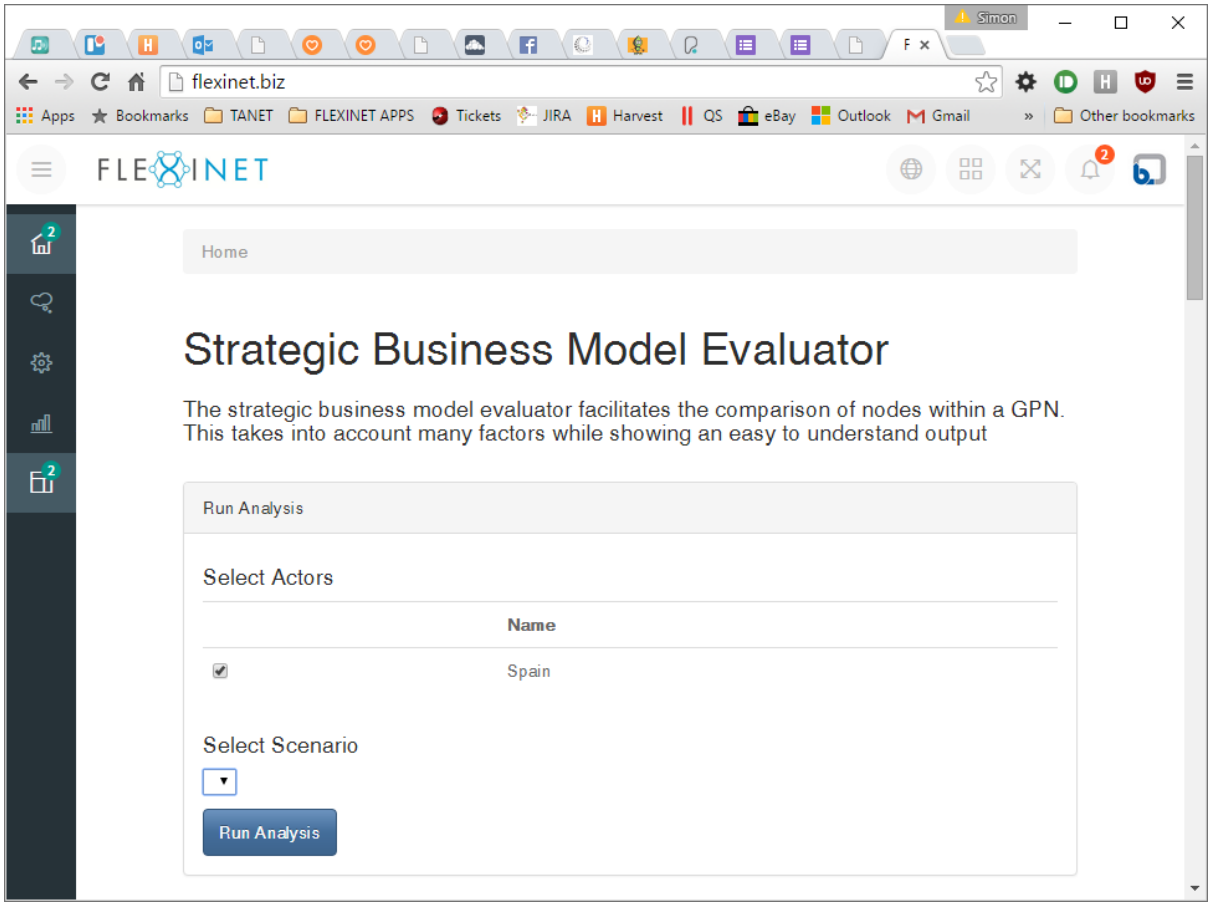


Figure 15: Strategic Business Model Evaluator

Ongoing development and improvement of the applications will continue in parallel to the validation by the end users of the released versions. The following sections (extracted from D5.8 and updated at M27) summarise the development of new features and functionality towards the final version that will be integrated as part of the final PND Configuration Tool.

3.1.5 Further improvements for delivered software

There are key improvements which are scheduled for each application. For the Initial Risk Analysis Specification Application the following is planned:

- Changes to the UI to simplify the dependency relationship between two organisations.
- In response to the release of D2.3 there will be changes to risk factors, scenarios and incidents.
- Regional level risk to be configurable.

For the Strategic Risk Assessment Application the following is planned:

- Further changes to the UI to incorporate changes from D2.3.
- The state of the graph to be saved for viewing the analyses.

For the Strategic Business Model Evaluator the following is planned:

- Improvements to actor configuration to break down groups of KPIs.

- Some additional validations within the UI to promote good data within the system.
- A profitability model has been delivered as part of D2.3 which we believe will give great value to the end user and as such we will be implementing this analysis.

For the Business Rules Authoring Application the following is planned.

- Improved ability to edit existing facts saved through the BRAA.
- Support for more evaluation concepts e.g. Preferred value.
- Support for validation of values entered.

3.1.6 Integration

Further to discussions with other partners a storyline for integration is being generated as part of D5.10 and to support the testing and evaluation work of WP6 and WP7. This will highlight key areas of integration between the applications. To facilitate this we shall be integrating the ontology into the BRAA and SBME which will be the key enabler to having the ERAS services work in conjunction with the PNES and PSCOM services.

3.2 PNES Applications

A new release of PNES applications (with GPN perspective e.g. GPN configurator, STEEP Analyser configurator and TEA analyser) is available now through the Dashboard under the PNES section prepared to integrate FLEXINET applications into the PND Tool. The advances of the release have been already depicted in D5.8. Precisely, user interface aspects of the GPN configurator have been improved in this new version and the connection to the ontology through Highfleet has been also updated to take into account the updates on the ontology. The STEEP analyser configurator and TEA analyser provide their main functionalities ready to be validated by the End-Users.

The following months are aimed at work on the customisation of the applications for the three end users. Some work has been already done in advance with some of the end users, but more work is needed on this issue, namely (see D5.4):

- Move forward on the integration with the compliance evaluator methods (D3.4).
- Customisation of the knowledge base for the three end users.
- Customisation of specific needs coming from End Users with the feedback collected in the Questioners.

3.2.1 GPN Perspective

3.2.1.1 Status of the released components

A new release of PNES applications (GPN perspective e.g. GPN configurator, STEEP Analyser configurator and TEA analyser) is available now through the Dashboard under the PNES section prepared to integrate FLEXINET applications into the PND Tool. Some advances of the release have already been depicted in D5.8. To be exact, user interface aspects of the GPN configurator were improved in this new version and the connection to the ontology through Highfleet was also updated to take into account the updates on the ontology. STEEP analyser configurator and TEA analyser provided their main functionalities ready to be validated by the End-Users.

Thus, the following are some general advances released under the PND tool:

- Web services have been implemented and deployed supporting the management of common entities with the Business Model Accelerator.
- Integration activities have been carried out in the context of PND Tool (Flexinet.biz).

Regarding GPN configurator (see Figure 16), the advances include:

1) Management of multiple GPNs (GPN defined like a set of facilities, systems contained in it and flows connected between them).
    a. Creation of new GPNs.
    b. Creation of new GPNs based on existent GPNs.
    c. Editing and removal of GPNs.
2) Detailed improvements:
    a. Under "GPN visualization" window the user can now selected a GPN. This will be then the current GPN of working to be included in the reasoning.
    b. Additionally, the same functionality has been implemented in the Facility management and Flows management section, where the flows are defined and assigned to a GPN.

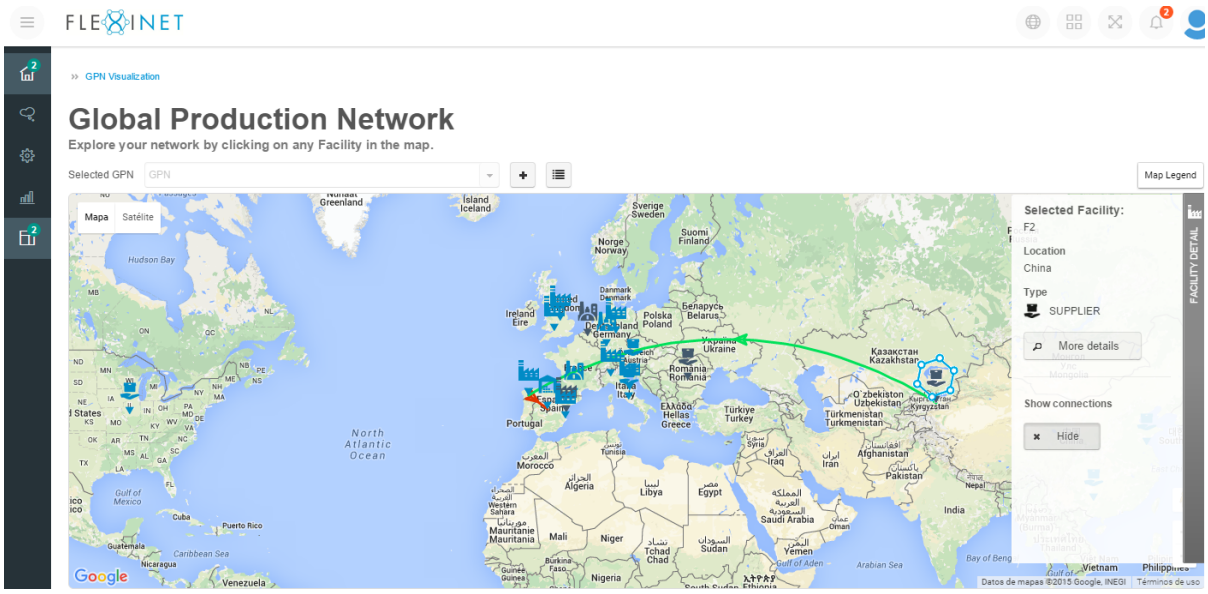


Figure 16: GPN configurator under PND Tool

The STEEP application (see Figure 17) has been completely redesigned to be adapted to the requirements of ERAS applications since the output of STEEP application has become the input for ERAS. The STEEP application now comprises three screens:

1) The main window lists the available indicators. The user can select from them relevant indicators to be included in the Knowledge base (KB) for later analysis.
2) Next step (next window), provides more detailed information about the selected indicator, and allows the user to edit and enter expected error rates so that STEEP application can load from the source of information (usually an URL already configured) the updated values available for all countries. Once loaded, values are inserted into the KMS for later reasoning.

3) The last window shows the list of selected indicators already inserted into the KMS. From here, they can be edited allowing the user to modify and update indicator values and information associated with them. The user can also remove indicators from the knowledge base so that they can be again visible on the main window.

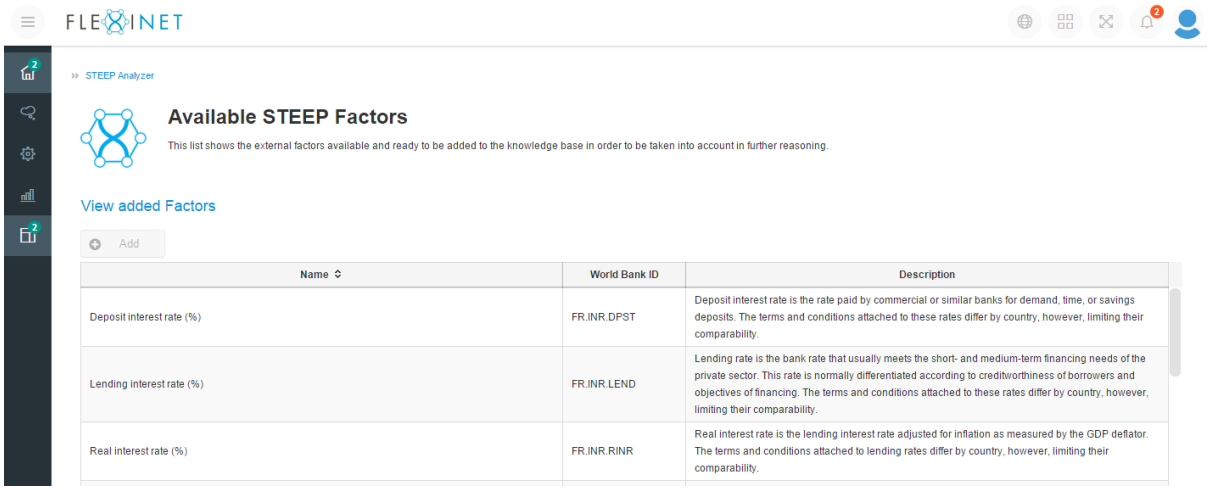


Figure 17: STEEP application released under PND Tool

The TEA application (see Figure 18) has been improved adding tooltips and introductory text for different sections.

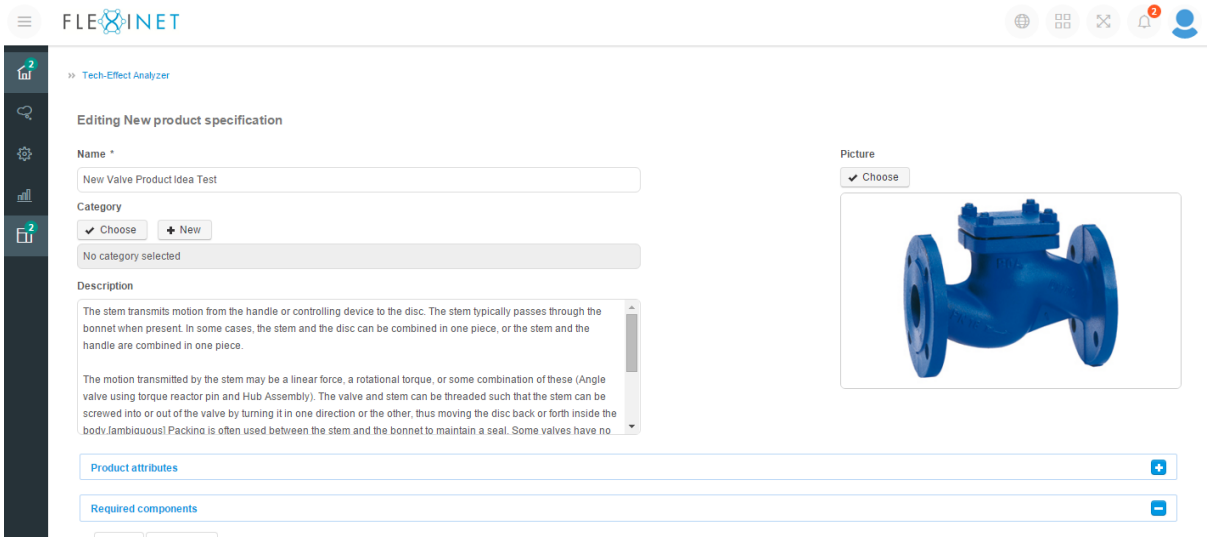


Figure 18: TEA application released under PND Tool

3.2.1.2 Future plans

The following months are aimed at work on the customisation of the applications for the three end users. Some work has been already done in advance with some of the three users, but more work is needed on this issue (see D5.4):

- Move forward on the integration with the compliance evaluator methods (D3.4).

- Customisation of the KMS for the three end users.
- Customisation of specific needs coming from End Users with the feedback collected in the Questioners.

3.2.2 Business Perspective Applications

3.2.2.1 Released components

The PNES components related to the business model accelerator (BMA) ODIM and MBV are available via the FLEXINET dashboard. The further development follows the further evolution of the methods in WP2 and WP4 but also the requirements and issues identified by the end users. Initial screencasts are available illustrating the core functionalities of the tools.

Related to the OBMC the modeller for fragments exists and currently fragments are in development in WP4. However this component is still not available via web-browser. This is not an issue within the local network of an organisation but in terms of a service provided via internet it needs to be improved. Currently it is necessary to access to the C2K server via remote access to manage the models and model fragments. On the other side it has no influence related to the Highfleet connection because this can be realised anyway as it has already tested in January 2015.

3.2.2.2 Status of implementation and future plans

ODIM is close to 85% ready but related to work in WP4 and WP3, further concepts might be integrated, e.g. the already existing concept of risk in the ontology should be also accessible in ODIM because of relations between risks and objectives.

MBV is about 75% ready. It is possible to model business model scenarios and to set attributes and indicators for the business options. A currently missing functionality is the evaluation of the business model related to specific indictors taking into account the targets defined for the business model. This is currently in development.

OBMC is 50% ready because of the missing web accessibility of the user interface. This is under development and expected for November/December M30. Anyhow the configuration of the models is possible as well as the update of the Highfleet interface related to the adaptations of the FLEXINET ontology.

Finally the integration, especially through Highfleet, needs to be done mostly by using FLEXINET interface services but also with direct access to the KMS for specific aspects such as objectives, drivers and ideas.

3.3 PSCoMS Applications

At M24, all the four applications of the PSCoMS package have been released as prototypes (not all of them finalised in the fully completed version, as described below), that passed the first stage of internal technical testing in the developers labs and then have been made available to the end users for their technical validation. The collected feedback is analysed and used to steer the continuous development activity that will be completed, as mentioned above, at M33.

3.3.1 Released components

Below in Figure 19, the tools are shortly described:

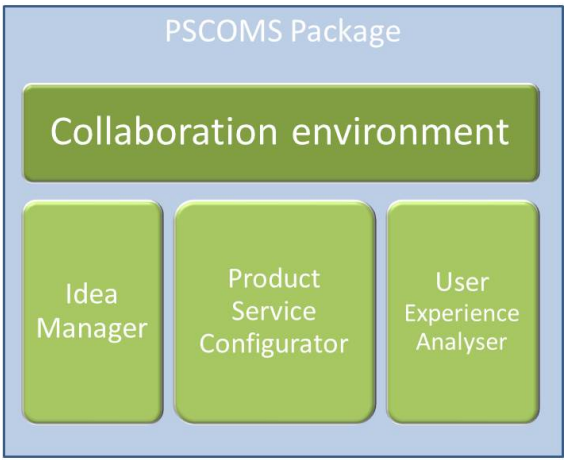


Figure 19: PSCoMS package

- The Collaboration Environment (CE) (see Figures 20 and 21) offsets a virtual space for setting up space-less, timeless collaboration sessions, where users can operate in the same virtual rooms of other colleague, to collaboratively analyse the output of the FLEXIENT tools and collaboratively take decisions about the evolution of (new/redesigned) product-services.

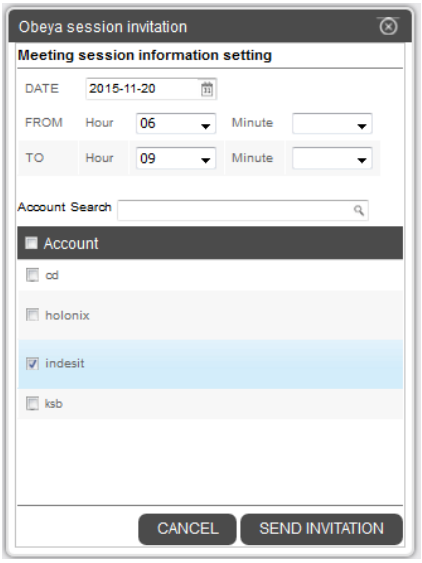


Figure 20: Creation of a virtual meeting

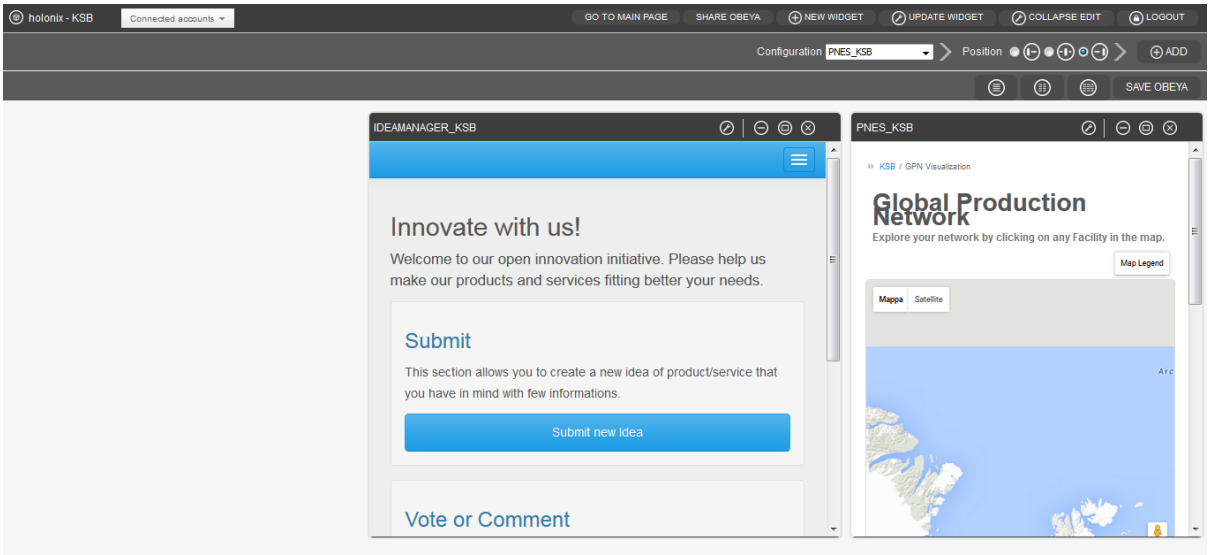


Figure 21: Dashboard for a virtual meeting with FLEXINET widgets

- The Idea Manager (IM) (see Figure 22) applies the Open Innovation approach for collecting suggestions for new product service ideas and to further elaborate these internally to the company.

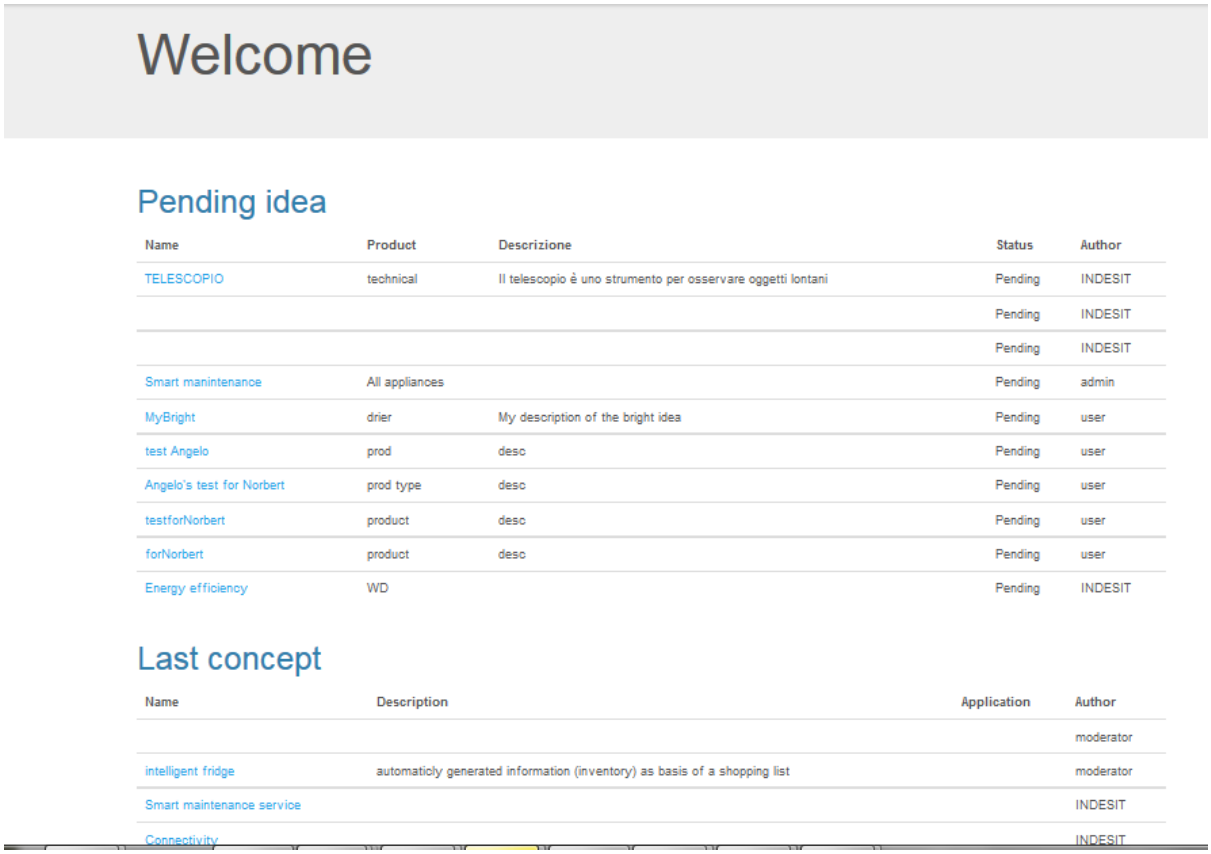


Figure 22: Ideas managed by the Idea Manager

- The Product Service Configurator (PSC) (see Figure 23) ideally gives continuity to the evolution of the product service idea, providing support to create a complete description and analysis of the idea, collecting inputs from various departments and roles in the company.

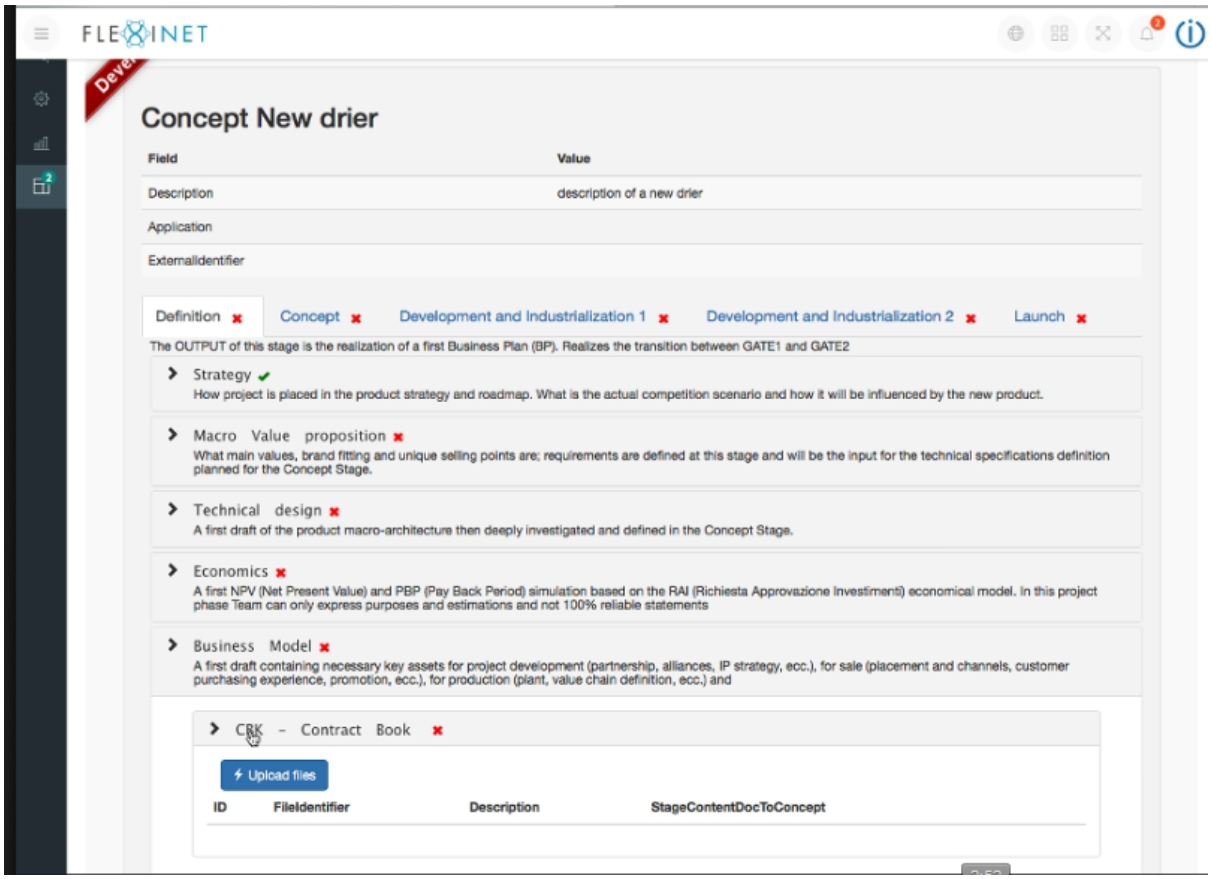


Figure 23: The status of documents for a concept

- The User Experience Analyser (UEA) collects information (comments, suggestions, and bug reports) from a pool of users selected for preliminary testing of the new P/S prototype.

3.3.2 Status of implementation and future plans

For some of the tools, further developments and improvements will be completed in parallel to the validation by the end users of the released versions. Table 7 below (extracted from D5.7 and updated at M27) shortly summarises the plans for next period that will release complete versions of these tools, integrated into the PND platform.

Table 7: status and planned final delivery of the PSCoMS applications

Application	Current Status	Main developments to be completed	Final Delivery
Idea Manager	90% finalised	Integration with KMS Usability improvements Integration with PSC	M30
P/S Configurator	80% finalised	Usability improvements Integration with IM and KMS	M30 (main intermediate version planned at M26)
User Experience Analyser	70% finalised	Integration with PSC	M30
Collaboration Environment	**100% finalised**	-	-

4 Labs testing by developers

This section reports the testing methodologies and procedures adopted by the IT partners to validate the tools in isolation (no integration testing) and within the development laboratory.

4.1 ERAS Labs testing

There were various levels of testing involved in the development of the ERAS, as follows.

4.1.1 Unit Testing

The ERAS was developed using Test Driven Design (TDD) which is a methodology where unit tests are used to define the problem scope of functional units of code and then the code is written to pass the individual unit. By doing this a core level of functionality can be proven. The advantage of this approach is that each individual unit can be tested quickly and easily which prevents changes to the code base causing regression issues long term. The disadvantage of this is that there is no testing of the full end to end system and a common issue is having false confidence of a system based on units and not a full quality assurance process. The unit testing framework used in ERAS is MSTest which is the standard Microsoft Library which is shipped with their flagship IDE Visual studio. MSTest is useful to use as it is fairly ubiquitous within the .Net ecosystem and requires little setup to begin using however it is less feature rich than frameworks like NUnit.

4.1.2 Integration Testing

As the core functionality of the ERAS system is heavily reliant on the Hightfleet knowledge base a suite of integration tests covering all the queries made to the knowledge base was put in place to prove that the interaction of the services that were built provided the correct functionality required by all FLEXINET services. The integration tests also give development staff confirmation that the interactions between services and the knowledge base have been tested (see Figure 24).

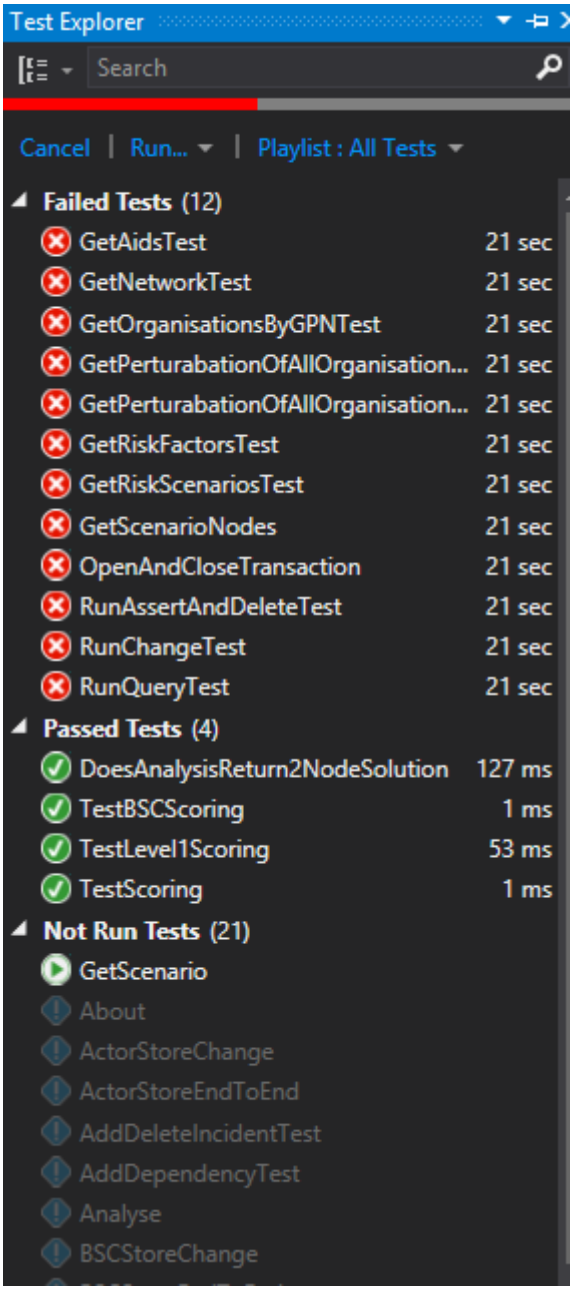


Figure 24: Integration tests running - The failures give a god indication that the applications and services cannot connect to the Highfleet knowledge base

Integration tests give greater confidence that the application and services will operate as expected at the back-end and also provide a specification for the interactions between these components. They can also be used to troubleshoot issues with the running system as they can be tweaked to production settings and run to highlight problems which could be caused by particular settings or configurations. MSTest is also used for integration tests.

4.1.3 Internal QA tests

While automated testing can give a base level of confidence there are usually still issues which are either difficult to automate, i.e. the user interfaces for the applications or still cannot be covered using automation. A mix of technical and non-technical staff have performed QA testing by covering expected and unexpected iterations. This also gives us a feel for how the interface performs when

used by people with differing levels of computer skills. The issues raised are entered into Jira (see Figure 25) which is an Atlassian product used in a larger number of software companies to manage tickets but also to plan and use agile methodologies.

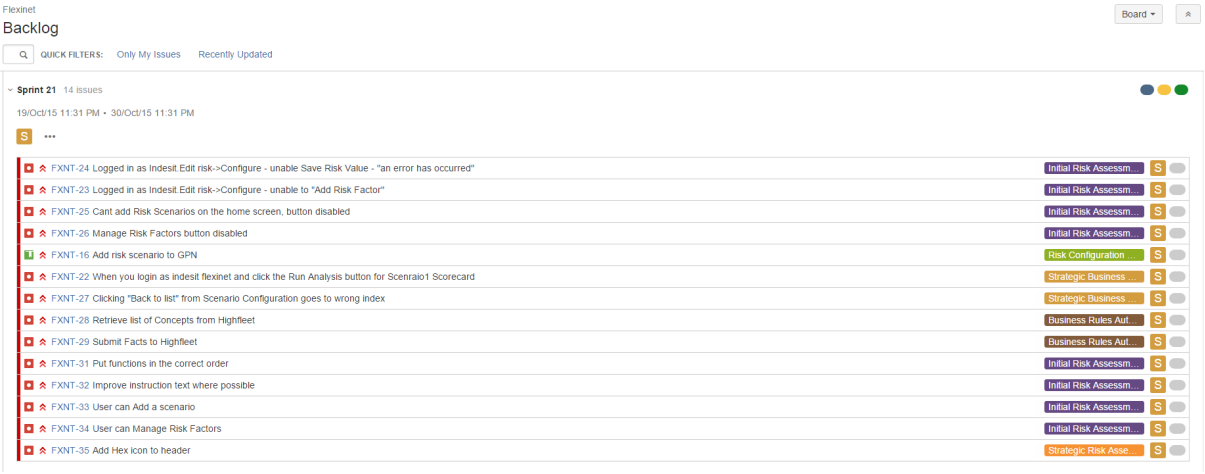


Figure 25: Jira sprint setup for FLEXINET

The issues raised in testing are placed into the project for FLEXINET where the issues can be prioritised based on severity or importance to the end user. The tickets are then split into manageable sprints which are completed with a view to having a deliverable outcome at the end of a sprint.

4.2 PNES Labs testing

PNES applications have been tested by developers following the guidelines for verification of the software at implementation level. Verification is concerned with evaluating a work product, component or system to determine whether it meets the requirements set.

PNES applications have been tested at different verification testing levels:

- Component testing: searches for defects in and verifies the functioning of software components (e.g. modules, classes etc.) that are separately testable.

In the context of PNES applications it refers to the different source code (JAVA) modules composing the applications.

- Integration tests interfaces between components, interactions to different parts of a system such as an operating system, file system and hardware or interfaces between systems.

Interfaces between the Ontology Modules (Highfleet) and integration of data between the three PNES applications has been included in this type of testing.

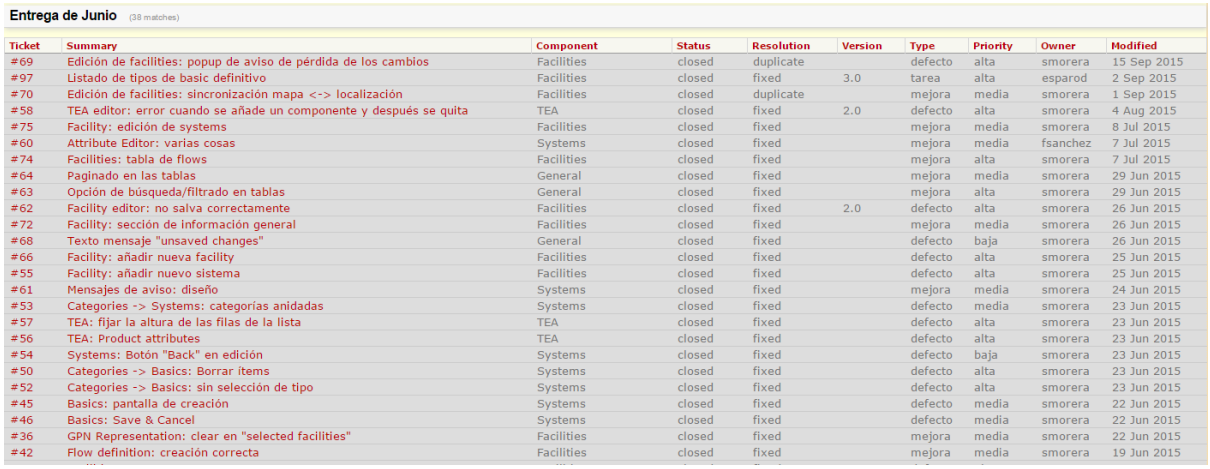
Note that integration here it refers to PNES tools not FLEXINET applications. This issue is addressed by the PND Tool.

- System Testing: concerned with the behaviour of the whole system/product as defined by the scope of a development project or product. The focus of system testing is verification against specified requirements. This test is a kind of validation testing done by developers.

Figure 26 shows some details of the tool used to track the different issues that have arisen when testing the applications. The methodology followed by the developers follows the creation of tickets (incidents) reporting the issue or problem arises from the process of testing.

Thus, we store for each issue the number of ticket, a summary with a brief description of the problem, the component/module tested, status, version, priority, owner, date modified and attributes related to each issue found during the development.

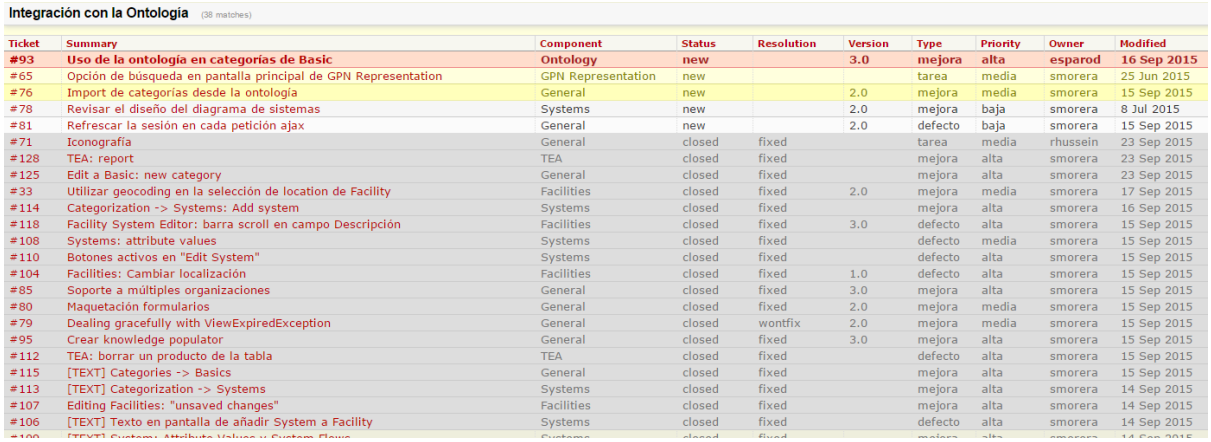
Figure 27 shows the details of some issues related with the last update in the testing process of integration with the ontology.



Entrega de Junio (38 matches)

Ticket	Summary	Component	Status	Resolution	Version	Type	Priority	Owner	Modified
#69	Edición de facilities: popup de aviso de pérdida de los cambios	Facilities	closed	duplicate		defecto	alta	smorera	15 Sep 2015
#97	Listado de tipos de basic definitivo	Facilities	closed	fixed	3.0	tarea	alta	esparod	2 Sep 2015
#70	Edición de facilities: sincronización mapa <-> localización	Facilities	closed	duplicate		mejora	media	smorera	1 Sep 2015
#58	TEA editor: error cuando se añade un componente y después se quita	TEA	closed	fixed	2.0	defecto	alta	smorera	4 Aug 2015
#75	Facility: edición de systems	Facilities	closed	fixed		mejora	media	smorera	8 Jul 2015
#60	Attribute Editor: varias cosas	Systems	closed	fixed		mejora	media	fsanchez	7 Jul 2015
#74	Facilities: tabla de flows	Facilities	closed	fixed		mejora	alta	smorera	7 Jul 2015
#64	Paginado en las tablas	General	closed	fixed		mejora	media	smorera	29 Jun 2015
#63	Opción de búsqueda/filtrado en tablas	General	closed	fixed		mejora	alta	smorera	29 Jun 2015
#62	Facility editor: no salva correctamente	Facilities	closed	fixed	2.0	defecto	alta	smorera	26 Jun 2015
#72	Facility: sección de información general	Facilities	closed	fixed		mejora	media	smorera	26 Jun 2015
#68	Texto mensaje "unsaved changes"	General	closed	fixed		defecto	baja	smorera	26 Jun 2015
#66	Facility: añadir nueva facility	Facilities	closed	fixed		defecto	alta	smorera	25 Jun 2015
#55	Facility: añadir nuevo sistema	Facilities	closed	fixed		defecto	alta	smorera	25 Jun 2015
#61	Mensajes de aviso: diseño	Systems	closed	fixed		mejora	media	smorera	24 Jun 2015
#53	Categories -> Systems: categorías anidadas	Systems	closed	fixed		defecto	media	smorera	23 Jun 2015
#57	TEA: fijar la altura de las filas de la lista	TEA	closed	fixed		defecto	alta	smorera	23 Jun 2015
#56	TEA: Product attributes	TEA	closed	fixed		defecto	alta	smorera	23 Jun 2015
#54	Systems: Botón "Back" en edición	Systems	closed	fixed		defecto	baja	smorera	23 Jun 2015
#50	Categories -> Basics: Borrar ítems	Systems	closed	fixed		defecto	alta	smorera	23 Jun 2015
#52	Categories -> Basics: sin selección de tipo	Systems	closed	fixed		defecto	alta	smorera	23 Jun 2015
#45	Basics: pantalla de creación	Systems	closed	fixed		defecto	media	smorera	22 Jun 2015
#46	Basics: Save & Cancel	Systems	closed	fixed		defecto	media	smorera	22 Jun 2015
#36	GPN Representation: clear en "selected facilities"	Facilities	closed	fixed		mejora	media	smorera	22 Jun 2015
#42	Flow definition: creación correcta	Facilities	closed	fixed		mejora	media	smorera	19 Jun 2015

Figure 26: Detail of testing issues. Release June.



Integración con la Ontología (38 matches)

Ticket	Summary	Component	Status	Resolution	Version	Type	Priority	Owner	Modified
#93	**Uso de la ontología en categorías de Basic**	**Ontology**	**new**		**3.0**	**mejora**	**alta**	**esparod**	**16 Sep 2015**
#65	Opción de búsqueda en pantalla principal de GPN Representation	GPN Representation	new			tarea	media	smorera	25 Jun 2015
#76	Import de categorías desde la ontología	General	new		2.0	mejora	media	smorera	15 Sep 2015
#78	Revisar el diseño del diagrama de sistemas	Systems	new		2.0	mejora	baja	smorera	8 Jul 2015
#81	Refrescar la sesión en cada petición ajax	General	new		2.0	defecto	baja	smorera	15 Sep 2015
#71	Iconografía	General	closed	fixed		tarea	media	rhussein	23 Sep 2015
#128	TEA: report	TEA	closed	fixed		mejora	alta	smorera	23 Sep 2015
#125	Edit a Basic: new category	General	closed	fixed		mejora	alta	smorera	23 Sep 2015
#33	Utilizar geocoding en la selección de location de Facility	Facilities	closed	fixed	2.0	mejora	media	smorera	17 Sep 2015
#114	Categorization -> Systems: Add system	Systems	closed	fixed		mejora	alta	smorera	16 Sep 2015
#118	Facility System Editor: barra scroll en campo Descripción	Facilities	closed	fixed	3.0	defecto	alta	smorera	15 Sep 2015
#108	Systems: attribute values	Systems	closed	fixed		defecto	media	smorera	15 Sep 2015
#110	Botones activos en "Edit System"	Systems	closed	fixed		defecto	alta	smorera	15 Sep 2015
#104	Facilities: Cambiar localización	Facilities	closed	fixed	1.0	defecto	alta	smorera	15 Sep 2015
#85	Soporte a múltiples organizaciones	General	closed	fixed	3.0	mejora	alta	smorera	15 Sep 2015
#80	Maquetación formularios	General	closed	fixed	2.0	mejora	media	smorera	15 Sep 2015
#79	Dealing gracefully with ViewExpiredException	General	closed	wontfix	2.0	mejora	media	smorera	15 Sep 2015
#95	Crear knowledge populator	General	closed	fixed	3.0	mejora	alta	smorera	15 Sep 2015
#112	TEA: borrar un producto de la tabla	TEA	closed	fixed		defecto	alta	smorera	15 Sep 2015
#115	[TEXT] Categories -> Basics	General	closed	fixed		mejora	alta	smorera	15 Sep 2015
#113	[TEXT] Categorization -> Systems	Systems	closed	fixed		mejora	alta	smorera	14 Sep 2015
#107	Editing Facilities: "unsaved changes"	Facilities	closed	fixed		mejora	alta	smorera	14 Sep 2015
#106	[TEXT] Texto en pantalla de añadir System a Facility	Systems	closed	fixed		defecto	alta	smorera	14 Sep 2015

Figure 27: Detail of testing issues - Ontology integration.

4.2.1 How the applications have been tested by the developers

For the PNES business model applications BMA and OBMC the following steps in the testing are applied:

1. Test by the developers if the application run accordantly to the specification.
2. Quality test on a different machine to check the function and correctness such as:
    - Breakdowns.
    - Usability issues.
    - Correctness of the realisation.
3. Deployment on the C2K server by the IPK developers.
4. Integration into the dashboard by C2K.
5. Quality test of the application integrated in the dashboard:
    - Accessibility.
    - Availability of the functionalities.
    - Inferences between dashboard and the application.
    - Final check of usability with at least one end user.

A major source for the application oriented quality test was the documentation and especially the data described in D6.2 which illustrates the customisation of the software applications. For example, the business model descriptions from INDESIT are used for initial tests of the functionalities of the provided MBV functionalities of the BMA.

4.2.2 **Main improvements w.r.t. M24 version (D5.8 version)**

Since M24 the applications have a high evolution in terms of provided functionalities, completeness and usability e.g. at M24 MBV was just a viewer for business models now it is possible to create business models and even create business models related to specific demands of clients. This means not only the CANVAS business model components but also further components can be defined by an end user. Also ODIM improves in terms of completeness of the edit functionalities and allows now to define and execute indicator functions. However the principle functionalities and user interfaces remain the same as described in D5.8.

4.3 PSCOMS Labs testing

The PSCoMS applications have been tested by the IT team of Holonix first within the development laboratory and then on the deployment environment provided by C2K. The first testing activity was aimed at highlighting incorrect behaviour of the developed functionalities and integration issues.

Component testing has been performed using the following testing tools:

- Integration tests using the **Spring Test Context** framework.
- UI tests with **Karma.js**.
- Performance tests with **Gatling**.

Then, system testing similar to the one described for PNES above has been applied, the implementation of the requirements has been checked by the developers, to verify that all the functionalities requested by the end users are available. In these phases, example data and documents provided by INDESIT have been used.

The second testing activity was aimed at verifying the accessibility of the tools and any interference due to the co-existence with the other applications from the other packages.

In order to keep track and manage the detected errors and problems, the Redmine ticket managing system has been issued to share these information between the IT partners.

Figure 28 below reports an extract of the tickets generated and managed during this phase of the testing.

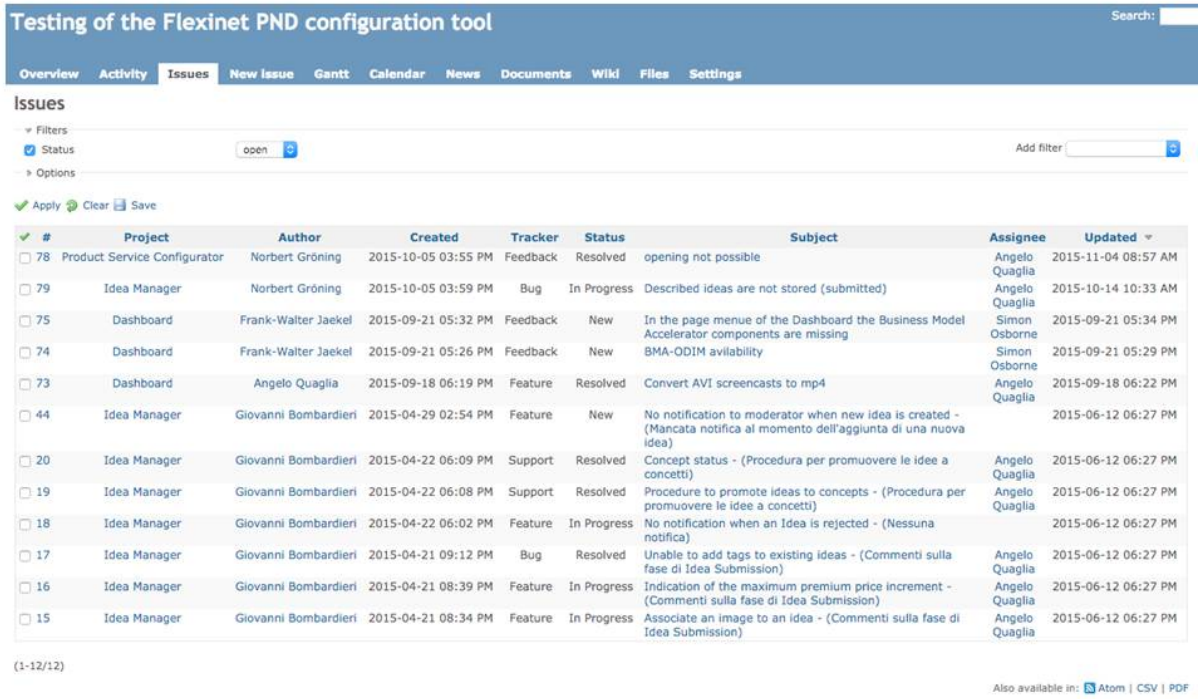


Figure 28: Problems detected during the testing of the deployed PSCoMS applications

Several improvements on the PSCoMS tools have been provided for the M24 version, partially to complete the functionalities that were not available in the version described in D5.9, and partially to solve the issues identified during the testing phase.

Idea Manager's testing has been driven by the Use Cases list defined in the analysis and design phase of the project. The testing process and the reports by the trials have been useful to recognise malfunctioning related to the role management and to the idea approval process.

The custom attribute feature has been finalised for the ideas, adjusting the layout of the related pages. The attachment feature has been refined fixing the function of avatar setting.

The Product Service Configurator has been transformed from an advanced mock up into a running application, integrated with the local database and with the document repository, where the various documents managed by the tool are stored.

The Collaboration environment was already a very mature tool at M24, thus only minor improvements have been implemented: basically, the possibility of creating templates of collaborative Obeyas and the possibility of controlling the visualisation of widgets depending on the role of the user.

4.4 Configuration and Deployment testing

In order for the FLEXINET services and applications to be tested the setup and commissioning of the project server was undertaken. This involved the identification of the infrastructure services required for the applications and services to run, their subsequent deployment and the testing that occurred to ensure the required functionality.

Table 8: shows the list of applications and frameworks that were defined by the partners developing the ERAS, PNES and PSCoMS applications and services that would need to be running on the server.

Table 8: Services deployed on the FLEXINET server

Microsoft Internet Information Services (IIS)	Webserver
Apache Tomcat 7	Application Server
Apache Tomcat 8	Application Server
MySQL	Database
PostgreSQL	Database
Microsoft SQL Server	Database
.Net Framework v4.0.3	Software framework
Java RTE 1.7.0	Software framework
Highfleet 5.0	Knowledge base / ontology
Highfleet 5.1	Knowledge base / ontology
Highfleet 5.1.1	Knowledge base / ontology

Figure 29 shows the architecture of the applications and services deployed on the server and which framework they depend upon. As the server operating system is Windows Server 2012 R2 the primary web server is Microsoft IIS which means that web requests are primarily handled by IIS and therefore they need to be ultimately handled by Tomcat then a series of rewriting rules were implemented to route the request through to the appropriate destination.

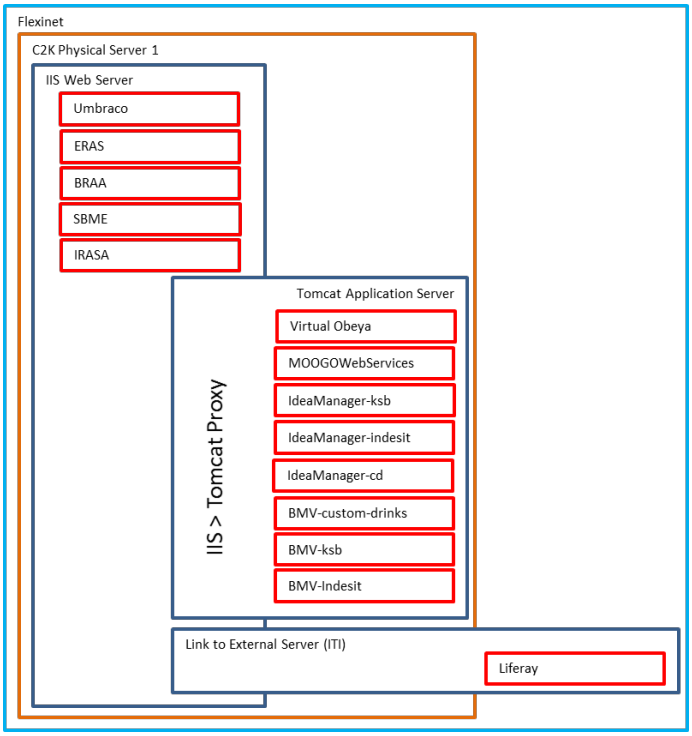


Figure 29: Software Frameworks deployed and the dependant Applications and Services

Figure 30 shows a sample of the routing rules setup to forward web request to Tomcat for the BMV component and services.

URL Rewrite

Provides rewriting capabilities based on rules for the requested URL address and the content of an HTTP response.

Inbound rules that are applied to the requested URL address:

Name	Input	Match	Pattern	Action Type	Action URL	Stop Processing	Entry Type
custom-drinks	URL path after '/'	Matches	(custom-drinks.+)	Rewrite	http://localhost:8080/bmv_{R:0}	False	Local
ksb	URL path after '/'	Matches	(ksb.+)	Rewrite	http://localhost:8080/bmv_{R:0}	False	Local
indesit	URL path after '/'	Matches	(indesit.+)	Rewrite	http://localhost:8080/bmv_{R:0}	False	Local

Figure 30: Routing of web request from IIS to Tomcat

Figure 31 shows the architecture of the databases deployed on the server and which database engine they depend upon. This includes the Highfleet system, whilst not using a traditional database is used as the primary knowledge store for all applications.

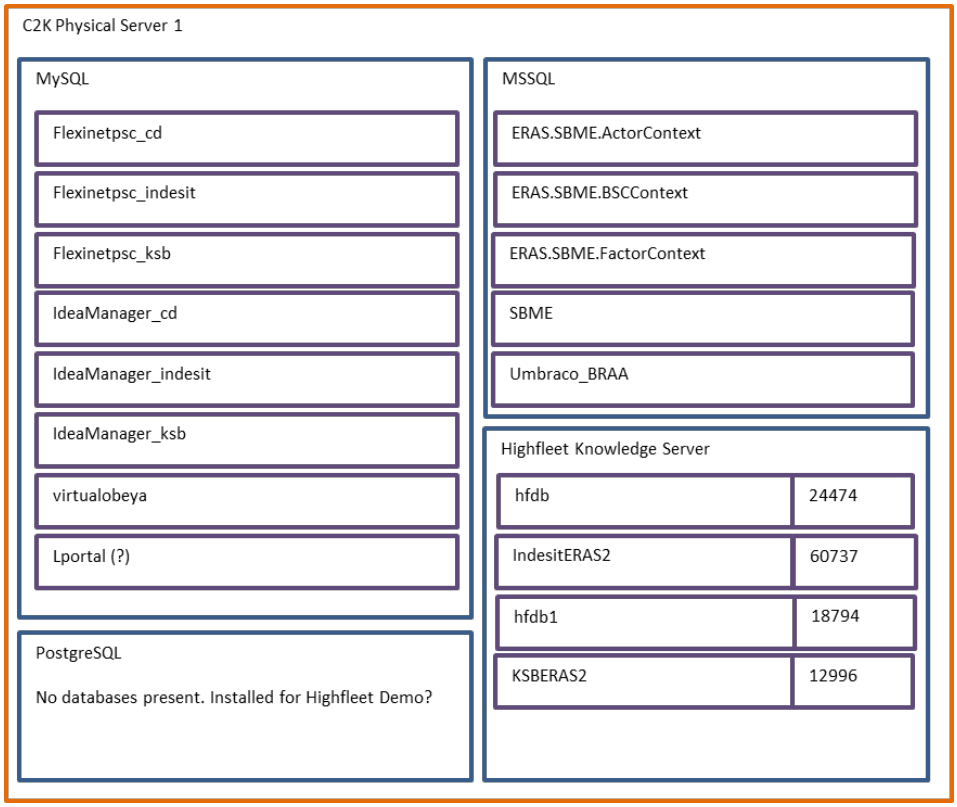


Figure 31: Database frameworks deployed and the dependant Applications and Services

Due to the quantity and diversity of the frameworks installed monitoring of the server resources under normal running conditions was carried out to maximise the amount of CPU, memory and storage resource available to the applications and services. Figure 32 shows a sample of the monitoring that was carried out weekly during testing.

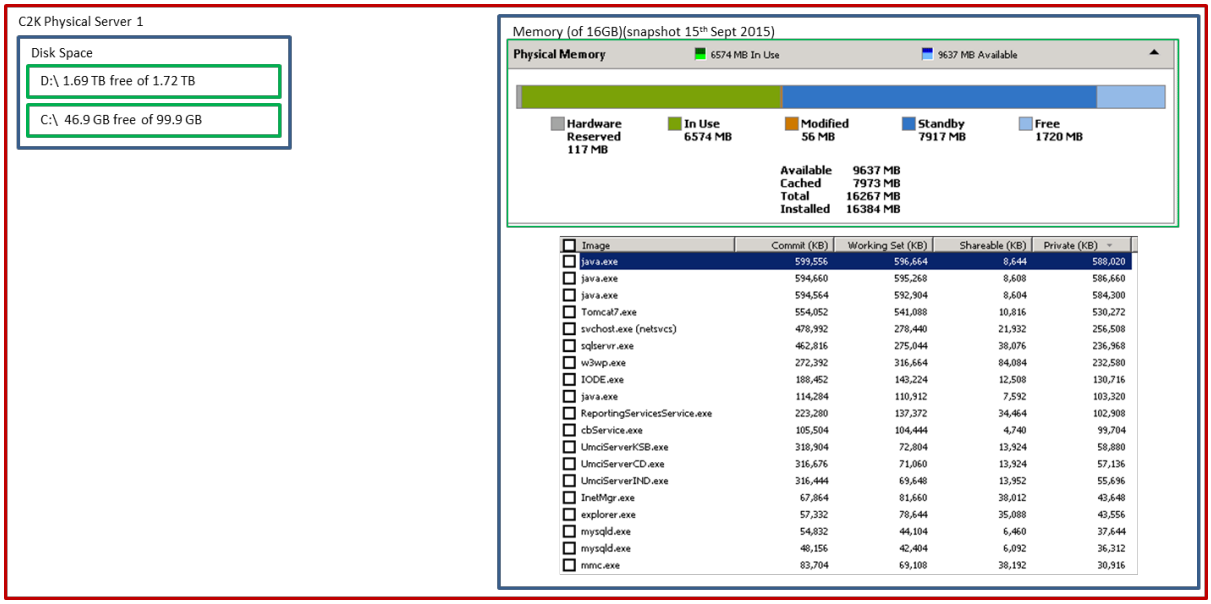


Figure 32: Server resource monitoring

In order to capture the issues raised during testing of the deployed frameworks the Redmine web application was used. This enabled tickets to be raised by all partners, and end users so that and issues encountered during deployment and testing could be captured, providing an audit trail for

outstanding items through to their resolution. Table 9: shows a snapshot summary of the activity on the Redmine system and Figure 33 shows an example of the tickets raised and how their status is tracked.

Table 9: Snapshot summary of Redmine tickets raised

Total No. of tickets	72
Tickets Resolved	11
Tickets in progress	11
New Tickets	14
Closed Tickets	36

#	Project	Tracker	Par	Status	Priority	Subject	Author	Assignee	Updated	Start date	Due date
1	Flexinet Software Deliverables	Task		New	Normal	D6.3 Results of initial servic	Angelo Quaglia		14/04/2015 17:15	14/04/2015	30/09/2015
2	Flexinet Software Deliverables	Task		New	Normal	D5.6 PND config. tool - rel.1	Angelo Quaglia		14/04/2015 17:07	01/08/2014	31/03/2015
3	Flexinet Software Deliverables	Task		New	Normal	D5.7 ERAS - release 2	Angelo Quaglia		14/04/2015 17:15	01/01/2015	30/06/2015
4	Flexinet Software Deliverables	Task		New	Normal	D5.8 PNES - release 2	Angelo Quaglia		14/04/2015 17:15	01/01/2015	30/06/2015
5	Flexinet Software Deliverables	Task		New	Normal	D5.9 PSCoMS - release 2	Angelo Quaglia		14/04/2015 17:13	14/04/2015	30/06/2015
6	Flexinet Software Deliverables	Task		New	Normal	D10 PND config. tool - relea	Angelo Quaglia		14/04/2015 18:27	14/04/2015	31/03/2016
7	Flexinet Software Deliverables	Task		In Progress	Normal	SSL Certificate on C2K serve	Angelo Quaglia		14/07/2015 19:24	15/04/2015	
8	Flexinet Software Deliverables	Task		In Progress	High	Deploy Liferay container int	Francisco Sánchez Cid	Salvador Morera Soler	27/05/2015 14:37	19/05/2015	
9	Flexinet Software Deliverables	Task		Resolved	Normal	Deploy MySQL in C2K server	Francisco Sánchez Cid	Aimée Morgan	27/04/2015 13:30	15/04/2015	15/04/2015
10	Flexinet Software Deliverables	Task		Resolved	Normal	Deploy Tomcat 7.0 in C2K Se	Francisco Sánchez Cid	Aimée Morgan	23/04/2015 19:39	15/04/2015	15/04/2015
12	Flexinet Software Deliverables	Task		Resolved	Normal	Deploy Virtual Obeya to C2k	Angelo Quaglia	Angelo Quaglia	25/04/2015 17:35	16/04/2015	
13	Flexinet Software Deliverables	Task		New	Normal	Verify all applications work	Angelo Quaglia		16/04/2015 14:35	16/04/2015	
14	Flexinet Software Deliverables	Task		Resolved	Normal	Holonix: Install internal dev	Angelo Quaglia	Angelo Quaglia	12/05/2015 18:05	16/04/2015	
15	Idea Manager	Feature		In Progress	Normal	Associate an image to an ide	Giovanni Bombardieri	Angelo Quaglia	12/06/2015 18:27	21/04/2015	
16	Idea Manager	Feature		In Progress	Normal	Indication of the maximum	Giovanni Bombardieri	Angelo Quaglia	12/06/2015 18:27	21/04/2015	
17	Idea Manager	Bug		Resolved	Normal	Unable to add tags to existir	Giovanni Bombardieri	Angelo Quaglia	12/06/2015 18:27	21/04/2015	
18	Idea Manager	Feature		In Progress	Normal	No notification when an Ide	Giovanni Bombardieri		12/06/2015 18:27	22/04/2015	
19	Idea Manager	Support		Resolved	Normal	Procedure to promote ideas	Giovanni Bombardieri	Angelo Quaglia	12/06/2015 18:27	22/04/2015	
20	Idea Manager	Support		Resolved	Normal	Concept status - (Procedura	Giovanni Bombardieri	Angelo Quaglia	12/06/2015 18:27	22/04/2015	
21	Flexinet Software Deliverables	Task		Resolved	Normal	Please configure IIS-Tomcat	Angelo Quaglia	Aimée Morgan	19/05/2015 11:45	25/04/2015	
43	Flexinet Software Deliverables	Support		In Progress	Normal	Apache httpd in front of IIS	Angelo Quaglia	Aimée Morgan	19/05/2015 12:31	28/04/2015	
44	Idea Manager	Feature		New	Normal	No notification to moderate	Giovanni Bombardieri		12/06/2015 18:27	29/04/2015	
52	Flexinet Software Deliverables	Task		In Progress	Normal	Shibboleth: Installation and	Angelo Quaglia	Angelo Quaglia	10/05/2015 08:23	10/05/2015	
53	Flexinet Software Deliverables	Task		Resolved	Normal	Please make available Tom	Angelo Quaglia	Aimée Morgan	13/05/2015 13:58	13/05/2015	
55	Flexinet Software Deliverables	Task	8	In Progress	High	Proxy to Liferay's tomcat	Salvador Morera Soler	Aimée Morgan	01/06/2015 12:43	19/05/2015	
57	Flexinet Software Deliverables	Bug		In Progress	Normal	Implement a simple menu i	Angelo Quaglia	Angelo Quaglia	17/06/2015 18:55	17/06/2015	19/06/2015
58	Flexinet Software Deliverables	Task		In Progress	Normal	Setup of the Virtual Obeya	Angelo Quaglia	Angelo Quaglia	17/06/2015 18:53	17/06/2015	
59	Flexinet Software Deliverables	Bug	57	New	Normal	Further application entries	Frank-Walter Jaekel	Angelo Quaglia	17/06/2015 20:28	17/06/2015	19/06/2015
60	Flexinet Software Deliverables	Task		New	Normal	Setup widgets for ERAS appl	Simon Osborne	Angelo Quaglia	13/09/2015 15:17	18/06/2015	19/06/2015
62	Flexinet Software Deliverables	Task		Resolved	Normal	Proxy idea manager apps	Angelo Quaglia	Aimée Morgan	23/06/2015 14:30	22/06/2015	
65	Flexinet Software Deliverables	Task		Resolved	Normal	Please configure IIS-Tomcat	Angelo Quaglia	Aimée Morgan	14/09/2015 18:46	25/04/2015	
66	Flexinet Software Deliverables	Support		New	Normal	Configure MySQL to support	Angelo Quaglia	Aimée Morgan	07/09/2015 10:05	07/09/2015	
67	Flexinet Software Deliverables	Support		New	Normal	Setup an IMAP mail server f	Angelo Quaglia	Aimée Morgan	07/09/2015 13:49	07/09/2015	
70	Flexinet Software Deliverables	Support		New	Normal	Publication of Tomcat-Webi	Fabian Brandt	Aimée Morgan	14/09/2015 18:47	10/09/2015	
71	Flexinet Software Deliverables	Bug		New	Normal	404 and 500 Errors	Fabian Brandt	Aimée Morgan	11/09/2015 09:56	10/09/2015	
72	Liferay Portal	Bug		In Progress	Normal	Cannot access the screencas	Norbert Gröning	Angelo Quaglia	13/09/2015 15:23	11/09/2015	

Figure 33: Example of Redmine tickets raised and their associated status

5 Outcomes of the validation with end users

This section reports the results of the testing of the FLEXINET applications performed with the support of the end users.

The applications, as described above, have been demonstrated to the end users (physical and web meetings) and then made available for direct usage, through the web environment set up on C2K server. The comments and feedback of the end users have been provided to the IT partners though two main channels: (i) the Redmine tool, used by the end users to create tickets every time they discovered a bug or any other technical problem in accessing or using the applications and (ii) the questionnaires provided by the IT developers to collect feedback about the tool versions provided at M24.

These testing results have been analysed by the IT providers; in the case of Redmine "tickets", they have been processed within the tool and closed whenever possible. In the case of questionnaires, the most relevant answers have been analysed and reported in this document.

5.1 Bug & Issue collection through Redmine

In order to manage the process of capturing and managing bugs and issues noted by end users and technical partners the Redmine web application was used (see Figure 34). This was installed on the FLEXINET server and was made available to stakeholders in the application setup and testing. The use of the system is quite straight forward and requires the bug or issue to be described in as much depth as possible including any error messages and URL's where they were noted. These are then appointed to an appropriate support partner, depending on whether it was infrastructure or application related.

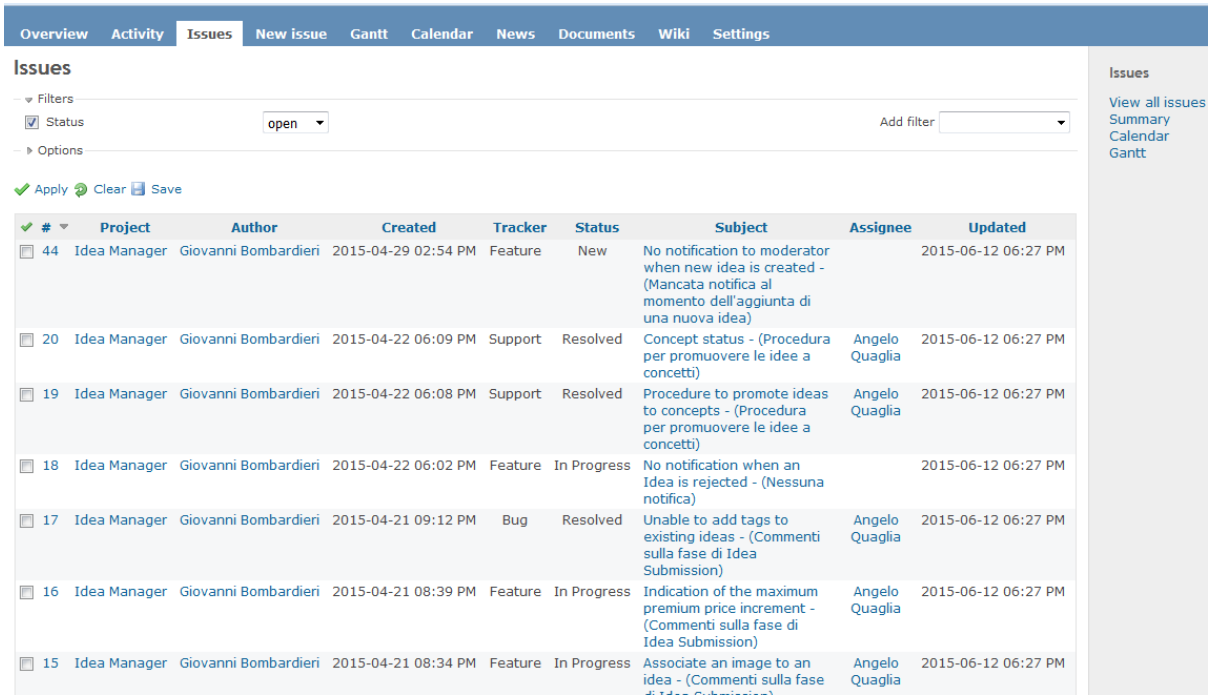


Figure 34: List of existing bugs and issues in the Redmine web application

From a high level perspective Table 10 summarises the current progress made in the resolution of reported bugs and issues. Overall over 65% of all submissions have been resolved or closed, with 15% of the remaining being tickets still in progress and the remainder being submissions received very in the last 48 hours.

Table 10: Summary of Redmine activity

Total No. of tickets	72
New Tickets	14
Tickets in progress	11
Tickets Resolved	11
Closed Tickets	36

5.2 Report of the M24-M27 phase of the testing

Table 11 below summarises which applications each end user received training for and have been tested by them.

Table 11: Applications tested by each end user

	INDESIT			**CustomDrinks**			**KSB**		
	Videos	**Webinar**	**Testing (*)**	**Videos**	**Webinar**	**Testing (*)**	**Videos**	**Webinar**	**Testing (*)**
ERAS	X	X	X (All)	X	X	X (All)	X	X	X (All)
PSCoMS	X	X	X (All)	X		X (IM PSC, UEA)	X	X	X (IM, PSC, UEA)
PNES	X	X	X (All)	X	X	X (All)	X	X	X (All)

(*)Testing applications made accessible on the C2K server and reporting feedback in the questionnaires.

5.2.1 Report on ERAS testing

The results provided by End-Users are outlined in this section with the applications analysed listed below:

- Initial Risk Analysis Specification Application (IRASA)
- Business Rules Authoring Application (BRAA)
- Strategic Risk Assessment Application (SRAA)
- Strategic Business Model Evaluator (SBME)

Users were provided a link to the online Questionnaire from which their opinions were collected, some samples from these results are provided below. Overall two user questionnaires were gathered, key excerpts are analysed below in order to draw conclusions regarding what worked well, where improvements are needed and where bugs or faults were identified. This will be used to focus further development of the ERAS applications in line with the development work undertaken in D5.10.

Figure 35 shows responses on users defining an incident in Initial Risk Analysis Specification Application. One user found the process easy however intermittent faults caused during saving to the underlying knowledge base meant that an error was displayed to the other user and prevented that action from occurring. Further investigation is required to eliminate such underlying issues.

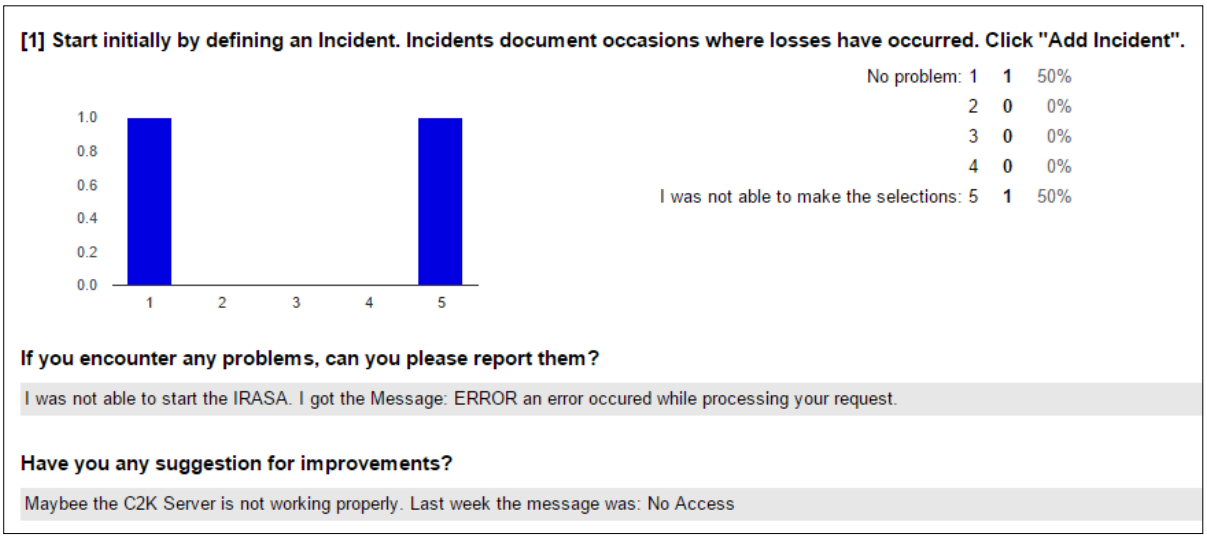
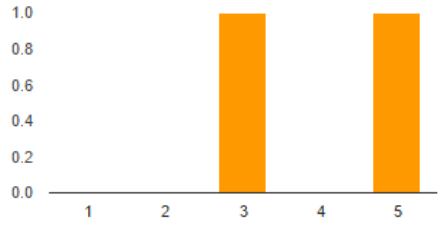


Figure 35: Responses on defining an incident in IRASA

Figure 36 shows responses relating to a user defining dependencies between GPN nodes in the Initial Risk Analysis Specification Application. For one user that same technical issue prevented them from performing the function whilst the other was able to do so, however found that the data was not customised sufficiently so that it was not as relevant to the INDESIT Use Case. This will focus effort on this topic, with the need to better account for the outcomes of D6.2 Service Customisation.

[2] As part of an analysis the dependencies between nodes also needs to be configured. Back at the initial IRASA page select a GPN from the "GPN Risk Settings" list to begin, then select an organisation to define its dependencies by clicking the "Dependencies" button.



No problem: 1	**0**	0%
2	**0**	0%
3	**1**	50%
4	**0**	0%
I was not able to make the selections: 5	**1**	50%

If you encounter any problems, can you please report them?

I am Indesit person, but the tool haven't Indesit information. So, I understand what I should do, but it isn't correct for Indesit case. Added functionality 1: create the Indesit GPN to do the risk assessment Added functionality 2: link this tool with PNES

see above: I was not able to start the IRASA.

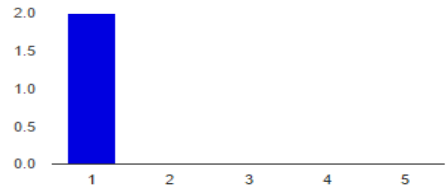
If you encounter any problems, can you please report them?

I propose to test the IRASA on an other server.

Figure 36: Responses on defining dependencies between GPN nodes in IRASA

Figure 37 shows the responses gathered relating to a user selecting concepts that they wish to specify thresholds of acceptability using the BRAA. Only one user provided feedback on this feature, however the comment was positive in that it was easy to perform.

[1] The first thing you need to do is select a concept that you wish to include in you business rule, View the list of concepts and make a selection.



No problem: 1	**2**	100%
2	**0**	0%
3	**0**	0%
4	**0**	0%
I was not able to make the selections: 5	**0**	0%

If you encounter any problems, can you please report them?

Have you any suggestion for improvements?

This is really simple to do.

Figure 37: Responses on selecting concepts in BRAA

Figure 38 shows the responses gathered relating to a user selecting the external factors that they wish to specify opinion on a threshold that would be considered acceptable. The feedback from two users was very positive, however the comment was made that threshold values need to be better defined to explain what they relate to. It should be noted that the STEEP application would need to make available that information where it is available.

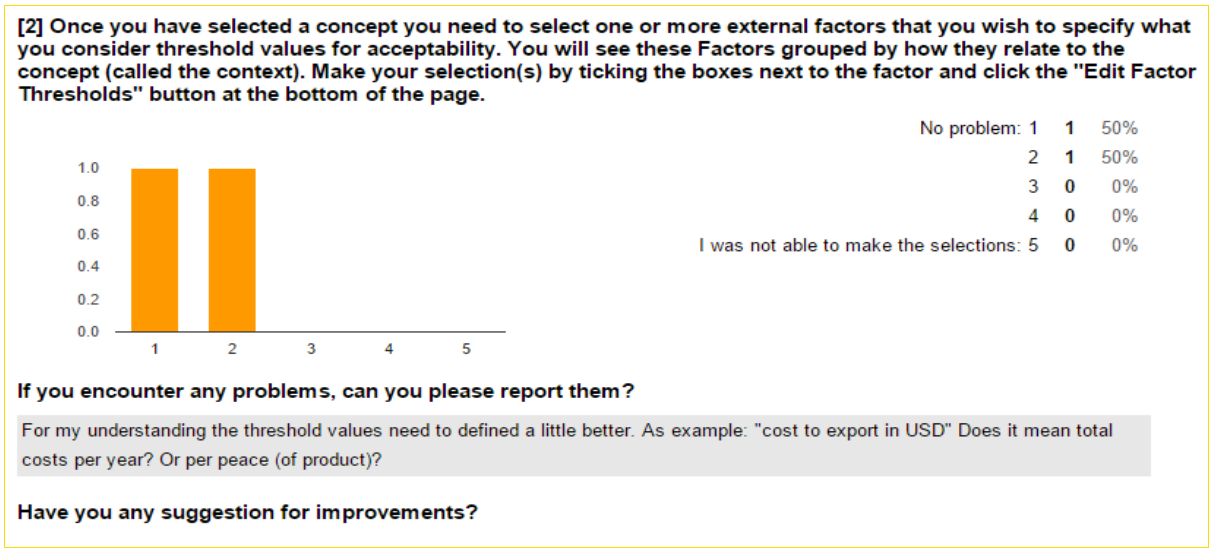


Figure 38: Responses on selecting external factors to set thresholds for in BRAA

Figure 39 shows the responses gathered relating to a setting up a scenario in the SBME including indicating the total possible score to be divided up. One user was positive about the functionality describing it as "easy", which the other reduced the feedback due to a "hidden command" which will require additional clarification on to understand the changes required.

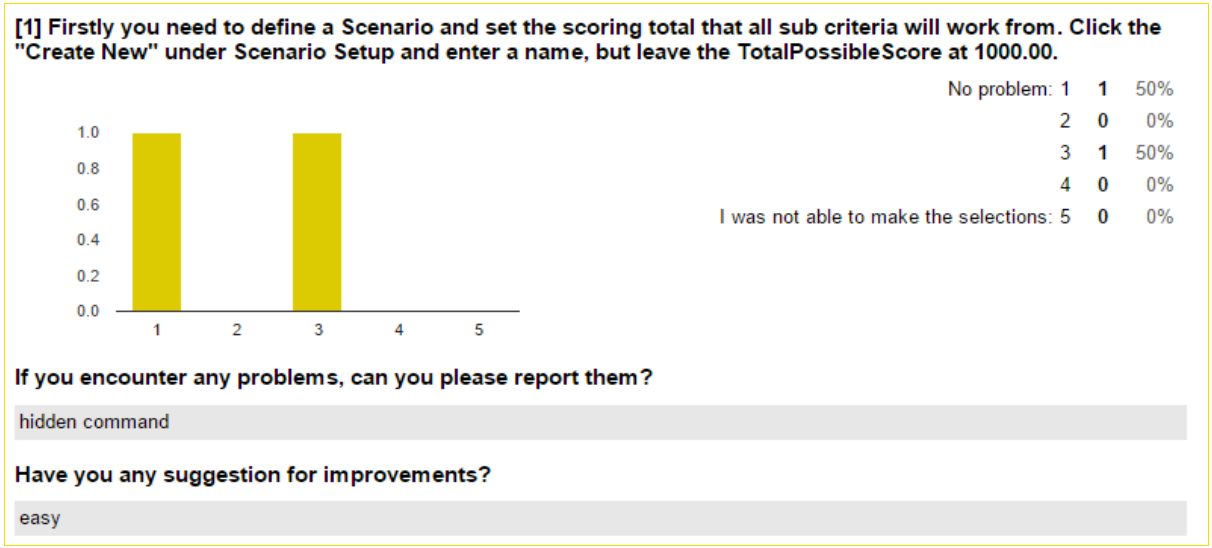
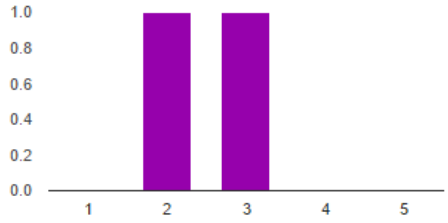


Figure 39: Setting up a Scenario in SMBE

Figure 40 shows the responses gathered relating to adjusting the performance factors for an existing country node in the SBME. The feedback indicated average feedback suggesting that the quantity of factors was too high, and the other that it was difficult to understand the motivation and knowledge required to change this values. Further feedback suggested indicating where in the overall workflow of using FLEXINET this function would occur.

[3] The next step is to configure one of the existing GPN nodes which are represented by the list of countries in the Actor Setup panel. Click the "Configure" button then make adjustments to the performance of that node against a list of Factors.



No problem: 1	0	0%
2	1	50%
3	1	50%
4	0	0%
I was not able to make the selections: 5	0	0%

If you encounter any problems, can you please report them?

Too parameters to evaluate

Here I lost once more a little bit the overview and had to study the sreencast more intensif. The individual entries are easy to make, but what and why I make just these entries was not really clear to me.

Have you any suggestion for improvements?

I think that for the first time of using this tool, it would be necessar to give some more information about the "Position" in the workflow.

Figure 40: Feedback on adjusting the performance on GPN node in SBME

5.2.2 Report on PNES testing

Results provided by End-Users are presented below. The applications analysed have been the GPN configurator, Technology Effect Analyser configurator and Technology Effect Analyser. Users were requested to fill in a list of tables (see 2.1.3.3) and provide suggestions. Results are presented by End-Users in the following pages.

5.2.2.1 INDESIT

Results collected by INDESIT (see Figure 41 and Figure 42) show that they experienced problems with the usability of the application. They also pointed out the necessity to link via application the TEA Analyser and the Idea Manager.

Test 1		
Menu-Item *Categorization -> Basics*	Create and delete categories of basics.	
Test purpose	Check Functionality and Usability of the menu-item Categorization -> Basics.	
User	*Indesit*	
Date	*September*	
Usability	*[1: Easy to Use - 5: Difficult to Use]* ○1 ○2 ◉3 ○4 ○5	
Incidents	*Problems to create a new basic, defining a categories already created in another section (for example inside "system")*	
Suggestions for Improvement		

Figure 41: INDESIT - Detail of the questionnaire output for CFG configurator

Test 1	
Menu-Item *Add*	Add a new Product Specification to test GPN availability in current GPN configuration
Test purpose	Check Functionality the menu-item Add New Product Specification.
User	*Indesit*
Date	*September*
Usability	*[1: Easy to Use - 5: Difficult to* ○1 ○2 ◉3 ○4 ○5
Incidents	*The same problem to create the basic: the system doesn't identify categories already defined inside another section!!*
Suggestions for Improvement	*Link this tool with the Idea manager tool in order to process the ideas assessed into the Idea Manager*

Figure 42: INDESIT - Detail of the questionnaires output for TEA application

5.2.2.2 Custom Drinks

Figure 43 shows detail of the results provided by Custom Drinks. In this case, Custom Drinks experienced that creating the configuration of the network from scratch was a difficult task. They observed that it would be helpful to have more descriptions (help context) added to the buttons of the applications and reported to the developers additional bugs not found in previous phases of the testing.

Test 3	
Menu-Item *Edelete*	Delete an existent Product Configuration
Test purpose	Check Functionality the menu-item Delete Product Specification.
User	*CD*
Date	*14/09/2015*
Usability	*[1: Easy to Use - 5: Difficult to U* *[Suggestions for improving the use of the application]* ◉1 ○2 ○3 ○4 ○5
Incidents	*The product selected doesn't desapear*
Suggestions for Improvement	

Test 1		
Menu-Item *Categorization -> Basics*	Create and delete categories of basics.	
Test purpose	Check Functionality and Usability of the menu-item Categorization -> Basics.	
User	*CustomDrinks*	
Date	*September*	
Usability	*[1: Easy to Use - 5: Difficult to Use]* ○1 ○2 ◉3 ○4 ○5	
Incidents	*the information was not correctly stored, the button didn't work, it took too long...*	
Suggestions for Improvement		

Figure 43: Custom Drinks - Detail of the questionnaires output

5.2.2.3 KSB

Figure 44 and Figure 45 shows some details of the feedback reported by KSB. They reported in the questionnaires some problems with the usability of the application and specific functionality. Additionally, they explained some improvements that would help to the final user of the application with the configuration.

Test 1		
Menu-Item *Categorization -> Basics*	Create and delete categories of basics.	
Test purpose	Check Functionality and Usability of the menu-item Categorization -> Basics.	
User	*KSB*	
Date	*29/09/2015*	
Usability	*[1: Easy to Use - 5: Difficult to Use]* ○1 ○2 ○3 ○4 ◉5	*[Suggestions for improving: I the PNES_APP.mp4 it is said, that (the list of basics already stored in the Knowledge Base will appear on your sreen). This is not the fact on using the flexinet.biz !!! Therefore it would be helpfull to have a definition of the tags.]*
Incidents	*[In the chapter heading: We see in the webinar PNES_APP.mp4 : "Name" ; in the fexinet.biz : "Basic". This is a bit confusing. Therefore my personel assessement of the usability = 5] The basic entry of the terms is easy (=1).*	
Suggestions for Improvement	*The previous definition of: Basic; Type and Category would be helpful. BTW:(Basic declared: basics are the foundamental building blocks of your system. The basics created here can be added as input, output or resource to your system, when defining them.) Type and category should be briefly described.*	

Figure 44: KSB - Detail of the questionnaires output for PNES applications Test 1

Test 4		
Menu-Item *Systems*	Create, edit and delete Systems	
Test purpose	Check Functionality and Usability of the menu-item Systems	
Test Steps	Go to Menu System and click on Add button. Follow the instructions and create (edit and delete) Systems of your interest.	
Expected Results	The system created by the user must appear on the screen to be edit, deleted or used by other functionalities.	
User	*KSB*	
Date	*19/09/2015*	
Usability	*[1: Easy to Use - 5: Difficult to Use]* ○1 ○2 ○3 ◉4 ○5	*It was initially not easy to determine the required system components from the predefined input masks. Once I created two times the same component as Input, and wanted to delete one of them.*
Incidents	*It was not possible for me, to go directly back to the sreen (create,edit and delete basics (names)). I always were redirected to the sreen (Manage your Systems). Later i have seen, that I have to choose the Submenue of the GPN Configurator to add a new component(as Input)*	
Suggestions for Improvement		

Figure 45: KSB - Detail of the questionnaires output for PNES applications Test 5

Conclusions on PNES testing by the end users

In general, the three End Users have a positive impression of the applications. However, they reported, in the three cases, usability problems as well as several bugs found during the process of testing. Additionally, improvements in the functionality of the application have been reported to the

development team to be included in the final release of the application. Improvements in regard to the usability of the application will be considered as well.

In terms of BMA and OBMC the tests illustrate a clear lack of usability and clearness of the workflow especially from the tests of KSB and INDESIT. An example is that inputs needs to be confirmed in different ways and several times before they are stored. Additionally, feedback is missing, such as asking for commitment in terms of deleting an element. In general feedback to the end user by provided the system is not sufficient.

Related to a sufficient application development it was a very helpful exercise to get direct end user feedback. In some cases it was possible to participate in the end user sessions which provided direct feedback to the developers. The next step is to improve the system accordingly.

Another aspect is that the usage of the tools needs to be better introduced. This is also a task for WP2 and WP4 to clarify the usage of the methods. From this feedback WP4 has introduced a work item "implementation approach" to express the usage of the methods. This will be documented in D4.2.

Currently the focus was on the core functionalities of the applications. Therefore the end user findings were important to improve the acceptance of the applications. The next version of the user interfaces will take into account these findings of the end user.

5.2.3 Report on PSCoMS testing

This section reports the results of the technical validation performed by INDESIT, KSB and Custom Drinks on the Idea Manager, Product Service Configurator, User Experience Analyser and Collaborative Environment applications. As described in section 2.1.3.1, users have been requested to fill in some online forms to report on the correctness of the implemented functionalities and to provide comments and suggestions for further improvements.

5.2.3.1 INDESIT

INDESIT tested all the applications of the PSCoMS package and reported the feedback in the questionnaires and through some short interviews, the main outcomes of this are set out in Table 12 below.

Table 12: outcomes of PSCoMS testing by INDESIT

Application	Detected problems	Suggestions	Corrective actions
Idea Manager	NONE: All the tested functionalities are working properly	"*I would like to have, the possibility of modifying also the ideas of my colleagues, not in the main fields, but providing an added field where I can add some information or setting the focus of that idea*"	This can be done by introducing custom attributes describing an idea
		"*The roles are too many and it is confusing to manage them: Make the role management more straightforward*"	HX is simplifying the management of roles, when not all the available ones are necessary to the customer.
		"It is important to inform the owner of an idea about its status and also to keep track of the incremental versions of an idea/concept"	This will be considered for future version, as it is an interesting but not trivial evolution
Product Service Configurator	Changing the status of a document and adding comments is considered not easy	Additional training was requested; Moreover: "*When I am inside the concept screenshot I can't back to the home, so why is there the "back" tab*?"	All the notified problems have been investigated. A new version of the tool has been released in November 15, fixing the problems concerning the document uploading and status management. The other problems notified by INDESIT were related to configuration issues of the deployed application.
User Experience Analyser	NONE: All the tested functionalities are working properly	No specific comment	
Collaboration Environment	Creation of a new Obeya and of a new widget is not possible; all the other functionalities are working properly		This problem was related to the role assigned to INDESIT for the testing activities; it has been solved and now INDESIT can create Obeyas and widgets.

		I suggest creating the "cancel" and "modify" tab to eliminate or change an existed category inside the widget template. Currently I can also add a new category, and it may be a limit for using this tool.	This functionality is not yet available, but its implementation is under evaluation.

Note: the test in italic reports exactly the content of the questionnaires.

5.2.3.2 KSB

KSB experienced some problems with accessing the tools online from within the company IT environment. But, a web call with Holonix on 05.11.15 (refresh problems with the browser) solved this problem (refresh problems with the browser) and KSB received additional training on the usage of the PSC. After this meeting, KSB was able to complete the testing in a more complete way. The main results of this are set out below in Table 13.

Table 13: outcomes of PSCoMS testing by KSB

Application	Detected problems	Suggestions	Corrective actions
Idea Manager	KSB experienced some problems with the login procedure.	NONE	A meeting has been held specifically with KSB people to solve the problem, due to refreshing problems in the browser. Users will be suggested to use the more recent versions of the browsers. However, still some instability of the login procedure remain and are under investigation

	KSB also reported problems in the creation of new roles and adding a new idea to an existing concept **All the rest is working properly**		These problems were not bugs in the application, but were due to lack of appropriate training. Improvements in the training material will be done, to make more clear how to execute these operations and, in addition, the interface will be analysed to identify how making these functionalities more intuitive
Product Service Configurator	The application works correctly	"*We need a more understandable naming In the menus*."	The names of the tabs represent phases of the process for the transformation of a concept into a prototype. They might be different from one company to another one. For the business validation, customised versions will be provided.
		The usage and meaning of values under the "Entities" menu is not clear	These elements have been included in the PSC to manage the relational DB for the concept creation. It will be removed as soon as the integration with the IM is completed.
User Experience Analyser	No problem detected	Integration with the concepts managed by the IM and PSC is requested	HX is working on such integration, so that concepts that are analysed and finally approved in the PSC configure automatically the UEA to collect feedback and issues about them.
Collaboration Environment	Not tested		

5.2.3.3 Custom Drinks

Customer Drinks worked on the technical validation of the Idea Manager and Product Service Configurator, that they plan to use as an internal tool for collecting and sharing new product requests from customers and prospects (Idea Manager) and for managing feasibility assessments and product specifications (Product Service Configurator) across different departments and teams. Thus, their interest in Idea Manager was really high and they suggested some improvements in order to make it more effective to support their internal process of customer request management that is not exactly an Open innovation approach, as customers, suppliers and other stakeholders are not expected to interact with the tools directly, but rather it is the account manager or marketing department that inserts and manages the new ideas in the tools. The main outputs of this are described in Table 14.

Table 14: outcomes of PSCoMS testing by INDESIT

Application	Detected problems	Suggestions	Corrective actions
Idea Manager	NONE	Keep track of the reasons why an idea (request of a new product) has been rejected	Rejection reasons could be inserted by Manager, but only the most recent one is visualised. However, all the comments can be stored and visualised to represent the history of an idea or concept.
		"I wonder if it is possible to access the Collaboration Environment from the Idea Manager. The reason is use the collaborative platform to support the discussions and register the decisions made during feasibility studies, sales studies"	An Idea Manager widget is now available in the Collaboration Environment
		"Idea Groups: Ideas can be grouped into groups, and groups can be further sub-divided into sub-groups, etc. This represents a hierarchical element for structuring ideas in an idea tree"	For the moment, concepts can be used to group idea. The development of a tree-structure is interesting but complex to be implemented within the scope of the project
		"Forum: Ideas can be subject to discussions. Performed in Web-based forums. Therefore, the relation of any postings to a forum and the concerned idea should be stored" "Open the idea ranking to the social media and select the user environment where evaluating the idea. Link also with the UEAA"	For the moment, "like-based" evaluating mechanism is available. The possibility of including comments in a more chat-like way has not been considered
Product Service Configurator	NONE	Define and establish the sequence for the product configuration (workflow) and the	The possibility of selecting templates of documents will be

		steps to be completed. Also templates or documents type for each step	evaluated
		Alert management for involved users to check pending operations	This functionality is under development
User Experience Analyser	NONE	To provide predefine value types and values for expected results of the evaluation	This functionality will be considered for implementation
Collaboration Environment	***Not tested***		

5.3 Deviations and suggested improvements

5.3.1 ERAS package

From the results gathered during the user testing and feedback of the ERAS application (IRASA, BRAA, SRAA, SBME) the following actions need to be taken to deal with the comments and suggestions:

- Improve description about what the purpose of each action is, alleviating the need to refer to the Screencast support material or support staff to explain.
- Better indicate and remind where the user is in the workflow of the overall FLEXINET platform.
- Fix the bugs noted by the end users.
- Improve relevancy of the build in data to cater for the end user customisation needs.

5.3.2 PNES Package

Having in mind the output provided by the End Users, PNES applications (GPN and STEEP analyser configurator and TEA app) need to be revised with the following points:

- List of improvements related with usability problems reported by End-Users.
- Fix the list of bugs reported.
  Additional improvements in functionality will be updated (e.g. Analysis of multiple GPN configurations).
- More descriptions are needed (missing "help context") when creating configurations or new products. This point will be improved in the final version.

Additionally, the next phases in the project involve the validation of FLEXINET applications. PNES applications will be validating on the context of the storyline presented in Figure 46 and against the test cases (user oriented and based on the use cases) that will be defined and executed by end users. The procedure will be similar to the one presented in this deliverable.

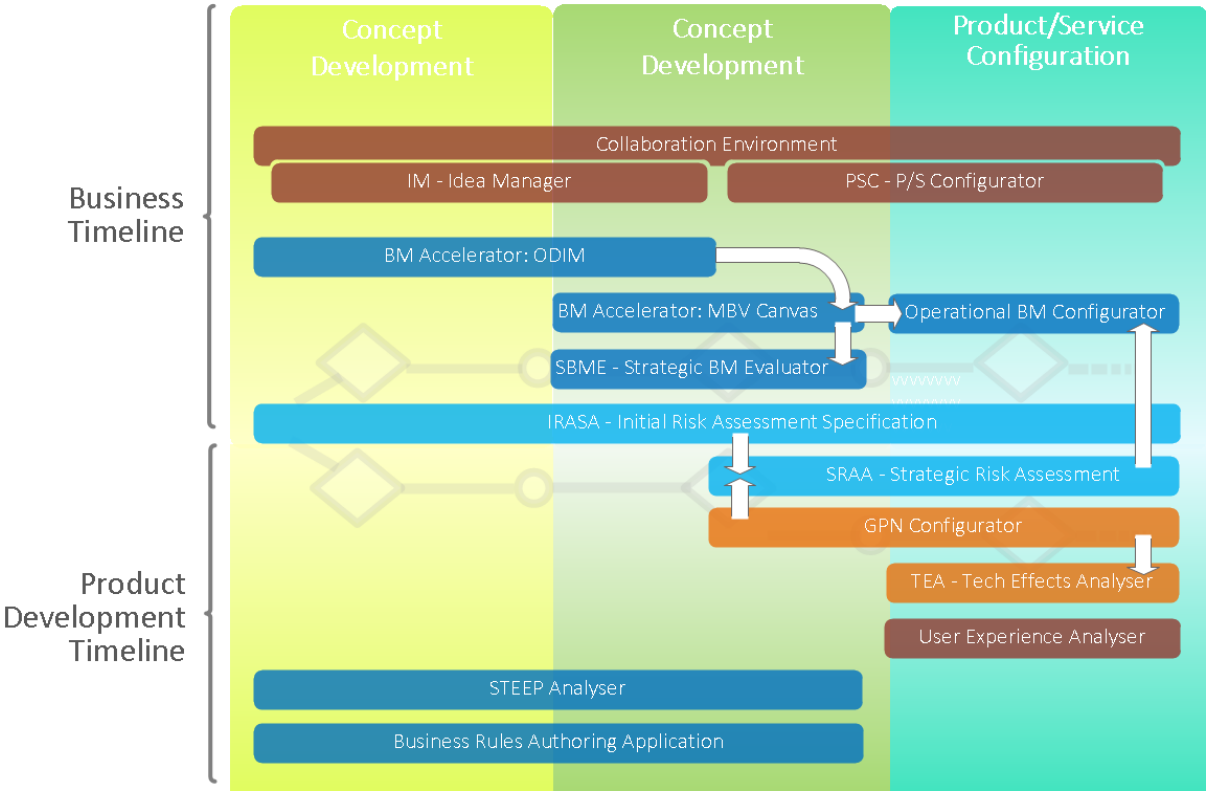


Figure 46: Flexinet Storyline

At request of the end users a more application like description of the use of the business model related PNES applications has been produced see Figure 47. It illustrates the major activities as well as the core input and output relations. For example ODIM might be used to define the company strategic objectives. Afterwards these objectives will be more detailed related to the business models defined in the MBV. However both MBV and ODIM use the ideas arriving from the Idea Manager as input. Finally in MBV the objectives will be used in the evaluation process for business models to find the most adequate business model. This also implies the EM fragments to define the business processes and organisational structure for the GPN which will be transferred to the GPN configurator. During this process also strategic business model analysis and risk analysis are applied.

An important point is the confidence in the evaluation of business models by the end users which will be further motivated by experiences and clarifying the methods for the end users. This will be further strengthened by business oriented tutorials and direct interactions with the end users.

In general the tutorials such as the videos were very much welcomed by the end users.

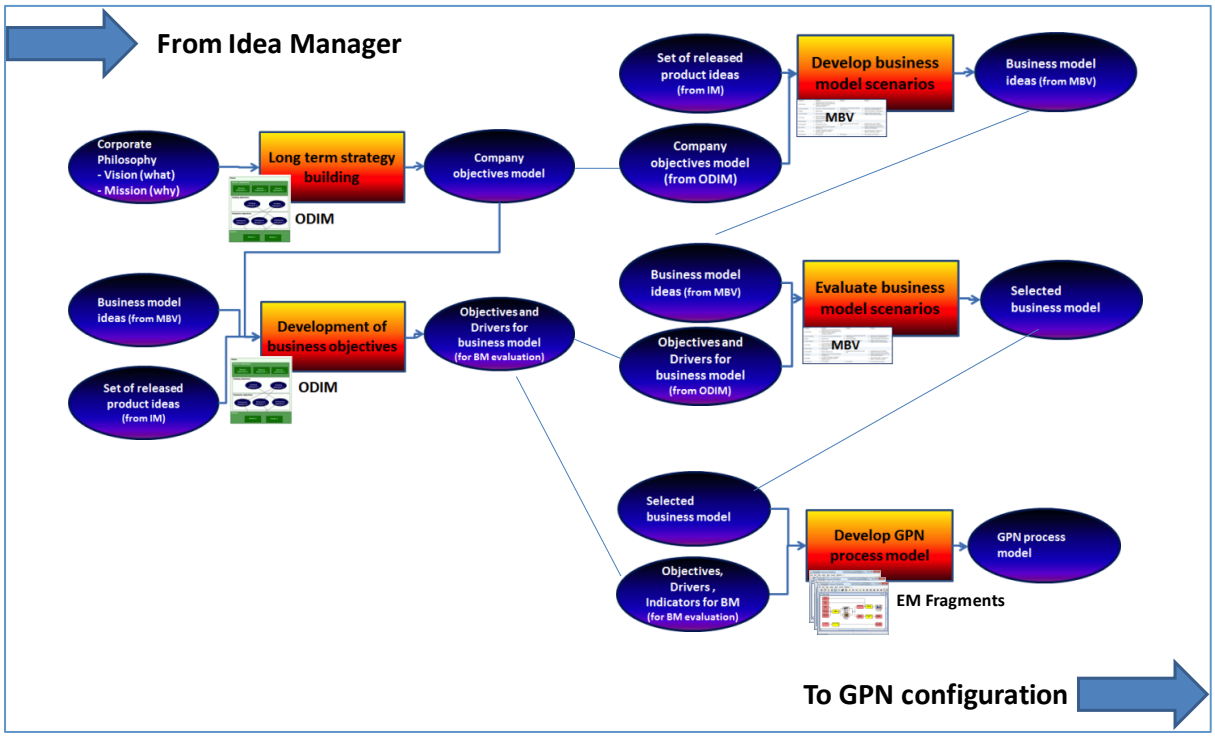


Figure 47: Workflow related to ODIM, MBV and the enterprise model (EM) fragments

ODIM and MBV require a significant update of the user interface in terms of usability. This is currently underway. A further point is to guide the end user across the FLEXINET application but especially inside the applications. This will be a point of further improvements to archive a higher maturity level of the applications. In fact the user should be aware of what each of their input means in terms of the whole approach from the idea to the GPN.

OBMC is still available in a client server manner and not directly via web. This was no significant drawback for the tests because the model could be manipulated directly on the server. But the visibility of the interrelation between the process model and the business model is desirable. Therefore, the implementation of the web interface is intensified.

5.3.3 PSCoMS Package

The three end users provided useful feedback demonstrating that some tools are at a very advanced level of development (Idea Manager and Collaborative Environment), whilst some other ones still need improvements relating to usability, as it was difficult for them to understand how to properly access and use some functionalities.

Thus, some actions are common to all the tools and are propaedeutic to the preparation of an optimal environment, where also "new" people, not involved in the project so far, will be involved:

- Fix the bugs noted by the end users: several of them have already been fixed during the T6.3 testing activities and were related to the issues of deploying the tools on the web server.
- Adopt the terminology that is more intuitive where possible, avoiding ambiguity (e.g. the use of the term "concept" compared with "idea", and the meaning of the word "document" in the PSC must be clarified).
- Pre-populate the tools with some examples of data, to clarify the information/document managed by specific functionalities.

- Make the usage of the tools as close as possible to the business processes of the end users and streamline it: for example, the PSC interface (see Figure 48) should provide continuity with the Idea manager, and give clear visibility of the workflow process, in addition to the available tab-based representation.
- Mechanisms or warnings and reminders to alert users about pending actions (ideas to be approved by the Manager in the Idea Manager or documents to be uploaded in the PSC or relevant new comments in the UEA, see Figure 49).
- Improvement of the usability of the tools and of the intuitiveness of the interfaces, making coherent usage of icons, terms and symbols throughout the PSCoMS tools and, if possible, also across packages.

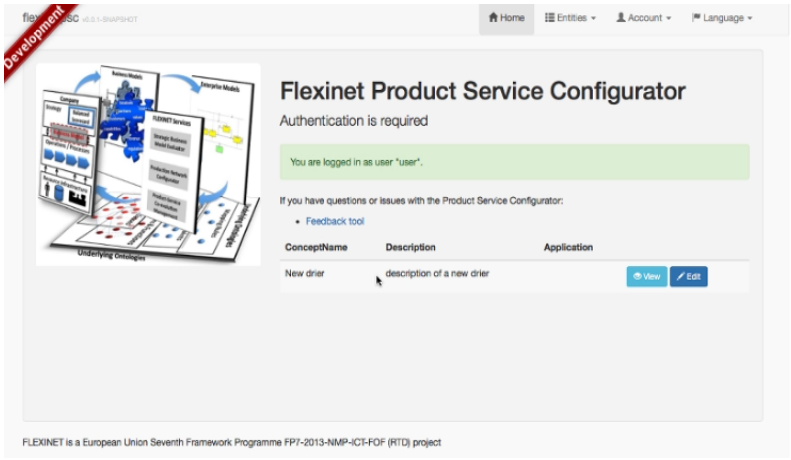


Figure 48: landing page of PSC

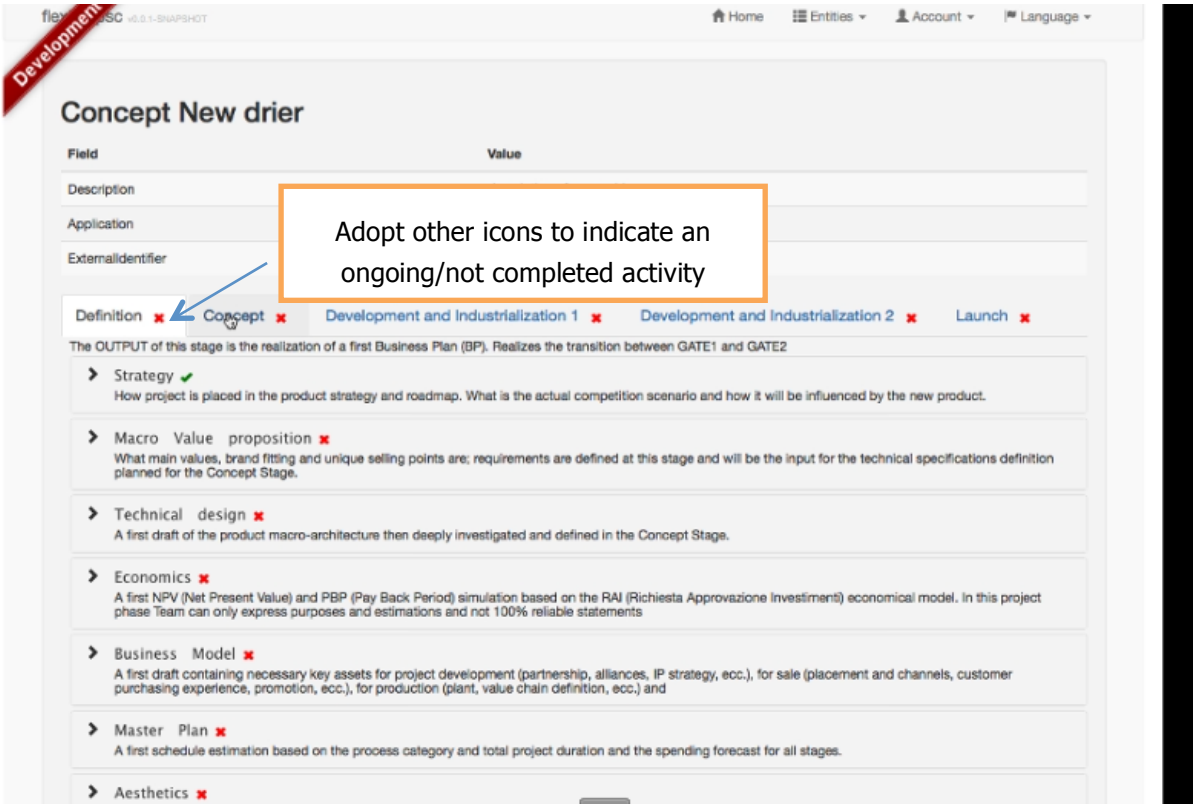


Figure 49: example of possibly misleading icons

As for the specific tools, general conclusions are:

- The IDEA MANAGER is a mature and complete tool, for which just minor adjustments are requested, some of them to be considered as suggestions for future improvements, not foreseen at requirement definition time, some other ones (notifications to the manager when new ideas have to be moderated, revision of the login procedure) are under development. Usability is not a major issue (even if the association of an idea to an existing concept could be more intuitive) and all partners judged it intuitive to be used.
- The PRODUCT SERVICE CONFIGURATOR evolved very much in the last period and it is almost complete in terms of available functionalities. However, it is less intuitive to use and the selected terminology has to be revised and adapted for users.
- The USER EXPERIENCE ANALYSER is considered easy to use and intuitive, however, it will be more valuable when integrated with the PSC.
- The COLLABORATION ENVIRONMENT is easy to be used and complete in terms of functionalities. However, the ease of use of the configuration part should be improved.

6 Conclusions

The technical validation of the WP5 results, released at M24, required some additional time with regard to what was originally planned in the DoW, as it has been decided to actively involve the end users in experimenting with the released prototypes and to provide feedback about the correctness and completeness of the functionalities.

Such activity required an intensive preparation period, just after the release of the software, not only to deploy the tools into the PND tool, but also to train end users on the various applications and to agree on the testing and reporting methodology.

The IT partners firstly prepared a unique access point for the end users, where INDESIT, KSB and CustomDrinks could find a personalised dashboard with access to the applications, to some training material (videos) and to the questionnaires for reporting feedback. In addition to that, webinars have been conducted and a ticketing system has been set up to collect issues generate by the IT developers (mainly related to problems with the deployment of the many different applications together with their execution environment on the same machine) and by the end users.

The overall result of these activities demonstrate that the ERAS, PNES and PSCOMS applications have already reached a high level of maturity and acceptance by the end users although the usability and intuitiveness of the tools might be improved.

Moreover, several suggestions for improvement and enrichment of the applications have been collected and analysed, to select those ones that are more critical and therefore must be implemented before the end of the project and possibly provided to the end users (at M30) before completing the business validation in WP7.

The difficulty in quickly understanding the use of functionalities and applying them to real businesses will be overcome in the upcoming months thanks to:

- Fixing of bugs and improving the reliability of the tools.
- Population of the applications with real data, documents and information, used in the real scenarios of the end users.
- Development of additional training material and preparation of some intuitive story lines, explaining the usage of the different applications in the main steps of the business processes.
- Integration of the applications among them and with the Knowledge Base that will enable the seamless flow of data and information among the tools.

The above elements will guide the end users in understanding which/how tools have to be used in each phase of their business processes.

Finally, the outcomes of the T6.3 activities and in particular the experience gained in involving end users in the technical validation of the results will be leveraged to better prepare and conduct the business validation in WP7.