Deliverable D400.5

Final Report on Trial Experimentation and App Development and Updated Plan for Phase 3 Rollout

WP 400

Status: Final

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FIspace Project

As a use case project in Phase 2 of the FI PPP, FIspace aims at developing and validating novel Future-Internet-enabled solutions to address the pressing challenges arising in collaborative business networks, focussing on use cases from the Agri-Food, Transport and Logistics industries. FIspace will focus on exploiting, incorporating and validating the Generic Enablers provided by the FI PPP Core Platform with the aim of realising an extensible collaboration service for business networks together with a set of innovative test applications that allow for radical improvements in how networked businesses work in the future. These solutions will be demonstrated and tested through early trials on experimentation sites across Europe. The project results will be open to the FI PPP program and the general public, and the pro-active engagement of larger user communities and external solution providers will foster innovation and industrial uptake planned for Phase 3 of the FI PPP.

The project will lay the foundation for realizing the vision and prepare for large-scale expansion, complying with the objectives and expected results of the Phase II use case projects. To achieve these outcomes the project will focus on the following four primary work areas, for which the main concepts and approach are outlined below:

1. **Implement the FIspace as an open and extensible Software-as-a-Service solution** along with an **initial set of cross-domain applications** for future B2B collaboration, **utilizing the Generic Enablers** provided by the FI PPP Core Platform
2. **Establish Experimentation Sites across Europe** where **pilot applications are tested in early trials** from the **Agri-Food and the Transport and Logistics** domains
3. **Provide a working Experimentation Environment** for conducting **early and large-scale trials** for Future Internet enabled B2B collaboration in several domains, and
4. **Prepare for industrial uptake and innovation enablement** by pro-active engagement of stakeholders and associations from relevant industry sectors and the IT industry.

Document Summary

This document is being submitted as specified in the FIspace Description of Work (DoW) as part of deliverable D400.5 – update progress report on trial experimentation and App development and updated work plan.The document provides an overview of the experimentation effort and results of the eight trials.It includes a detailed work plan for the work package containing the activities and milestones of the work package as well as for each trial.

Project Consortium

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Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Change History

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001	Creation of the Document	12.12.2014
002	First Draft	20.3.2015
003	Second Draft	17.4.2015
004	Third Draft	28.4.2015
005	Final refinement of the Document	30.04.2015

Abbreviations

App	Application		IPR	Intellectual Property Rights
B2B	business to Business		ISO	International Standardization Organization
BPM	Business Process Management		KPI	Key Performance Indicator
D	Deliverable		LDD	Large Digit Display
DLO	Dienst Landbouwkundig Onderzoek		LSC	Logistics Service Consumer
DoW	Description of Work		LSP	Logistics Service Provider
e.g.	Exempli gratia = for example		M	Month
EC	European Commission		MIP	Meat Information Provenance
EDI	Electronic Data Interchange		PC	Personal Computer
EPCIS	Electronic Code Information Service		PInfs	Product Information Service Baseline App
ESB	Enterprise Service Bus		QR-code	Quick response code
EU	European Union		RFID	Radio Frequency Identification
FFV	Fruit Flowers Vegetables		RTD	Research and Technological Development
FI PPP	Future Internet Public Private Partnership		RTI	Returnable Transport Item
FIA	Future Internet Assembly		SDK	Software Developer Kid
FP7	Framework Programme 7		SLA	Service Level Agreement
GA	Grant Agreement		SME	Small and Medium Sized Enterprise
GE	Generic Enabler		ST	Sub-Task
GLN	Global Location Number		T	Task
GPS	Global Positioning System		TIC	Tailored Information for Consumers
GUI	Graphic User Interface		TTS	Time Temperature Sum
i.e.	id est = that is to say		WP	Work Package
ICT	Information and Communication Technology			
IP	Intellectual Property			

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Disclaimer

1   Introduction

Insights gained in Phase 1 of the FI-PPP emphasize the need for novel ICT solutions that allow radical improvements for collaboration in business networks. Numerous sectors demand such solutions including the Agri-Food and Transport and Logistics industries, which are the focus of the FIspace project. This project leverages the outcomes of two complementary Phase 1 use case projects: FInest and SmartAgri-Food. The aim of the project is to pioneer fundamental changes in how collaborative business networks work in future.

Modern business is characterized by cross-organizational business networks where several actors need to interact in order to achieve common, as well as individual, business goals. When conducting business in such highly networked, often border-crossing, dynamic and competitive environments, it becomes crucial for the involved actors – which can include commercial enterprises of any size, public authorities, associated service providers (e.g., financial institutions or insurance companies), etc. – to collaborate in an efficient, effective, secure and trustworthy manner, i.e., to exchange information and communicate among each other in order to coordinate their business activities.
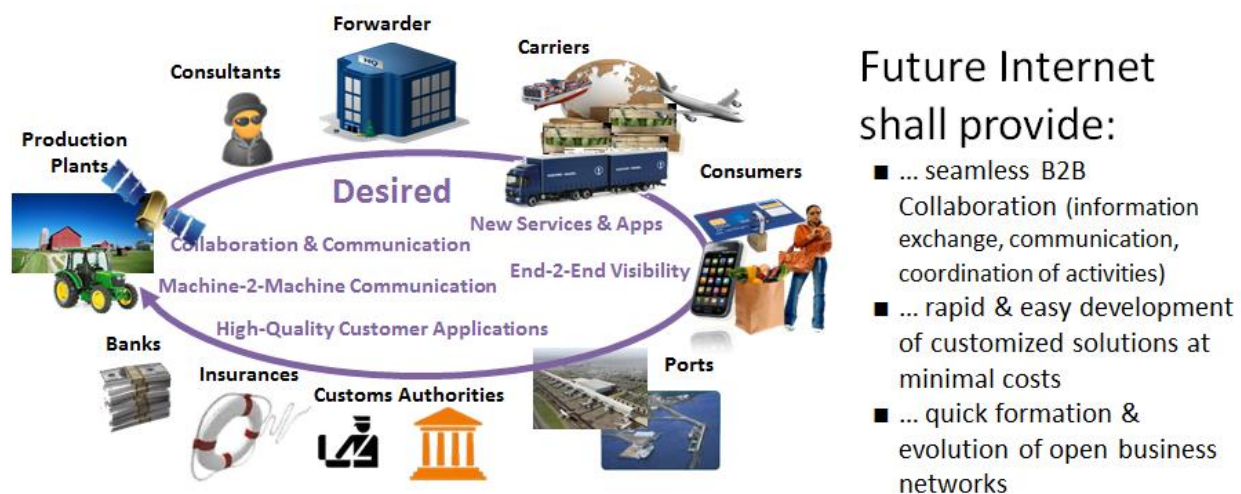
Figure 1:   Desired Collaborative Business Network and the needs for the Future Internet

Current ICT solutions do not provide adequate support for collaborative business networks. The vast majority of existing and currently employed IT solutions focus on supporting the internal business activities of individual actors, while interaction with business partners is limited to manual efforts using e-mail, phone, and fax, or only partially supported through EDI. In addition, monitoring and managing of business processes still heavily relies on human involvement, leading to high latencies between the occurrence of a business event in the real-world and its observation by IT systems, and thus other stakeholders along the value chain. This results in the unsatisfying situation where there is only limited end-to-end visibility in collaborative business networks, with unacceptably high manual coordinating efforts required by each involved stakeholder leading to the establishment of mainly closed partner networks. Closed networks particularly disadvantage SMEs who generally do not have the financial or technical means for entering these networks and collaborating with larger organizations.

Novel ICT infrastructures that enable seamless B2B collaboration and facilitate the creation of dynamic and open business networks are needed – not to merely overcome today's technical deficiencies, but in order to pave the way towards truly collaborative business networks in the future. Such a future can be realized by exploiting the capabilities of Future Internet technology developed within the FI PPP programme. These technologies allow, for instance, the gathering of real-world data via smart sensors (Internet of Things), cost-efficient development of value-added applications by orchestrating existing ones (Internet of Services), and ubiquitous access via Cloud infrastructures.

1.1   WP400

1.1.1   Use case trials and domain Apps (WP 400)

WP 400 focuses on leveraging and extending work performed in Phase I of the FI PPP program to setup trial sites for real world use cases and to exploit those sites for conducting initial use case experiments (with the support of WP 300) to determine and demonstrate whether the FIspace solution and the under-lying Generic Enablers being utilized are capable of delivering benefits and utility in the real-world.

Based on the needs of the use case trials themselves, baseline and domain Apps will be developed (as part of WP 400) so that the trials can be performed and the ecosystem business model envisioned for the FIspace service tested. In addition, where needed, trial-specific, local infrastructure (such as in-the-field sensors and devices) will be set-up and linked to the FIspace components hosted by WP300.
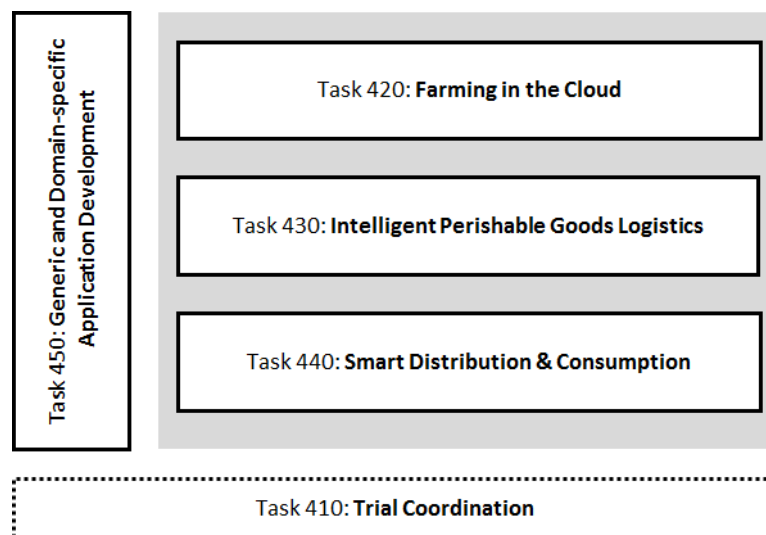
Figure 2:   High-level structure of WP400 "Use case trials and domain Apps"

The questions addressed to the WP400 are to evaluate if and how, enabled through advanced ICT and the Future Internet represented by FIspace, effective and sustainable applications allow all players in the business community developing specific easy to establish and maintain business solutions.

1. Can a novel business model be developed using emerging Future Internet services that allow SMEs and large enterprises in the agri-food and transport and logistics domains to collaborate and compete for business on an equal basis?
2. Can novel applications of ICT, enabled through Future Internet technologies, be implemented that improve the production and distribution activities of organizations collaborating in the agri-foods and transport and logistics domains?
3. Can the bi-directional integration of information generated during the production and distribution of agri-food (and possibly other) products be used to improve both producer and consumer capabilities for managing their production/consumption activities?

Answering these questions requires innovative ICT solutions that are capable of addressing the business challenges. Examining the industrial needs with respect to business efficiency and socio-ecological impact reveals two central requirements that future ICT technologies in the agri-foods and transport and logistics sectors must address if these questions are to be answered:

Requirement 1: Efficient support for partner discovery, trust development and inter-organizational collaboration in business networks that operate in agile and dynamic environments and involve a multitude of stakeholders.

Requirement 2: Seamless integration of information and data in heterogeneous IT landscapes along with embedded facilities for real-world data acquisition and integration.

These requirements can most suitably be realized on the basis of the technologies provided by the FI PPP Core Platform, which effectively integrates emerging Internet technologies.

2 400.5 Final Report on Trial Experimentation and App Development and Plan for Phase 3 rollout

This deliverable provides the final report on the development of trial experiments and FIspace Apps as well as an overview of the plans currently being developed for Phase 3 rollout of the FIspace service for the agri-food and transport & logistics domains. The document provides an overview of the experimentation plans of the eight trials proposed for the FIspace project and includes a detailed set of work plans for the work package.

Each trial progress report is concerned with the actual conduct of the defined experiments using the identified experimentation environments, domain specific applications, FIspace services and FI WARE infrastructure. Experimental outcomes, based on clearly defined protocols which are being developed, will be compared to expected outcomes. Results will be documented and feedback made based on achievement of business value, performance of FIspace and FI WARE services and the domain applications. The progress reports include (or will include in the future as experiments are carried out) details on the following:

- Progress monitoring and control of the experimentation and domain application development activities
- Definition of trial specific key performance indicators (KPI)
- Documentation of experimental outcomes with a balanced score card approach
- Feedback of experimental outcomes to interested domain partners, FIspace developers, domain application developers and FI WARE developers

This document encompasses the results of the work done in trials from M1 till M24 of the FIspace project. The deliverables D400.1, D400.2, D400.3 and D400.4.have been reflecting and reporting these efforts.

To align with the Apps functionalities proposed in D400.6 and D400.10, involved partners have made an initial analysis of the Apps and their relationship to the trials. Alignment of the Apps with the trials is a work in progress with some trials more advanced in the analysis than others. All the trials will perform the deep inspection and analysis of the Baseline Apps necessary to ensure that these apps are properly developed during the next reporting period.

- Look for similar business processes within and between each trial
- Avoid parallel and unaligned approaches to App development
- Align on experimentation and testing scope
- Establish a collaborative network among the trials

Activities and actions concerning the development and implementation of initial and domain apps, which is lead and monitored by Task 450 will be reported in D400.8 as well as in D400.12 and in the upcoming D400.13.

Harmonizing the activities of WP400 shall ensure an efficient utilization of the provided funds and a high level of productivity for achieving the aims set out in the DoW.

This report also includes discussion of the identification of potential large scale trials, identification of potential additional trial sites and development of a large scale trial rollout plan for Phase 3 of the FI PPP. The initial work on the set-up of Phase 3 actions includes preliminary work on:

FIspace
Business Collaboration

2.1 Trial 421 – Crop Protection Information Sharing

2.1.1 Trial Overview

2.1.1.1 Purpose

The objective of the Crop Protection Information Sharing trial is to show that crop protection and also other cultural practices can be optimized by cooperation of different business partners. The control of Phytophthora in potatoes is used as an example in this trial. Business partners cooperate by providing so called Capabilities in the FIspace platform which can be chosen by the end user, who in this case is the farmer. The farmer will be able to connect those capabilities to realize his business process. The capabilities provided by the project partners, which are tight together for the business process of Phytophthora control are shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**.
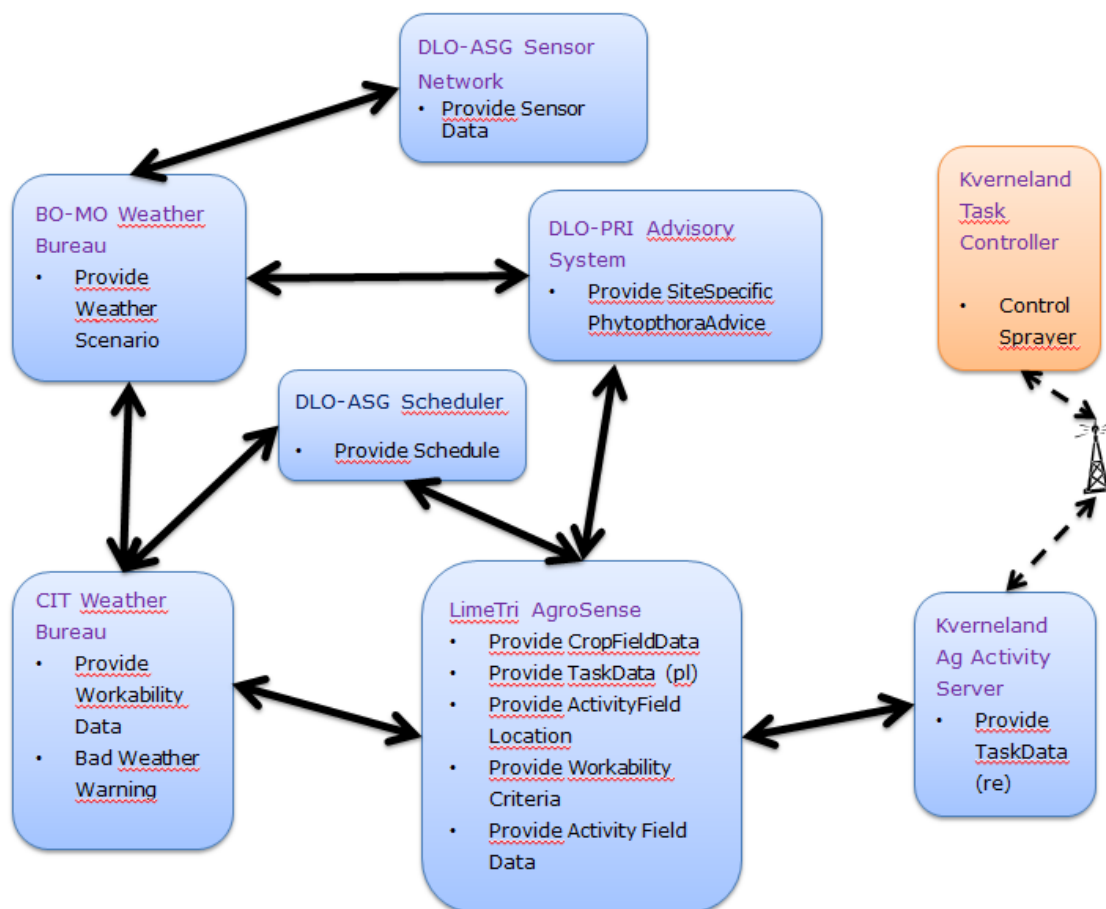
Figure 3:   Interaction of Capabilities provided by different project partners to realise the business process of Phytophthora control.

2.1.1.2 Business Relevance and expected Benefits.

For the end user, the farmer, it is important that he can choose those components for his business processes that give the best performance under the particular farming conditions. Choose the weather predictions from that office which has proven to be most accurate, get advice from thos familiar with his crops and cropping conditions, the farm management system that covers his needs and, depending on the farm, choose a scheduler for his work or not. The choice of equipment will not only depend on data management aspects.

For the different business partners it is important that they can concentrate on their specific expertise and experience and leave other required functionalities to other business partners. A developer of farm information systems can concentrate on efficient data handling and user interfaces. The adviser can specialise in a particular discipline like crop diseases, nutrient management, irrigation, etc. The machine manufacturer specializes on precise realisation of the field operations and the weather bureau on regional weather forecasts. The latter is a clear example of a service which is not limited to one business process in Agriculture and not to the agricultural domain. Agriculture needs weather forecasts for a number of business processes, like irrigation, disease control and fertilization, but also the tourist domain, transport domain will be users of weather information.

2.1.2   Trial Team

The Crop Protection Information Sharing Trial will be realised by:

DLO-ASG   Trial lead, Scheduling application and weather & soil moisture sensor system

DLO-PRI   Phytophthora advisory applications.

Kverneland   Spraying.

LimeTri   Farm Management Information System.

BO-MO LTD   (open call partner) "Formulation of weather scenarios"

CIT Development S.L.   (open call partner) Bad weather alert & Workability

2.1.3   Report on Trial Work

2.1.3.1   Overview across the work done thru M1-M24

The concept of the trial was already formulated during application for the FIspace project. At that moment the main functionalities were indicated and appropriate partners chosen for development of Apps implementing those functionalities.

The number of Apps as defined in the original proposal is reduced to keep a clear overview of the trial Crop Protection Information Sharing. Many of the originally mentioned apps were in fact sub processes of one application. This does not mean that the functionality of the trial is reduced, but no unnecessary details are presented.

The components of the trial are shown in Figure 3.

2.1.3.2   Progress M19 – M24

Quite some time is spend on restructuring of the reference data model drmCrop, fixing some bugs in drmCrop and aligning it with the elements used from Sensor Web Enablement (OGC's swe) and the Geographic Mark-up Language (OGC's gml).

The capabilities and messages for the Agricultural Domain are extended in the core API for the FIspace platform. An effort is made to follow a naming convention for the messages and capabilities.

Interface description are continuously updated in the document MessagingForCropProtectionInformationSharingVersionYyyyMmDd.docx. Data exchange is based on XSD specifications that are generated from the drmCrop reference model. The resulting XSD's are made available to all partners in the trial.

Testing of the integrated apps was not possible up to now due to lack of a stable FIspace platform. This will be done during the extended period and reported in deliverable D400-13.

Progress on the apps is described hereafter.

2.1.3.3 App Development

The Phytophthora Advisory application is thoroughly tested on its agronomical aspects during the 2014 growing season. Integration testing is difficult during winter 2015 by lack of growing season. This testing will be done in the extended period April-June, and reported in deliverable 400-13.

The FMIS is extended to deliver data on ActivityField's, apart from data on CropField's which are already made available for the advisory system. Delivering planned Task Data and collecting realized Task Data was already implemented and demonstrated during the review in November 2014. Delivering of Workability criteria is added as capability.

The Scheduling Application is developed as an initial version which is focused on only Phytophthora control with one Man-Machine-System and normative assumptions on required spraying actions after the advised period. The design is however such that it can cover all types of farm operations. This is possible when the FMIS and workability App used in this trial provide the required information for these extensions. In the tested version the optimal schedule is only presented in XML format. A viewer is to be developed by the client application, i.e. the FMIS.

Spraying is now tested for data exchange by wireless communication between Agricultural Activity Server and Task Controller. The exchange with the FMIS through the FIspace platform is based on exchanging whole ISO11783 Task Files.

The app for formulation of the weather scenario is now available as web service and integrated in the FIspace platform. A scenario includes historical weather. The use of a local weather station will be added as soon as it is available.

The workability application is developed, integrated in the FIspace platform and uses the weather scenario. The use of Activity Field location and Workability Criteria will be tested as soon as they are integrated in the FIspace platform.

Data gathering from external data sources (Buienradar and KNMI stations) for the Bad Weather App has been achieved during this period. Integration with the FIspace platform and communication to the FMIS will be tested in the extended period and reported in deliverable D400-13.

2.1.3.4 Key Performance Indicator

Key performance indicators are used to measure the success of the Crop Protection Information Trial by using FIspace. The performance shall be measured in respect of all stakeholders.

One of the stakeholders is the European Union with the objective of FIspace, as part of the FI-PPP program, to accelerate the adoption of future internet technologies in Europe. A group of stakeholders are the server providers for the agricultural community who want to sell their products to the end users, in the domain of this trial the farmers. The third category of stakeholders are the end users, which are farmers and in some cases consultants which advice the farmers.

It is the objective of the server providers to reach a market as large as possible, with low distribution and service cost. Another objective is to use data and services provided by business partners at a better quality and at less cost than when they would have to do it themselves.

The objective of the farmers and consultants is to have easy access at low cost to a suite of products which together fit best in their enterprise.

Key performance indicators can be classified in:

- KPI's from the overall FI-PPP / FIspace perspective
- KPI's from the business providers perspective
- KPI's from om the Business Process of the end user (farmer & consultants) perspective
- KPI's from the individual app perspective

Some of the performance indicators are not measurable during this Phase 2 trial period, especially that of the overall FI-PPP / FIspace perspective.

An important key performance indicator is the quality of the application offered by the different Apps. This would require for our trial a meteorological and agronomical evaluation. This is out of the scope of this trial. The assumption is that the apps are of the same level of performance as offered outside the FIspace environment. The performance evaluated here is on the employability of the apps by using FIspace technology.

KPI's from the FI-PPP / FIspace perspective

- The number of applications in the App store(s)
- The number of purchases from the App store
- The number of events processed by the Business Collaboration Object
- Regional distribution from Apps, and purchases.
- Number of entities purchasing Apps.
- Number of Business Processes formed by combining Apps.
-

KPI's from the business providers perspective.

- The number of purchases by the FIspace App store
- The availability of other Apps which can be used as input / contributed for the developed apps
- The effort required to offer the app through the FIspace platform
- The cost of initial employment
- The periodical cost of employment
-

KPI's form the Business Process and end user perspective

- The effort to define a business collaboration by combining Apps.
- The choice of combinable Apps on the FIspace platform.
- Improvement in capabilities and quality of a business process on FIspace in relation to a classical forms of the business process.
- The cost of the apps (purchase, update and/or per run cost) required for a business process on FIspace in relation to a classical forms of managing the business process.
- Reduction in labour time spent to perform the advisory, planning and administrative aspects of the business process.
- Timeliness of event messages in relation to actual events.
- Handling of failing apps in the business process.

KPI's from the individual app perspective

General:

- Response time of the app. (this can be also just an acknowledge that a request is received)
- Required time to deliver the requested information.
- Actuality of the App.
- Handling of observed error/bugs.

2.1.3.5 Balanced Scorecard

For each of the four stakeholder (groups) a balance scorecard is formulated in respect of four different perspectives. The four perspectives are:

- Learning and growth perspective
- Internal Business Process perspective
- Customer satisfaction
- Financial performance

Overall FI-PP & FIspace

Figure 4:   Overall FI-PPP & FIspace balance scorecard

Perspective	Objective	Measure	Target	Activity
Learning & Growth	Regional distribution	Number of countries		
	Number of Platforms	Number of Platforms		
	Number of App providers	Number of App providers		
	Number of End users	Number of End users		
	Number of formed Business processes	Number of formed Business processes		
Internal Business Process				
Customer satisfaction	Number of Apps	Number of Apps		
	Number of Purchases	Number of Purchases		
	Number of processed events	Number of processed events		
Financial Performance	Ability to run without EU subsidies			
	Total financial turnover	turnover		

Business Providers

Figure 5:   Service provider balance scorecard

Perspective	Objective	Measure	Target	Activity
Learning & Growth	Growing number of end users purchasing apps.	Number of purchasing end users.		
	Growing number of Apps that are input for "my" App	Number of available Apps as input		
Internal Business Process	Effort required to offer the App through the FIspace platform	Learning time		
		Installation time per App		
Customer satisfaction		Number of purchases		
	Growing number of Business Processes in which "my" App is used	Number of Business processes using "my" App		
Financial Performance	More turnover by FIspace	Turnover through FIspace platforms.		
	Reduced financial cost	The cost of initial employment on the platform		
	Reduced financial cost	The cost of employment per year.		

End User

Figure 6:   End user balance scorecard

Perspective	Objective	Measure	Target	Activity
Learning & Growth		The number of "competing" Apps per App Type.		
Internal Business Process		Time spent on formulating a business process		
	Improvement in capabilities and quality of the business process			
	Reduction of administrative time to run a business process	Time spend behind the different computer systems.		
	Timeliness of event messages	Time (hour minutes seconds) between occurence and event message.		
		Tiem spend on solving problems for running the business process		
Customer satisfaction	-	-	-	-
Financial Performance		The total cost (per hectare) of running the business process during a season		

Individual App

Figure 7:   Individual App balance scorecard

Perspective	Objective	Measure	Target	Activity
Learning & Growth	The App uses latest expertise/data	??		
Internal Business Process		Response time of the App		
		Required Time to deliver the requested information		
	Handling of observed errors/bugs	Time spent on handling errors		
Customer satisfaction		Number of purchases of this App		
		Number of activated Business processes of the App		
		Number of activations of the App per season/year.		
Financial Performance		Turnover of the specific App		

2.1.4 Evaluation and Conclusion

2.1.4.1 The work done and results.

A number of applications are developed which form together the business process of Phytophthora Control. Therefore it was required to have a common data model to exchange required information. The drm-Crop model developed in the Netherlands proved to be a good basis, but required some modifications, extensions and further specification to fulfil requirements for the trial. It is possible to generate XSD's from the case tool (Enterprise Architect) in which the model is documented. These XSD's are used by the FIspace core API to describe the message content.

It took quite some time to get the interaction between the different Apps and the FIspace platform stable. Matters to solve were; in which case a direct response can be given and, when processing time is required, when a "resource available" messages had to be send.

2.1.4.2 Was it worth to spend the effort?

Advisory systems in agriculture are quit static up to this moment, while due to continuously changing weather conditions and stochastic character of time spend on field operations, a much more dynamic approach is required. To realize such a dynamic approach is challenging in an architecture where apps from different business providers cooperate. Both the business cooperation and the dynamic character are new for the agricultural domain.

To experiment with an architecture which provides above mentioned aspects is very worthwhile, and without the possibilities of the FIspace program the Phytophthora Control business process would not have been implemented on such a way.

2.1.4.3 Results and Next steps.

Are the results convincing? Based on the results what will be the next steps (trial perspective).

As in month 24 still a lot of work is done to get the FIspace platform stable, we were not able to test the Phytophthora Control business process in a real setting during a growing season of potatoes. This will be done during the extended period, in April – May, when Phytophthora control becomes opportune. The results will be reported in deliverable D400-13.

The results so far show that a dynamic interaction between apps is possible.

2.1.4.4 Actions beyond the end of the FIspace project.

The Phytophthora Business Process will stay operational during the whole growing season 2015, provided the FIspace platform is operational and the Weather Scenario will be available.

The possibility will be investigated to have an alternative Phytophthora Advice System and an alternative FMIS. These will have basic functionality with the objective to show that formulation of the business process with alternative components is possible and do, due to limited basic functionality, not have the objective to be a competitor on the market.

This should act as a demo for professional providers of advisory systems and FMIS's to provide their apps as a FIspace Capability, as some other modules are already available.

The Weather Scenario app has the intention to stay available, provided the platforms it is running on stay available. A master research project in Wageningen UR will use the Weather Scenario App for irrigation advice purposes, as a test of the FIspace concept.

The scheduling module will be further developed by Pragmaas such it can be used by other Phytophthora advice systems and becomes available for more agricultural field operations.

2.1.4.5   Commercial opportunities

There are certainly commercial possibilities for the weather application as it is suitable for a numer of business processes in agriculture.

The Phytophthora advisory app will be commercialised as an innovative alternative for other Phytophthora control advisory modules.

AgroSense will be brought to market as Farm Management Information System.

Kverneland will extend its range of commercial products with an Agricultural Activity Server.

2.2   Trial 422 – Greenhouse Management and Control

2.2.1   Trial Overview

The Greenhouse Management & Control trial involves several Business Stakeholders collaborating via the FIspace platform in order to efficiently accomplish different business scenarios related to the agri-food domain. The domain-related scenarios involve growers, agronomists and other domain experts, end-product producers, advisory service owners, meteorological scientists and services, Greenhouse managers who are willing to maximize their revenues, etc. Smart web and mobile applications are being developed in the context of the trial in order to facilitate the business collaborations and are evaluated via specific business, as well as technical, Key Performance Indicators (KPIs). The applications that are developed, are tested in the context of the various trial's scenarios and are demonstrating the added value that they provide taking advantage of FIspace business-to-business platform. Each one of the trial applications is mapped to the respective so-called business entities, which are set-up inside the platform core. Overall, the trial via its use case aims at optimising production efficiency, food safety, as well as improve services towards farmers, experts, managers and consumers.

2.2.2   Trial Team

The Greenhouse Management and Control trial is realised by:

NKUA	Trial lead, Contributing to the development of the trial apps, expertise on Sensor Networks, and mobile/wireless communication (for the data acquisition in the greenhouses)
OPEKEPE	Traceability platform provision, experimentation site, farmers, Complaint Management & Product Recall apps' development contribution, mobilising
Innovators	Experimentation site realisation and support, aiming at ubiquitous access and IoT integration.
MOBICS	Development of Crop Monitoring and Crop Analyser applications

2.2.3   Report on Trial Work

2.2.3.1   Overview across the work done thru M1-M24

In the beginning of the project, the Greenhouse management & control trial defined several scenarios, each one of which, involved different business stakeholders and legacy systems. The list of farmers and greenhouse owners to participate in the trial was finalised. Representatives from the trial team visited the greenhouses, identified the special requirements per site, and explained the scope of the use cases to the stakeholders. Apart from the farmers/greenhouse owners, several meetings took place with groups of agronomists in order to obtain the required knowledge regarding rules, alerts, standards, etc., which were utilised afterwards in the implementation of the trial's applications. In addition, the legacy systems that would be integrated into the FIspace platform were identified. The requirements for each one of the legacy systems were discussed; the data and communication schemas were identified, as well as several important details regarding the integration procedure with the FIspace platform in the context of the trial.

The identification and definition of the scenarios' functional and technical requirements started since the begninning of the project. Although, all the apps were finalised in terms of these requirements, the development of selected trial's apps began since M6. In parallel, the installation of the required equipment was taking place. After the installation of the sensor equipment was finalised inside the Greenhouses (M5-M8), the beta version of the Greenhouse Monitoring & Advice was already available and testing began. The integration of the initial set of external greenhouse systems (Farm Management Information Systems - FMISs, Databases, etc.) into the platform was one of the main tasks. In parallel, the trial team collaborated with the T240 team (Work Package 200), in charge of the Business-to-Business core module, in

order to identify and finalise the business entities that were required for running the business collaboration.

Apart from the Greenhouse Monitoring and Advice app, one of the platform's initial apps, the Marketplace Operations began being developed by the trial team. Marketplace Operations is regarded as one of the inter-trial apps that is finally being utilised by more trials. Greenhouse trial makes use of it in the context of the Search for Farmers scenario, in order to create, search for, and handle service offers and demands from the agri-food domain. Last but not least, regarding the first period of the project, the Greenhouse management & control trial was the first one to be integrated with the FIspace platform and was demonstrated in the M12 review meeting with excellent performance.

Furthermore, after the first release of the Greenhouse Monitoring and Advice, as well as the Marketplace Operations apps that were already demonstrated in the M12 review, the development of the rest trial applications began. Complaint Management app was the next one to be developed, while Marketplace Operations app 2nd version was being implemented with more advanced features. In parallel, the requirements for the Open Call apps were being identified.

During the next period (M12-M18) of the project, there was already a set of trial apps available. At the same time, a new partner (MOBICS) joined the trial via the Open Call and began developing two new applications, i.e. Greenhouse Crop Monitoring and Greenhouse Crop Analyser apps. The development continued throughout this period and resulted in the 2nd version of the Marketplace Operations, as well as, the initial release of the two open call apps. In addition, The Greenhouse trial team (NKUA and MOBICS) participated in the Smart AgriMatics conference in Paris, in June 2014. The NKUA team chaired with success the session "Smart Greenhouse Management & Control on FIspace B2B platform". Several demo sessions, as well as a lot of fruitful discussions between stakeholders and experts of the domain took place.

2.2.3.2   Progress M19 – M24

During the latest period of the project, the development continued for all the apps of the trial. All the apps were finalised and entered the testing phase in order to evelute the implemented features, functional and technical. The testing of the applications involved both the platform's Experimentation Environment, as well as, testing independently the apps' back-ends, interfaces and front-ends (mainly related to the experience of the user) and reporting the respective results. The list of the KPIs of the trial were finalised, taking into account both the stakeholders', as well as the paltform's perspective. The greenhouse trial team managed to collaborate efficiently with the T250 team (System & Data Integration), resulting in the respective tests and the evaluation of all the trial apps in relation to their functionalities and their communication with external/legacy systems. Results in accordance with the defined KPIs were aggregated and are presented in this deliverable. The KPI results were collected only in the cases that this was applicable and the resepctive platform component available. It must be noted that due to the WP200 team's intense workload, the integration process of several scenarios of most of the trials has been delayed, thus the testing in relation to the platform integration is is some cases not yet realised and –as a result- only independent app testing results are provided. In the independent testing cases, local deployments of the Core components (such as the System & Data Integration (SDI) module or the Complex Event Processor) of the FIspace platform have been used by the trial developers, in order to realise the communication between the back-ends of the various apps and the platform side.

During the last part of the trial experimentation, a novel use case was initiated and completed during the M19-M24 period for the Greenhouse management & Control trial. This use case is aiming to demonstrate the facilitation of a dynamic integration procedure of various legacy systems into the platform, so as to be able to communicate with the existing platform domain apps. External systems may define custom data interfaces, which may be unknown to FIspace. The described approach presents a seamless integration scheme by incorporating an intermediate adaptation (abstraction) layer, enabling external systems to easily integrate with FIspace. Integrating external systems to any platform is a key asset for any software stack that allows expandability and scalability of a system. FIspace is designed according to these principles by focusing on a multilayer architecture. In the following sections we will describe this methodology of adoption of the afore-mentioned abstraction layer that facilitates the robust expanding of the platform towards consuming external data sources or streams.
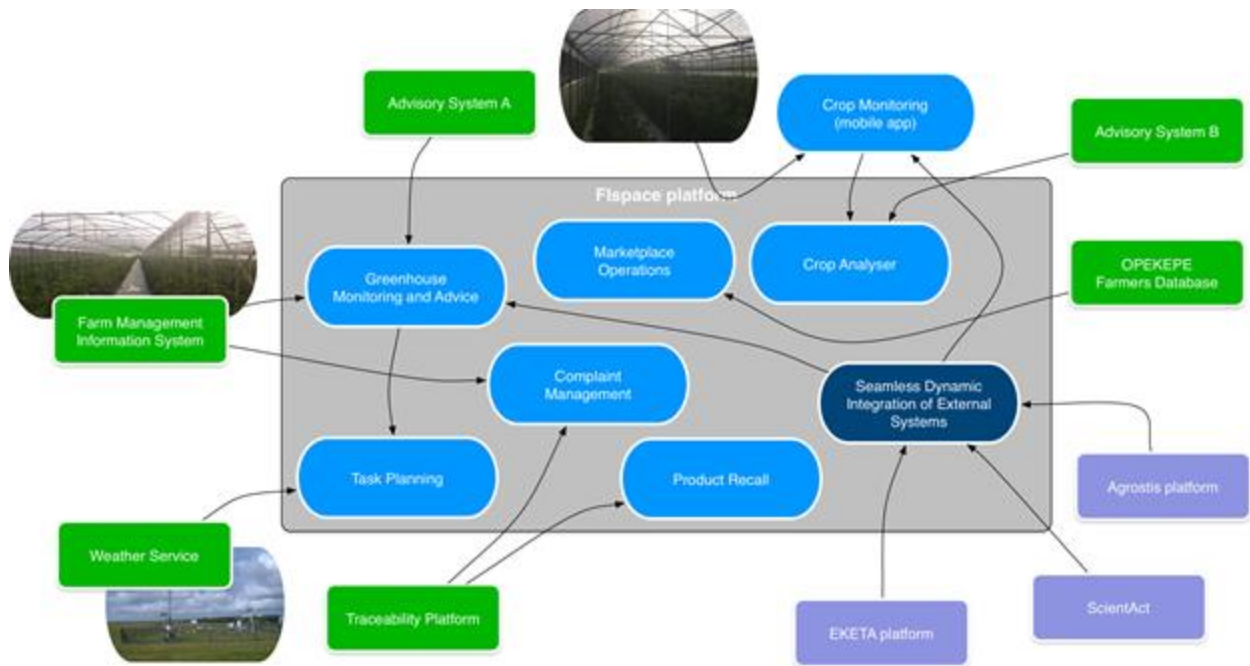
Figure 8:   Final overview of the Greenhouse trial's use cases

2.2.3.3   App Development

An overview table is initially provided that illustrates the different apps that were developed in the context of the trial, mapped to the trial scenarios. For each one of the apps, there is a column, which describes the status of the development, as well as another one that provides details in relation to the testing outcomes so far.

Figure 9:   Overview of the Greenhouse Management & Control apps

Scenario	App	Development status	Testing status
Advice Request	Greenhouse Monitoring & Advice	Completed	Integrated with the Experimentation Environment – successful functional and technical requirements outcome
	Greenhouse Crop Monitoring	Completed (both iOS & Android versions)	Integrated with platform SDI module – succesful testing of all technical and functional requirements
	Greenhouse Crop Analyser	Completed	
Search for new Farmers	Marketplace Operations Service	Completed (also integrated with CarSwApp from the T431 trial)	Integrated with FIspace SDI module, communicated succesfully via SDI with the OPEKEPE's farmer database, as well the back-end of CargoSwApp (T431 trial)
Managing Complaints	Complaint Management	Completed	Integrated with FIspace SDI module, communicated succesfully via SDI with the ESIT traceability platform
Product Recall	Product Recall	Completed	Integrated with FIspace SDI module, communicated succesfully via SDI with the ESIT traceability platform
New: Seamless Integration of External Legacy Systems	3 external apps/systems: EKETA, ScientAct, Agrostis	Completed	Succesfully tested for all 3 external systems

Regarding the Grenhouse Monitoring & Advice app, the main task was the integration of the GUIs of the formerly two separate apps (Greenhouse Monitoring & Greenhouse Advice) into a uniform front-end with wider functionality. The back-ends of the two apps were also re-structured. The main development tasks of the Greenhouse Crop Monitoring mobile app, was the implementation of the iOS version and the finali-

sation of the Android version. Both app versions were succesfully completed, and the final testing process is currently taking place. Complete report for this open call app will be included in the D400.13, which was extended till M27 of the project. With regard to the Greenhouse Crop Analyser app, the develpment was also completed and succseful testing has taken place. The communication between Crop Analyser and the Crop Monitoring mobile apps was also verified with success.

As far as the Search for New Farmers scenario and the Marketplace Operations (MOS) app is concerned, the 3rd and final release is already available since M21. Being an inter-trial Fispace service –apart from a standalone app-, MOS was tested in the context of both the Greenhouse Management & Control trial, as well as the Fish Distribution and (Re-)Planning. One the one hand, all the advanced features were finalised (e.g., offer/demand match-making mechanism, advanced service search, etc.), while in parallel the connection to external components and apps was succesfully tested. The two main external components was the CargoSwApp, as well as the Greek Farmers' database. Both systems were tested in succesfully exchanging the required service offerings and demands, alongside with their description that were retrieved from the respective GEs, connected to MOS (Repository GE and Marketplace GE).

Regarding the Managing Complaints scenario, and the Complaint Management FIspace app, the functionality of the app is completed, while it has been tested only via a local deployment of the FIspace SDI module. In a similar way, the Product Recall app was also completed and tested via the same local configuration of the latest SDI version of the FIspace platform.

As already mentioned above, the latest use case that was realised in the context of the trial was the seamless integration of 3 external apps/systems (EKETA, ScientAct and Agrostis) in order to demonstrate the procedure for any external system that may need to connect to one of the existing Greenhouse trial's business entities. The main idea is the addition of an adaptation layer (abstraction layer), which adds a flexible multi-interface for external systems and data sources. A high level architectural diagram is illustrated in the image below:
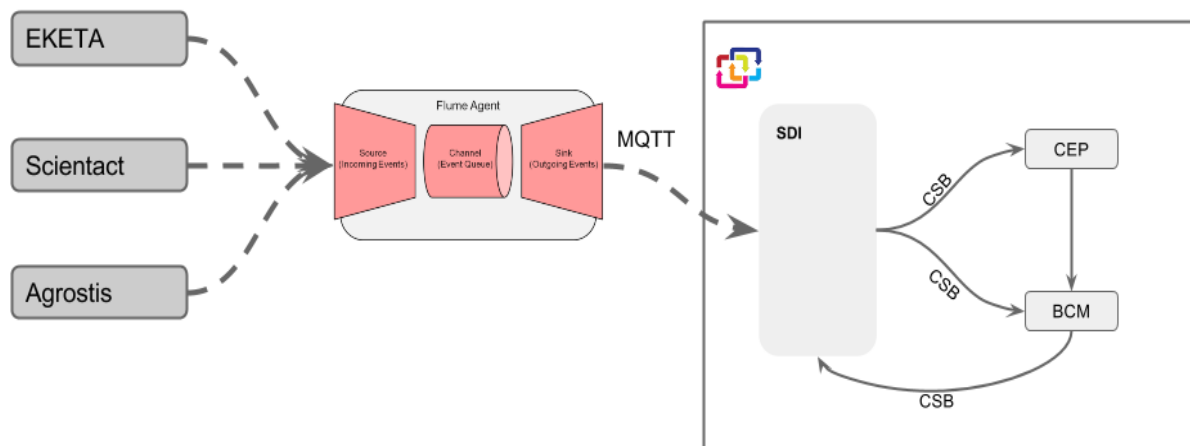
Figure 10:   high level architectural diagram

Due to the technical nature of the particular use case, more details are not in the context of the present deliverable. The use case will be thoroughly analysed in the final technical deliverable (D400.13, M27).

2.2.3.4   Key Performance Indicator

In this section we present the Key Perfomance Indicators (KPIs) that are being evaluated in the context of the trial, from the technical perspective. Although already presented in previous deliverable, in this deliverable, a refined version of the KPIs is illustrated in the table that follows. In the existing ones, MOBICS – the trial's open call partner- has provided additional KPIs in relation to the two applications that is developing, i.e., Crop Monitoring mobile app and Crop Analyser. The testing in some cases is on-going (taking into account the platform's development extension), thus, for the KPIs that are provided below, we provide either the KPI-related results, or the target values that will be assessed at the end of the testing.

Figure 11:   Overview of latest status of Greenhouse trial's KPIs

Perspective	KPI	Means of assessment	Value (target or result if available)
Stakeholders	Time required to accomplish each one of the business collaborations defined in the trial scenarios	The different use cases (Advice Request, Complaint Management, Search for Farmers, etc.) are tested either after they are deployed on the FIspace Experimentation Environment or using the app's GUI, and analysing the related log files.	All the trial apps were succesfully tested with response times in the end-to-end scenarios less than 10 seconds.
	Time required to get an expert's response for a specific crop problem.	The end to end time is calculated from the time a farmer starts filling in a form until the time he gets a first response from an expert (some realistic assumptions on the typical expert response times should be made)	Similarly with the above KPIs, the received result values were smaller or equal to the above KPI evaluation.
	Deployment costs	a) Time required for the deployment, to which extent does it influences the on-going production process, network deployment (e.g., Internet connection if not available), FIspace Apps purchase (FIspace Store), IT expert responsible for the integration with the platform. b) equipment cost required for the deployment	a) Varies depending on the scenario. As a general statement, the results show that the deployment on the platform if all infrastructure is set-up and running may take up to 30 minutes using the FIspace SDK toolkit; significantly lower than the legacy system's deployment b) The equipment cost applies only on scenarios such as the Advice Request where sensor equipment is required and highly depends on the size of the network that is deployed in the greenhouse, farm, etc. In any case, the equipment cost is lower than the legacy system's costs, as the expert systems are placed in the cloud, and no extra infrastructure is required in the farmer's premises.
	Maintenance costs	Connectivity costs (e.g., Internet connection	Connectivity costs are considered slighlty

Perspective	KPI	Means of assessment	Value (target or result if available)
		costs), periodic subscription fees due to FIspace app usage, IT expert costs for maintenance	higher than the legacy system's, as the latter case, no Internet connection is required if solution is deployed locally. Subscription fees varies among different apps and according to the specific business model of the owner. Expert costs (technical support) for maintenance is significantly lower comparing to the legacy system, as FAQ, troubleshooting, support/ consulting, etc. can take place remotely in a centralised way.
	Update / Upgrade costs	New FIspace app release cost (FIspace Store updates), additional features (in-app purchases), new devices supported (equipment)	Software update costs varies per app, similarly with the legacy system's case. Equipment upgrade costs also may vary, in the same way with the legacy system however as well.
	Impact on the stakeholder's revenues	Assess the gain from: the automation of processes, the centralized support of the software inside the platform, the possibility for early warning from remote experts about crop/product problems and great potential for collaborations with diverse stakeholders via the FIspace Marketplace	Varying slightly among stakeholders. Assessed via targeted questionnaires. Available upon request.
Platform	Platform usability	a) time required to integrate external systems into FIspace, b) training time for the stakeholders	a) System Integration, as well SDK toolkit team-dependent currently. Significantly lower than the legacy system's case, due to the centralised support and the automated integration processes. b) Depending on the time of the training. No higher than the legacy system's training.
	Response time (applied	Experimentation Envi-	Detailed log files were

Perspective	KPI	Means of assessment	Value (target or result if available)
	for each one of the test cases, e.g. time for alert to be triggered, time for advice to come back, time to find receive a complaint analysis for a product etc.)	ronment (EE) testing.	generated during the EE testing for 2 of the trial's scenarios, i.e., Advice Request and Search for Farmers. Regarding the rest scenarios, separate log files were generated using app-specific testing framework.
	Scenario Step time	EE testing.	Similar as above.
	Scenario Step Success Rate	EE testing. Depending on the experiment step type may be time length threshold, number of notifications produced per time, etc.	Similar as above.
	Time required in order to deploy a FIspace app onto the FIspace Store	The SDK tools that are provided by the T280 team provide the means, as well as the guidelines to upload a new app to the FIspace Store.	Using the SDK toolkit, the time required in order to deploy a FIspace app to the Store is no higher than a few minutes (varying slightly on the type and size of the apps).
	Quality Indicators: a. Product life time, b. User Acceptance, c. Quality of notifications (true positives, false positives, etc.)	a) To be further elaboratoed in next report (TBFE) b) Questionnaires c) EE testing	
	Number of FIspace apps created and uploaded on the FIspace Store	Overall number of Greenhouse trial apps.	In the context of the trial, 9 different apps were developed and deployed on the Fispace platform. Some of them were later integrated into larger-scope apps.
	Number of different business entities created in the context of the Greenhouse trial	Overall number of Business Entities created in the BCM module, in collaboration with the Business Core module team.	The main Business Entity that was created in the context of the trial was the Advice entity. In addition, additional entities were created for Complaint Management scenario, as well as MOBICS apps (based on the Advice entity).
	Number of stakeholders /SMEs /external systems involved in the	Each one of the trial's scenarios involved several (in some cases the	Overall, 4 individual farmers (or greenhouse owners), 8 legacy sys-

Perspective	KPI	Means of assessment	Value (target or result if available)
	scenarios	same) stakeholders, legacy systems, etc. This KPI refers to the overall number (sum of the 5 different trial scenarios).	tems and 5 SMEs were involved in the context of the trial scenarios.

2.2.3.5 MOBICS Development KPIs

In addition to the above KPIs, MOBICS has defined some additional KPIs to be evaluated in the context of the two apps that are being developed. The detailed results will be reported in the final trial deliverable (D400.13). The tables below provide further details.

Figure 12:   Crop Analyzer app

KPI Name	Degree of system usability
Description	This KPI will measure the degree of perceived system functionality, the usefulness of the system services in the users' actual environment and perceived system usability, in terms of relevant variables such as task-goal achievement, efficiency, effectiveness, learnability, understandability, memorability. Main tasks to be checked are a) access to request information, b) collaboration with third parties, ease of use during response creation
Methodology	This KPI will be calculated based on subjective ratings, and self-reports drawn from questionnaires, personal interviews, and user observation.

KPI Name	Time required for collaboration and response to farmer
Description	This KPI will measure the end to end time between a diagnosis request submission and the arrival of the response from the crop manager or expert/consultant. This is a KPI measured in conjunction with Crop Monitoring app.
Methodology	This KPI will be measured from relevant timestamps logged by the system during its use and questionnaires filled in by the users.

KPI Name	Precision of automatic disease identification
Description	This KPI will measure the precision of the disease identification by the application based on the input provided by the grower (potos, request details) and the available cases
Methodology	This KPI will be measured with standard precision measures

All tests involving human subjects will be performed in two phases:
- A) With (semi-)expert users, specifically students of Agricultural University of Athens. They are familiar with new technologies and can assume the roles of both farmers and agronomists. During this phase, initial usability problems and other technical issues will be identified and fixed.
- B) Experts and professionals: farmers in collaborating greenhouses and agronomists (research and education staff from Athens University of Athens). Such users are the final users targeted by the application

Other indirect metrics that highlight the benefits of the app, such as money and effort saved, will be assessed by qualitative questionnaires.

Crop Monitoring mobile app

KPI Name	Time required for submission of diagnosis request
Description	This KPI will measure the time required for submitting a full request to the FIspace plat-form.
Methodology	This KPI will be measured from relevant timestamps logged by the system during its use by users.

KPI Name	Degree of system usability
Description	This KPI will measure the degree of perceived system functionality, the usefulness of the system services in the users' actual environment and perceived system usability, in terms of relevant variables such as task-goal achievement, efficiency, effectiveness, learnability, understandability, memorability. Main tasks to be checked are, b) collaboration with third parties, a) ease of use during request creation, b) unambiguous navigation in the app screens, c) ease of use for photo shooting, d) handling responses from experts.
Methodology	This KPI will be calculated based on subjective ratings, and self-reports drawn from questionnaires, personal interviews, and user observation.

KPI Name	Time required for response retrieval
Description	This KPI will measure the end to end time between a diagnosis request submission and the arrival of the response from the crop manager or expert/consultant. This is a KPI measured in conjunction with Crop Analyser app.
Methodology	This KPI will be measured from relevant timestamps logged by the system during its use and questionnaires filled in by the users.

All tests involving human subjects will be performed in two phases:
- A) With (semi-)expert users, specifically students of Agricultural University of Athens. They are familiar with new technologies and can assume the roles of both farmers and agronomists. During this phase, initial usability problems and other technical issues will be identified and fixed.
- B) Experts and professionals: farmers in collaborating greenhouses and agronomists (research and education staff from Athens University of Athens). Such users are the final users targeted by the application

Other indirect metrics that highlight the benefits of the app, such as money and effort saved, will be assessed by qualitative questionnaires.

2.2.3.6   Balanced Scorecard

The Balance Scorecard methodology provides the means to describe the objectives, the Key Performance Indicators (KPIs) and the targets of the FIspace trials from a higher-level business view. Four perspectives are taken into account: i.e., the process, the customer, the learning and the financial. The table below presents the updated balanced scorecard for the Greenhouse Management & Control trial alongside with the respective outcomes. Positive is considered the outcome when the targeted KPI is met.

Figure 13:   Greenhouse Management & Control Balanced Scorecard

Perspective	Stakeholder	Objective	Measure	Target	Activity	Outcome
Process	Farmer	Improve productivity	Time required for handling alerts/task planning	-50%	Greenhouse Monitoring & Advice app, Crop Monitoring app, Crop Analyser app usage	Positive (beyond target)
		Improve quality and production size	Production loss due to late response to crop problems	-20%	Greenhouse Monitoring & Advice app, Crop Monitoring app, Crop Analyser app usage	To be evaluated for stakeholder separately.
	Producer	Improve efficiency	Reduction of Customer complaint analysis required time (time/complaint analysis)	-50%	Complaint Management app usage	Positive (beyond the target)
			Reduction of time required to retrieve the list of the stakeholders related to a particular product (time/ retrieved list)	-50%	Product Recall app usage	Positive (beyond the target)
			Easier discovery of potential new business partners in a marketplace (new collaborations/ year)	+10%	Marketplace Operations app usage	Positive (beyond the target)
	Legacy system owner	The external process of the legacy systems sep-	-	-	-	-

Perspective	Stakeholder	Objective	Measure	Target	Activity	Outcome
		arately will be integrated as is				
Customer	Farmer	Food safety reliability	Reduce complaints received from end-product producers	-10%	Improved, efficient, automised procedures using the Greenhouse FIspace apps (Crop Monitoring, Analyser, etc.)	Positive
		Improve services towards end-product producers	New customers/ year	+10%	Automised procedures using Greenhouse FIspace apps (Crop Monitoring, Analyser, etc.)	Exploitation of FIspace is required over time.
	Producer	Improve services towards end users (higher satisfaction)	New customers/ year	+10%	Automised complaint management & product recalling procedures	Exploitation of FIspace is required over time.
	Legacy system owner	Attract more customers/ system users	New customers/ year	+10%	By integrating the system into FIspace, it is directly available for participating in diverse business processes	Exploitation of FIspace is required over time.
Learning	Farmer	Increased flexibility in employee engagements	Freed time in process activity	-20%	Automation of provided services	n/a
	Producer	Shorter learning curve for new crop production	Time required for studying about a new crop	-20%	Digital context-aware crop treatment resources (Crop Analyser App, Crop Monitoring App)	
	Legacy System owner					

FIspace
Business Collaboration

Perspective	Stakeholder	Objective	Measure	Target	Activity	Outcome
Financial	Farmer	Lower process costs	€/process cycle	-10%	Optimized operations, customer base increase, reduction of travel and communication costs	Positive
	Producer	Lower transportation costs	% of transportation required	-70%		
	Legacy System owner	Increase of productivity	Product quantity/ services accomplished per year	+10%	Optimized operations	Positive

2.2.4   Evaluation and Conclusion

In this section an overall presentation of the Greenhouse Management & Control trial's developments and outcomes was provided. In the first section, a detailed description regarding the trial's steps throughout the project's duration was provided. This began with the definition of the scope of the trial, the business goals, the functional and technical requirements that resulted from the stakeholders' view; continued with the integration of the legacy systems that participate in the trial's scenarios; after completing the intgration of the external systems, the development steps for each one of the trial's applications (via several releases per app with added features) were described; finally, the testing results of the apps were provided, alongside with the evaluation of each one of the scenarios' outcomes.

A succesful and efficient collaboration throughout the project's duration between the trial's partners (NKUA, OPEKEPE, Innovators and MOBICS) resulted in achieving all the trial's milestones and business goals. Sophisticated business collaborations involving multiple stakeholders and legacy systems were demonstrated. Via the trial's use cases the significant value of the FIspace platform was demonstrated and valuable outcomes were collected. In addition, significant knowledge was aggregated during the collaboration with the platform core modules development teams, such as the Business Collaboration module team and the System and Data integration team. Several challenges showed up during the integration of the heterogeneous data models and interfaces, resulting in useful discussions, evaluation of different technologies and finally generic solutions that provided added value services and modules to the overall platform functionality.

With regard to the scenarios' outcomes, the evaluation in all cases ended-up in positive results, both from a technical, as well as a business perspective. All trial apps were completed succesfully, incorporating all the features and requirements, which were initially identified. In some cases, however, the assesment of certain KPIs (e.g., new customers/year for an SME) is not possible to be evaluated at this stage. A more mature platform version would be required, as well as a longer-term usage in order to provide with confidence a complete KPI evaluation.

The next steps of the trial mainly involve further testing for most of the apps until the end of the extended project duration. The updated results will be reported in the final deliverable (D400.13). In parallel, several Phase 3 projects have expressed interest in some of the trial's apps. Novel applications, which will be developed in the context of current and upcoming Phase 3 Open Calls, plan to utilise part of the trial's developments. Through this exploitation, the existing Greenhouse trial apps will be inter-connected with more external systems and their usability will be further evaluated. In addition, commercial exploitation of the apps will be realised by the trial team's SMEs (Innovators and MOBICS) based on business models, which are currently being developed.

2.3   Trial 431 - Fish distribution planning

2.3.1   Trial Overview

2.3.2   Purpose of the trial

The Fish Distribution Planning Trial is used to demonstrate the capabilities of the collaboration platform to support business processes during the planning of transport, and contributes to improvement in business interaction and collaboration between shippers and carriers.

Within a context of export of dry/frozen fish in refrigerated containers from Norway, the trial was used to set up user- and functional requirements for the development of one domain Application that would, to-gether with other functionalities of the FIspace platform, facilitate market and planning operations: publi-cation of transport service offers and demand, bid offers, benchmarking of services, match-making, search for cargo available for transport and assessment of booking requests.

The main challenge on focus in the trial is the frequent and high number of late cancellations of transport bookings by shippers, which often results in the vessel sailing at less than full capacity. The motivation behind the CargoSwApp has been to cope with these late cancelations and enable carriers to quickly react and find replacement. In addition, the Application shall offer the possibility to assess each booking, and enable the carrier to anticipate cancellations (using overbooking in a more effective manner). By ex-tending the scope of the CargoSwApp, functionalities for shippers have also been added: the possibility to search the market place via the cargoSwApp and benchmark service offers at shipment level (versus service level as offered by the MOS). The Cargo SwApp allows for immediate information exchange be-tween shipper and carrier.

Business relevance

The "Fish distribution trial" and associated Application CargoSwApp is relevant first and foremost for the spot market for container shipping. Indeed, Fish export is a typical spot market for regional sea carriers, characterized by homogeneous services, high competition and relatively low customer loyalty or use of long-term contracts. The low predictability of transport demand and a high number of changes and can-cellations in bookings represent a challenge for carriers, affecting the capacity utilization and limiting their potential to offer customized services. Hence the aim of the Fish case is to show how business collabora-tion can enhance transparency and visibility in container shipping, thus improving the quality of transport planning for both ship operators and cargo owners, and lead to higher capacity utilization and service level.

That being said, in the context of the Fish Trial, FIspace can support more broadly the management of business processes like operation planning, the marketing, sale and purchase of transport services, con-tracts negotiation, all based on real-time information.

The picture below illustrates how distinct combination of FIspace Apps can provide business process support throughout the entire transport chain (vizualised by distinct colours).

FISpace for Fish Supply Chain
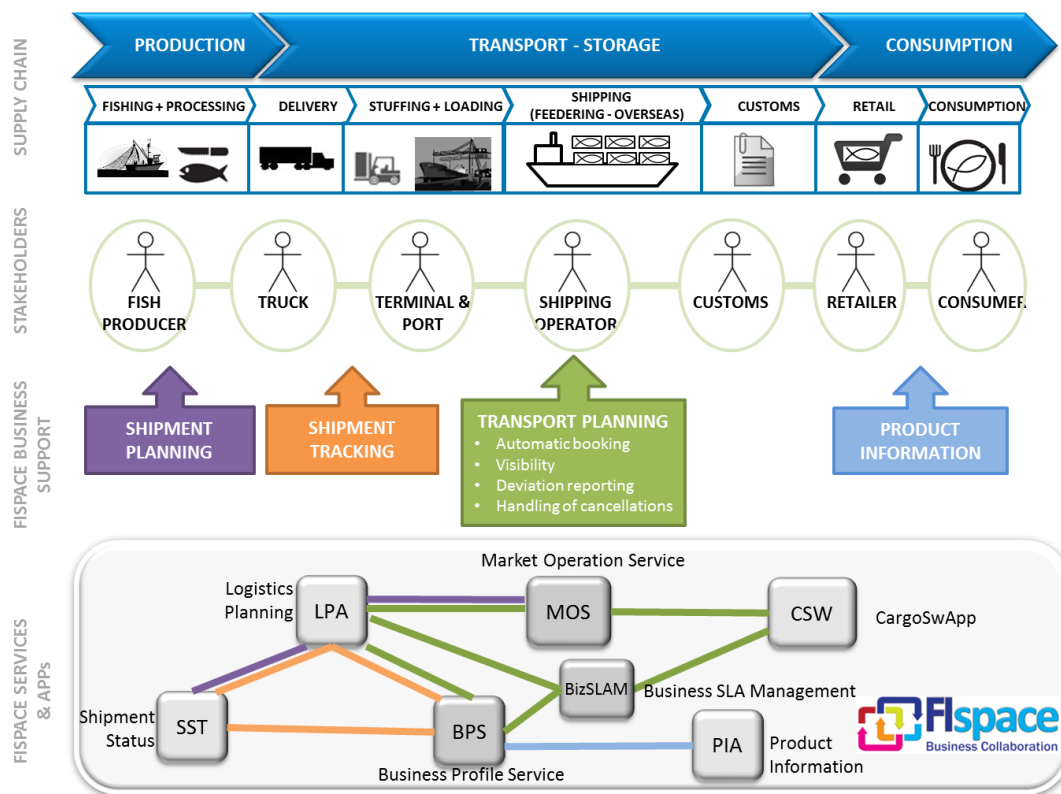
Figure 14:   Expected benefits through FISpace.

The potential contribution of FISpace to business performance from the perspective of a carrier is summarised below, showing the relationship between business performance objectives and FISpace functionalities.
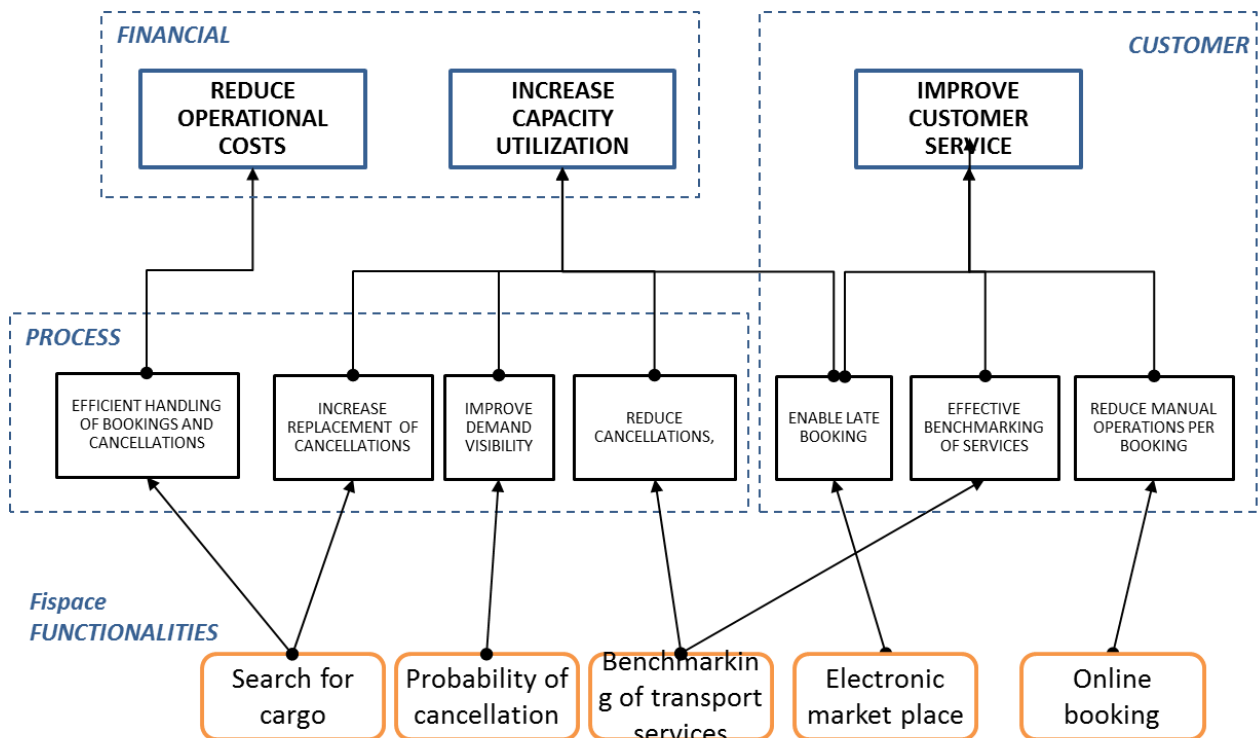
Figure 15:   Benefits Diagram

The challenge of capacity utilization is not only characteristic of spot markets like the one in the Fish trial, but of many freight transport segments: shortsea and deep-sea transport, container or all for of unitised cargo, spot markets and also market with blanket and volume contracts etc.

Ultimately, the goal should be to ensure best use of transport capacity, smarter use of available capacity by ensuring more accurate and timely match-making between offer and demand. Concepts like electronic market place, match-making, last minute booking.. are not new especially for sectors like retail or passenger transport. Electronic logistics market places also are appearing, under distinct governance models. The vision in the FIsh trial is therefore not new, but what is innovative with FIspace is:

- Easier connection among business entities

- Effective and secured information exchange

- Easier uptake for small actors

2.3.3   Trial Team

The Fish Distribution Planning trial is realized by:

MARINTEK   Trial lead, trial coordination, building scenario for App test, describe user requirements, input and feedback on App development, organise stakeholder meetings, and report on working progress.

SDZ   Open Call partner, developer of the Application "CargoSwApp" (match-maker and search engine for replacement cargo in last short window before departure)

NCL   North Sea Container Line. Industrial representative, provides some data for test, input for App development (user needs), feedback on demo.

2.3.4   Report on Trial Work

2.3.4.1   Overview across the work done through M1-M24

Through the entire project, the work related to the Trial "Fish distribution (re)planning" consisted of:

- Description of the trial: described business context, challenges, needs for improvement
- Set-up of working plan
- Description of requirements to the FIspace platform, and functionalities needed to support the to-be vision of the trial
- Set-up of requirements for Open Call Domain specific Apps (cargo search, pricing and probability Apps).
- Revision of the Trial plan based on outcome from Open Call: the App "cargo search" to be developed by SDZ
- Kick-off with SDZ and revision of functional and business requirements
- Development of the CargoSwApp: requirements, specifications, mock-up, prototypes, tests and updates. Regular meetings MARINTEK-SDZ
- Presentation of the Trial and CargoSwApp at conference, in papers, brochure, and through a video demonstration.
- Collection of feedback from stakeholders and potential users

2.3.4.2   Progress M19 – M24

The last reporting period has focused on finalizing the Application, and make it more generic so that it can be applied in the Fish Trial, but also in a broader context. The work has resulted in an Application that links providers and customers of container shipping services from terminal to terminal.

Dissemination activities included presentation at conference, update of brochure, video demonstration, and stakeholder meetings.

The testing done in M19-M24 period focused on verifying whether the Applications support business processes, how effectively, and whether the integration among the Applications is ensured. The test has been focused on the CargoSwApp, rather than LPA and MOS has previously planned. This is because the CargoSwApp covers most of the functionalities required in the Trial, and test was possible independently from the integration CargoSwApp-MOS.

The Experimentation plan has been updated, and the red circles indicated the tests conducted so far.
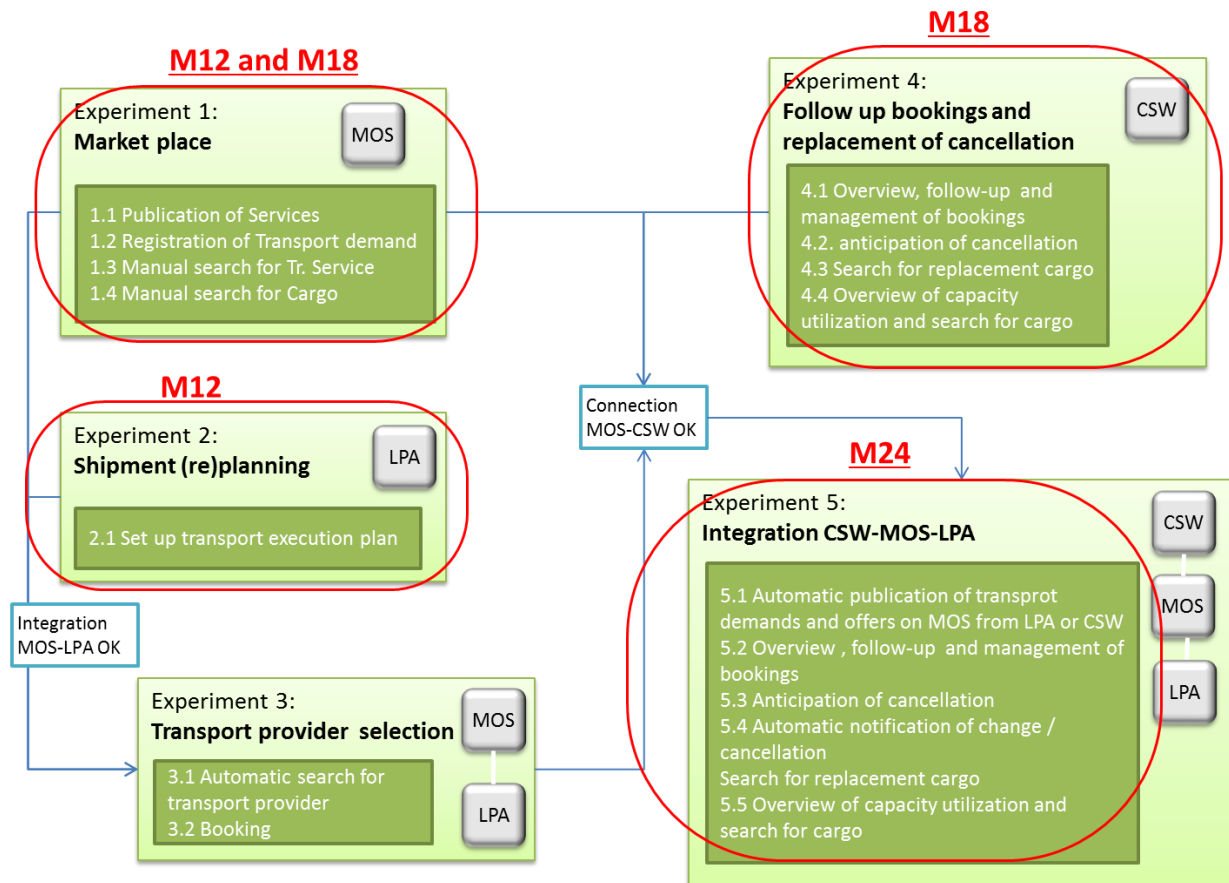
Figure 16:   Updated experimentation plan

The experimentation 3 was not conducted because because transport planning (search for transport service) from shipper side was directly simulated in the CargoSwApp.

2.3.4.3   App Development

The fish trial app "Find Cargo Replacement" App (CargoSwApp) has been developed in collaboration between SDZ, MARINTEK, NCL, and tested in several rounds, either through online demos, face-to-face demos, workshops among the partners etc.

Access to CargoSwApp: http://176.9.164.3/cargoswapp/

Access to video: http://www.cargoswapp.sdz.de/cargoswapp/Content/Video.wmv

Figure 17:   The main test elements and results are summarized below:

Functionality requirement	Test result
Shipper publishes transport demand on marketplace through the CSW	Yes. Integration MOS-CSW ok.
Carrier - overview , follow-up and management of bookings	OK
Carrier - searches the marketplace through CSW and sends offers through CSW	OK
Carriers - Anticipation of cancellation	Probabilities are calculated based on the customer's booking history
Carriers - Automatic notification of change / cancellation	OK
Carriers – treatment of pending reservations	Not implemented
Carrier - vessel capacity utilization chart	OK
Carrier - visualizes the cargo available directly on the capacity utilization chart	Not developed

The CargoSwApp is integrated with the Market Operation Service (MOS) and FIspace.

2.3.4.4   Key Performance Indicator

The following KPIs aree suggested for evaluating the performance enabled by FIspace. No measurement has been possible in the project due to no possibility to test FIspace in real business conditions.

Performance area	Objective	Measure	Target	Rational
BOOKING MANAGE-MENT	Automatic Book-ing	Share of bookings not made by mail/phone/fax	99% of bookings	All bookings online, through Fispace, and connection to back end systems
	Booking reliabil-ity	Share of bookings and requests that resulted in actual transport	+50%	More transparency of ser-vices and possibility for last minute booking reduce need for dummy bookings
	Replacement of booking cancel-lations	Share of booking cancella-tions replaced	75%	Rapid cago search through CSW
	Booking proba-bility accuracy	Share of anticipated can-cellation	+50%	Calculate probability of cancellation by CSW
OPERATION-AL COSTS	Planning costs	Manhours for handling bookings	-50%	Automatic booking through FIspace
	Re-planning costs	Manhours for handling replacement of cancella-tions	-90%	Rapid cago search through CSW
VALUES FOR TRANSPORT USERS	Transport plan-ning efficiency	Lead time and manual work to find best offer (stop searching)	-50%	Search online market place through FIspace
	Automatic book-ing	Share of bookings not made by mail/phone/fax	+90%	Use of LPA and MOS
VESSEL UTI-LIZATION	Transport ca-pacity use	Average load factor	+50%	Visualization on CSW
	Replacement of late cancella-tions (vol.)	Share of late cancellations cancellation replaced (in nbr. of containers)	75%	Use of CSW by carriers
	Rapidity to find replacement	Active time to find replace-ment after cancellation;	-90%	Use of CSW by carriers

Figure 18:   Key Performance Indicator

FIspace
Business Collaboration

2.3.4.5   Balanced Scorecard

Applying the balance scorcard to the Fish trial, the following requirements for performance and potential benefits from FIspace have been identified.

Balance Scorecard for Fish Trial

Vision:	Better transport offer and services, as a result of higher capacity use, lower operational/planning costs, and more effective planning
Stakeholders:	Trial's core business relationship: (1) Feeder shipping operator NCL, (2) Cargo owner / Shipper (Fish exporter or forwarder)
Logic:	Improve information availability => improved info exchange => Improved transparency => More visibility => better planning => better services

Perspectives for improvements:

BSC perspective	Requirement for improvement
Processes	Planning; booking performance
Employee	Operational efficiency
Customers	Value for transport users
Finances	Vessel capacity utilization; More sales

Figure 19:   Potential benefits

Potential benefit for carrier	Potential benefit for shipper
- Better communication/ information - Higher visibility, better prognostics - Higher operational efficiency - More time to replan - Effective search for replacement cargo - Better capacity utilization - Less late cancellations - Higher environmental efficiency	- Efficient benchmarking of services - Access to real-time, up-to-date and correct information - Easy booking (less manual work) - Possible last minute booking - Incentive for more accurate planning

2.3.5   Evaluation and Conclusion

The Fish trial has enabled the team to develop a FIspace Application that can support business interaction between carriers and shippers, particularly SMEs operating in spot market. The CargoSwApp offers the main functionalities necessary for customer and providers of transport service to find information and conduct business: a market place to publish and find information and a match-maker to optimize resource allocation.

The Application is integrated in FIspace, but works also as a stand alone application. The missing link is the integration with back end systems.

The trial offered the possibility to increase dialogue with industry for collecting ideads, feedback, and create awareness around FIspace.

Results have also been disseminated at conferences and through papers.

The Trial activity has enabled the team to understand the challenge of capacity utilization in shipping and late cancellations better, seeing the big picture and consider other relevant solutions to complement the support offered by FIspace. The team has also looked for other relevant domains for application of the ideas developed through CargoSwApp, beyond the context of the Fish distribution trial and looking at maritime transport in general.

FIspace
Business Collaboration

The results from the trial are still theoretical, not based on real life testing. Besides, such a solution, also highly relevant, requires users. However, the team plans to continue the design of the concept in order to fit a large user community than the one described in the Fish trial.

The CargoSwApp and FIspace will be used as prototypes for demonstrations and basis for workshops with shippers, freight forwarders and carriers in Norway. The purpose of this work will be to create more awareness around the benefit of collaboration and Future Internet benefits in order to make better use of transport capacity, and design together a solution that is adapted to the local market.

2.4   Trial FFV - Fresh Fruits and Vegetables

2.4.1   Trial Overview

The FFV trial builds on a network of interconnected actors that represent the following stages of the food chain (see figure 1):

Figure 20:   Principal organization of the FFV food chain.

Starting from production on farms, products are collected by traders (often organized as farmers' cooperatives), and sold to retail which might involve procurement centers that are responsible for sourcing, distribution centers that collect products from different sources and allocate them to different retail outlets, and retail outlets organized as e.g. supermarkets that provide the link to the consumers as the final customer.

The organization of this network is supplemented by laboratories linked to farms and traders that provide food safety and food quality analysis, logistics providers that provide transport, and service providers that provide re-usable packaging (Returnable Transport Items, RTIs) in form of crates and pallets.

In intensive discussions with FFV stakeholders in general and the trial participants specifically, the following core lines of information interests where identified for being dealt with in the trial:

1. Interest of trade, retail, consumers, authorities

A major interest concerns the communication of information from all stages of the chain but especially from farms for use by trade, retail, consumers, and where relevant, for use by food safety authorities (forward communication). Information interests involve, first, information related to food origin, food safety, food quality, social concerns, and on environmental impacts (static information).

Secondly, they include information on deviations in food safety, food quality or delivery status provided by early stages of the chain, by monitoring activities along the chain, or by authorities in case of food safety problems where a fast track is required to allow timely reaction by those concerned (dynamic information).

Traders (and the farms linked to them) could provide information on origin but also information on a specific product's quality and contaminations (e.g. from laboratories) as well as on the production process (spraying, etc.) of the individual sales product. Monitoring information could be provided by all stakeholders along the chain and especially transport services.

2. Interest of RTI service provider: Crate management

The focus of RTI service providers is on dispatch advises that inform the RTI service provider on traders' RTI deliveries with products to their customers such as retail. A confirmation on receipt of RTI deliveries with products by retail completes the 'handshake'. Organizing an electronic 'handshake' is of prime interest to all stakeholders concerned in improving efficiency. In addition, an electronic handshake could provide all stakeholders with most actual information on the movement of RTIs. Furthermore, as dispatch advices and confirmations on receipt usually do not only include information on RTIs but also on the products carried by the RTIs, the approach allowed automated tracking of deliveries and transportation status throughout the chain and the provision of a tracking and tracing service.

The project initiated the development of Apps for all of these information interests. The App PIA dealt with the communication of static information, the App RISKMAN with information on deviations (dynamic information), and the App BOXMAN with the information interests linked to the movements of crates (RTIs).

2.4.2   Trial Team

The trial was built around various pillars with different responsibilities. The first pillar dealt with the coordination of the trial activity with the platform development initiative of work package 200 and the App development activities in task 450. It was supported by various members of partner ATB. The second pillar dealt with the coordination of stakeholder enterprises linked with the trial activity. It was supported by various members of partner Europool Systems International. The third pillar dealt with the coordination of all trial activities. It was supported by various members of partner CentMa. The activities around the various pillars were supported by partner GS/1 representing the standardization initiatives within the project.

The team was supplemented by the open call partners snoopmedia and Fraunhofer who entered the project at a later stage and were developing specific Apps for the trial.

A number of stakeholder companies were linked to the project from the very beginning. They served as discussion partners and provided expertise on business needs and the relevance of App developments. Apart from EPS International which had entered the project as partner, the following enterprises provided appropriate trial support:

1. The company Landgard as a major trader of fruits and vegetables which also represented farmers as primary producers.
2. The company EDEKA as a major retail company with its procurement center and distribution centers.
3. The company Vendel as a major provider of transportation services.

2.4.3   Report on Trial Work

2.4.3.1   Overview across the work done thru M1-M24

The trial activities during the course of the project involved a variety of initiatives.

1. Analysis of the needs of stakeholders in improving efficiency and transparency along the chain related to food safety and quality, which, in turn would improve competitiveness.

2. Specification of appropriate concepts for serving the needs through IT solutions based on the FIware and FIspace technology.

3. Initiating the development of Apps (PIA, RISKMAN, and BOXMAN) for serving the needs which included the activation of new partners through an open call.

4. Demonstrating prototype developments to core stakeholders (operational level and board level) at various occasions and discussion of relevance, improvement needs and operational value.

5. Demonstrating prototype developments at conferences and open stakeholder meetings.

6. Identification of key performance indicators (KPIs) and delineating KPIs with potential for experimental analysis during the duration of the project.

7. Clarification with stakeholders the Apps contribution to serving the KPIs that could be dealt with in experimental evaluation.

8. Preparation of prototype Apps for transfer into operational systems with specific focus on BOXMAN (actually being transferred) and RISKMAN (being transferred through follow-up project FINISH).

2.4.3.2   Progress M19 – M24

During the concluding period of the project the main focus was on

a) the finalization of the prototype development,

b) the clarification on how to move towards operationalization,

c) the interaction with stakeholders as potential users,

d) the presentation at open stakeholder meetings, and

e) the finalization of experimental activities in line with the KPIs relevant for experimental evaluation.

2.4.3.3   App Development

The trial focused from the very beginning on three core Apps which were considered the backbone of any further App developments. They include the Apps PIA, BOXMAN, and RISKMAN. Additional Apps with relevance for the trial were developed within the Flowers trial. The PIA App was developed within the project as an initial App with relevance for various trials. Its development was in the hands of partner ATB. The Apps BOXMAN and RISKMAN were part of the project's open call and were developed by the new partners Fraunhofer and snoopmedia.

PIA

The focus of PIA is the collection and communication along the food value chain. It allows forward communication from the source (producer) to the end (retail and consumers) as well as backward communication form the end (retail) to the source (initial producer). This is a very general task which is relevant for any chain irrespective of the products involved. The outline and organization of PIA has been described in various deliverables of the project.

The 'general' PIA development was adapted to the specific needs of the FFV trial and discussed with stakeholders of the chain (especially trade and retail) several times. The initial discussion was on implementing the App along the chain with all stakeholders. However, it became apparent that at this stage of cooperation among stages in the chain, the communication element (a) requires individual adaptations for each individual company and (b) should provide benefit to individual stages even if not all stages of the chain would participate.

Several alternative options for implementation have been discussed with stakeholders, the last time in a joint meeting in January 2015. One opportunity discussed for the trader stage involves the free distribution among all production farmers for communicating the necessary information to the trader who would then utilize it for providing information to the retail stage. This option would require additional development activities after the conclusion of the project. The example demonstrates the potential of PIA but also the need for further elaboration regarding its potential integration into the communication processes of the FFV chain.

RISKMAN

The focus of RISKMAN is the provision of early warning to stakeholders in the chain regarding food safety and food quality deficiencies. Early warnings are a prerequisite for eliminating potentially deficient prod-

ucts from reaching consumers. As a secondary benefit, early warnings that concern certain product categories but are not directly related to the specific products handled by a specific enterprise in a chain might help that enterprise to adapt its information and communication activities towards its customers and consumers by addressing their concerns.

RISKMAN builds its early warning approach on a variety of information sources. Enterprises who are interested in RISKMAN's services can chose to utilize all information sources, to concentrate on a single one or to ask for the integration of an additional one. The implemented information sources represent 'typical opportunities' each of which representing a cluster of closely related alternatives.

The alternatives include (a) data provided by enterprises at early stages of the chain such as producers or traders, (b) data from laboratories involved in food safety or quality analysis, (c) warnings from the European food safety authority (EFSA), and (d) information identified through an analysis of social media, specifically of Twitter. For realizing the first alternative, data provided by enterprises, RISKMAN links up with the App PIA.

BOXMAN

The focus of BOXMAN is on the management of the crates that are used in the distribution and selling of fresh fruits and vegetables. These crates represent reusable packaging which is linked with the distribution of products from the producer until retail. Empty crates are channeled back by retail to the crate management company which is responsible for cleaning the crates and their re-location to producers for the next cycle of use.

The crates carry information about products from producer to retail and are, as such not just a logistics element but a source of information for all stages of the chain. During its path through the chain, each enterprise monitors incoming and outgoing crates which provides the management company with an overview on the origin of products as well as on the various enterprises that were engaged in the distribution process.

As an internet-based service, BOXMAN facilitates the communication between enterprises and the crate management on crate movements. This is the primary benefit of BOXMAN. However, the inherent monitoring of the distribution path of products is an added benefit that might become the primary value of the monitoring service in the future.

With its management support in monitoring activities BOXMAN contributes to improvements in efficiency. This makes it of primary interest for companies to implement it in its operations.

2.4.3.4   Key Performance Indicator

The identification of key performance indicators (KPI) in the food and vegetable trial requires the consideration of the main stakeholders in the chain. They involve the crate (RTI) management group, the trading group, and retail. The KPIs for the stakeholders have been determined through the Balanced Scorecard (BSC) approach which is outlined in the next chapter. A summary of the approach and the results relevant for experimental initiatives are as follows:

The major business objectives were identified as competitiveness based on improvements in efficiency and market related sustainability. This can be captured in a variety of indicators that are outlined in more detail in the next chapter. Core indicators such as improvements in customer returns and the turnover/year that are expected as benefits related to the utilization of Apps can only be identified upon operationalization of the Apps in daily business activities and are not suitable for experimental analysis during the lifetime of the project. The relevant KPIs associated with investments and utilizations in the Apps that can be utilized in experimental activities are as follows:

BOXMAN
The implementation of the App BOXMAN could provide benefits for trader, crate management group, and retail. Its implementation would be through the crate management group, while trader, retail, and the crate management group itself would use the system through internet interfaces.

KPIs for experimental evaluation involve the following:
a) Reduction in process time by Box Service Provider
b) Reduction in process time by customers (trader, retail)
c) Reduction in errors by customers (trader, retail)

RISKMAN

The implementation of the App RISKMAN could be realized by any stage of the FFV chain. Its early warning capability is, however, most relevant for traders and retail. The early warning would be beneficial for the individual user but also for other members of the chain who could be informed about the early warnings. As an example, if the trader is being informed on food safety deficiencies identified by a laboratory he could initiate appropriate action but, in addition, inform customers and retail of the deficiencies if products have already left the premises of the trading enterprise.

KPIs for experimental evaluation involve the following:
a) Better early warning capability of user (Trader, Retail) and towards its customers

PIA
The implementation of the App PIA could be realized by any stage of the FFV chain. It supports the collection of information from suppliers and service institutions like laboratories and the communication of information to customers. The information presently considered in the App involves information about products, processes, and the status of enterprises such as information on certification regarding engagements in food safety and food quality initiatives.
KPIs for experimental evaluation involve the following:
a) Better information about products for customers along the chain such as trader and retail (forward communication)
b) Better information about production status of enterprises incl. farms for customers along the chain such as trader and retail

2.4.3.5   Balanced Scorecard

The KPIs for the stakeholders are being determined through the Balanced Scorecard (BSC) approach. The scorecards for the three core stakeholders in the FFV chain, RTI service provider, trader and retail, are outlined in table 1-3. Relationships between objectives (KPIs) are characterized by arrows in the tables.

Table 1: Scorecard RTI Service Provider

Perspective	Objective	Measure	Target	Activity
> Process perspective (info collection)	Reduction in process time	Min./process cycle/customer	- 50%	**Investment in BOXMAN** (automization of process)
> Customer perspective	Reduction in process time by customers (offer)	Min./process cycle at customers	- 50%	Provision of BOXMAN to customers for facilitating data input (automization)
	Better customer relationships	New customers per year	+ 10%	Provision of BOXMAN to customers for improved process efficiency
	Reduction in input errors by customers (time saving)	Errors/cust./ process cycle	- 30%	Provision of BOXMAN to customer (automization)
> Learning perspective	Increased flexibility in employee engagements	Freed time in process activity	- 10%	Investment in BOXMAN for reduction in process engagement (automization)
> Financial perspctive	Increase in customer returns	Turnover/year	+ 10%	Increase in customer acquisition
	Lower process costs	€/process cycle	- 10%	Reduction in time and personnel
	Lower costs for growth	Personnel for growth/year	- 10%	Less employees for process activities

Legend: Red cells in objectives indicate KPIs for experimentation; grey cells in activities indicate investments in Apps; arrows across rows indicate dependencies in objectives

Figure 21:   Scorecard RTI Provider

Table 2: Scorecard Trader

Perspective	Objective	Measure	Target	Activity
> Process perspective	Reduction in crate mgmt process time	Min./process cycle	- 50%	Utilizing BOXMAN provided by box service (automization)
	Better information about products	No of info items /delivery	+ 50%	**Investment in PIA-System**
	Better information about production status at farms (better marketing opportunities)	No of status reports per customer	+100%	**Investment in PIA-System**
	Better early warning capability on deficiencies in products	Time for informing customers	- 50%	**Investment in RISKMAN**
> Customer perspective	Better planning in customer service (early planning of deliveries)	Accuracy in projected delivery status (variability in weeks)	- 50%	Utilization of PIA-System
	Better guarantees in food safety and guarantee (risk reduction at customers)	No. of complaints	- 50%	Utilization of PIA-System
	Better customer relationships	Increase in customer returns	+ 10%	Utilization of PIA-System and RISKMAN
> Learning perspective	Increased flexibility in employee engagements	Freed time in box mgmt. process activity	- 10%	Utilization of BOXMAN
> Financial perspective	Increase in customer returns	Turnover/year	+ 10%	Better customer relationships
	Lower process costs (box mgmt.)	€/process cycle	- 10%	Reduction in time and personnel
	Lower costs for growth	Personnel for growth/year	- 10%	Less personnel for process activities

Legend: Red cells in objectives indicate KPIs for experimentation; grey cells in activities indicate investments in Apps; arrows across rows indicate dependencies in objectives

Figure 22:   Scorecard Trader

Table 3: Scorecard Retail

Perspective	Objective	Measure	Target	Activity
> Process perspective	Reduction in crate mgmt process time	Min./process cycle	- 50%	Utilizing BOXMAN provided by box service (automization)
	Better information about products (risk reduction)	No of info items /delivery	+ 50%	Investment in PIA-System
	Better information about production status at farms (better purchasing opportunities)	No of status reports per customer	+100%	Investment in PIA-System
	Better early warning capability on deficiencies in products	Number of cases where deficient products reach consumers	- 50%	Investment in RISKMAN
> Customer perspective	Trust in food products	Number of cases where deficient products reach consumers	- 50%	Utilizing RISKMAN
	Better transparency	Increase in sales	+ 10%	Providing consumers with information they request
> Learning perspective	Increased flexibility in employee engagements	Freed time in box mgmt. process activity	- 10%	Utilization of BOXMAN
> Financial perspective	Increase in customer returns	Turnover/year	+ 10%	Better trust and transparency for consumers
	Lower process costs (box mgmt.)	€/process cycle	- 10%	Reduction in time and personnel
	Lower costs for growth	Personnel for growth/year	- 10%	Less personnel for process activities

Legend: Red cells in objectives indicate KPIs for experimentation; grey cells in activities indicate investments in Apps; arrows across rows indicate dependencies in objectives

Figure 23:   Scorecard Retail

2.4.3.6   Evaluation and Conclusion

Was it worth to spend the effort?

As has been discussed frequently, the food sector has tremendous problems in realizing an appropriate transparency and communication system along the chain. The reasons are quite obvious and will not be outlined here. The concepts developed in the Fiware and FIspace technology open an opportunity for changing the situation. The developments and the discussions with stakeholders demonstrate the opportunity. However, the question remains if the emerging opportunities are being realized by the sector and its enterprises. The Fiware program is emphasizing the activation of SME system development groups for getting the Fiware technology into the market. This approach may lead to certain attractive developments with wider reach. However, when looking at the food sector as a whole, the activation of development groups needs to focus on grasping sector attention. The trial(s) are a first and necessary step into this direction. However, they needed to be complemented at a later stage by a major marketing effort.

Are the results convincing? Based on the results what will be the next steps (trial perspective).

The results of the project regarding the project focus are convincing. The Fiware and Fispace concepts seem to provide the base on which the sector can solve its pressing problems regarding transparency and communication along the chain and towards the consumer. The project links up with the follow-up

accelerator project FINISH which will continue providing support for SME system development groups. This will certainly support the utilization of the Fiware and Fispace technologies by system development groups. However, from a sector perspective, this focus may not sufficiently lead to sector wide engagements that might initiate a breakthrough of developments towards increased transparency and communication along the chain. Such a breakthrough will depend on the further developments of Apps within e.g. FINISH that directly approaches the needs and complement the initial prototype applications developed within the project.

Actions beyond the end of the FIspace project.

The FFV trial is, together with the trial 'Flowers and Plants' at the core of the follow-up accelerator project FINISH that aims at the development of operational Apps for perishable goods.

This project will support further communication of the prototype Apps which are used in meetings with stakeholders and IT companies for demonstrating the opportunities and power in App development. First of such meetings have already initiated new opportunities for utilizing the FIspace Apps beyond their initial focus. As an example, the developers of the RISKMAN App were approached by an industry association for developing an information service for their SME membership.

Commercial opportunities?

Commercial success depends on convincing products, an appropriate marketing strategy, and the ability to reaching the target audience. The project delivers convincing prototype products which serve important needs of the sector as identified during a preceding project (SmartAgriFood). It can reach the target audience through its project partner and supporting stakeholders. However, a marketing strategy requires products that are ready for being used. To this end, various initiatives are going on for transferring prototype applications into operational systems. The further development of BOXMAN is supported by a stakeholder who as project partner is interested in its implementation. RISKMAN is planning to participate in the follow-up project FINISH for transferring the prototype system with engagement of stakeholders into operational systems.

2.5   Trial 433 - Flowers & Plants Supply Chain Monitoring

2.5.1   Trial Overview

The purpose of this trial is to develop apps by which quality of (flowering) pot plants can be real-time checked and controlled throughout the whole supply chain from producer to retailer or garden center. Originally, the following apps where planned:

1. Item tracking and tracing: following the product lot real-time throughout the chain.

2. Conditions monitoring: measuring environmental conditions affecting product quality (light radiation, temperature and air humidity) real-time

3. Product quality assessment: measuring the product quality at crucial control points in the chain.

4. Product quality alerts: generating quality alerts based on the integration of data generated by the apps described under 1, 2 and 3

5. Quality decay prediction: on the basis of time series data generated by the apps described under 1, 2 and 3, the quality decay of products throughout the supply chain can be modelled and used to adjust the boundary values of environmental conditions in order to improve the product quality.

Furthermore in the open call, a Botanic Info App has been programmed that serves as a product information broker providing relevant product information to every relevant stakeholder in the supply chain.

2.5.2   Trial Team

Lead: DLO

Participants: Floricode, GS1 G, M&A

Open call partner: Q-Ray

2.5.3   Report on Trial Work

2.5.3.1   Overview across the work done thru M1-M24

The emphasis of the work has been on Item Tracking and Tracing: the unique identification of a lot of plants throughout the supply chain. However, during the development of this app, we faced several difficulties. In the first place, the main business partner went bankrupt at the end of 2013. The project team had to get new business partners involved, which was successful, but caused a delay of 6 months. Secondly, it appeared from interaction with these new business partners that unique identification of a plant lot throughout the supply chain was not possible, since product lots delivered by the producer were split and recombined by the wholesaler with other product lots before sending them to the retailer. Technically solving this issue would cost too much time. Unfortunately in November 2014 also this wholesaler went bankrupt. The activities of this firm where transferred to a competitor. This firm was only interested in conditions monitoring which got emphasis in the development. Parallel to this, the product quality assessment app and quality decay prediction app where developed without stakeholder interaction. Furthermore, the Botanic info app was developed.

2.5.3.2   Progress M19 – M24

During the period October 2014 to March 2015, the development of the items tracking and tracing app has been stopped. The conditions monitoring app has been developed and tested at the business partner (Hamiplant). Parallel to this, the product quality assessment app and quality decay prediction app where developed without stakeholder interaction, and by consequence without testing. Several attempts have been made to work on integration of the apps in the FIspace Platform, without success because the Platform development was delayed.

2.5.3.3   App Development

The current status is:

1. Item tracking and tracing: app development stopped.
2. Conditions monitoring: app ready and tested.
3. Product quality assessment: app ready, but not yet tested
4. Product quality alerts: app not developed because of lack of interest of the latest stakeholder and lack of possibilities to get it integrated in time in the FIspace platform.
5. Quality decay prediction: app ready, but not yet tested
6. Botanic Info App : development almost ready.

2.5.3.4   Key Performance Indicator

Because of the bankruptcies of stakeholders, no activities have been undertaken to calculate the KPI's.

2.5.3.5   Balanced Scorecard

Because of the bankruptcies of stakeholders, no activities have been undertaken to calculate the KPI's.

2.5.3.6   Evaluation and Conclusion

The progress made in this trial has been disappointing for two reasons:

1. The Bankruptcies caused a lot of delay and change of the focus, frustrating the app development.
2. The parallel development of the platform and the trial gave the feeling of building flying planes parallel to the development of airports. The lack of progress of the airport development prohibited landing of the planes.

Nevertheless, the intensive stakeholder interaction during this project has convinced us that a number of stakeholders are interested in application of the apps envisaged at the start of the project and developed during the project. Therefore a number of initiatives will be taken to proceed with development in the third phase project such as Finish. It is questionable to what degree the FIspace Platform will be applied in these app developments.

2.6 Trial 441 Meat Information Provenance (MIP)

2.6.1 Trial Overview

The overall goal of the Meat Information on Provenance (MIP) trial is to realize an efficient, scalable, and decentralized data provision in the meat supply chain that enables tracking (where does a specific meat item come from) and tracing (where are all related meat items), a series of functionalities are described in the following sections.

To achieve this goal the MIP trial has developed a new system that enables meat supply chain stake-holders and regulators or authorities to track and trace and – at the same time – allows meat consumers to use their smartphone (or internet) to get immediate and direct access to all information on the specific meat item they see at the butcher or in the supermarket. This meat transparency system follows meat through the supply chain and stores its history. Apps help supply chain partners to upload the data they want or have to share and apps help them, authorities and consumers to get the stored history in a format that fits the intended user.

Tracking and tracing is enabled by the MIP transparency system in two directions: from farm to fork and from fork back to the farm. This information will be stored in one or more EPCIS repositories to make it available for tracking & tracing by apps. These apps will inform consumers (what is the history of the meat item I am considering to buy?), meat supply chain partners (where are the meat items that went through my company?) and – in case of food alerts – authorities (where can we find all meat items that belong to some suspected lot?).

As the system is based on the international EPCIS standard, roll-out of the meat transparency system to other supply chains (other types of meat, other types of food and other countries) is easy and straight forward.
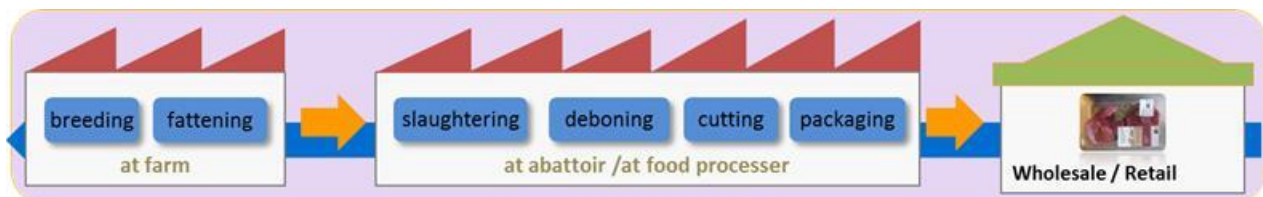
Figure 24:   Beef from farm to fork (orange arrows) and from fork to farm (blue arrow).

We distinguished three groups that can benefit from the new transparency system: (1) consumers, (2) meat supply chain partners and (3) authorities and regulators. The system now supports the first two groups. The third group of users are not directly supported. In this section the benefits for each of these groups will be summarized.

Consumers can use their smartphone in the shop (or a PC at home) to be informed about the meat product they are buying or have already bought. The information will include provenance (trace) and product information, including: dates of birth and slaughtering, place of birth and slaughtering, weight, ingredients (if applicable), certification, recipes, etc. When using a smartphone app, consumers can also make a personal profile of interest that tells the apps how to filter the information. From the questionnaires we used at the first consumer workshop at Plusfresc, Lerida, January 2015, we learned that consumers (~70%) want to know more about the meat products they buy, meaning the consumer app will positively affect consumers' experience at the retail shop.

Supply chain partners can benefit from the meat transparency system for tracking and tracing as ex-plained above. Farmers, slaughterhouses and meat processors will be able to know where their product is – or is being processed in. They will be able to know the history of the product starting from the farm. If the complete provenance information is passed to the consumers, farmers will benefit a lot because they can differentiate their products from those of other farms. Moreover, a farmer's investment, e.g. in sus-tainability or in animal friendliness, will be made visible for the meat consumer.

Authorities are able to control and enforce regulations in case of a meat alert such as the horse meat scandal. However, no specific app is developed for authorities. However, the apps in use at the supply chain partners will enable authorities to provide fast and surgical response in case of meat crises.

2.6.2   Trial Team

The Meat Information Provenance Trial is realized by:

- Wageningen University (trial lead)
- GS1 Germany (standards, EPCIS and meat supply chain processes)
- European EPC Competence Center (apps/software based on EPCIS)

2.6.3   Report on Trial Work

2.6.3.1   Overview across the work done thru M1-M24

The MIP trial used the first year to involve stakeholders (farmer, meat industry, retailers) and to set requirements to the new transparency system, including the apps to work with it. Involving stakeholders has been attempted along various ways. The MIP trial tried to organize workshops for the stakeholders, held an inquiry and tried to raise interest by person to person conversations. All these efforts did not result in active involvement of the stakeholders in experimentation with the new meat transparency system in practice. Nevertheless the trial partners made efforts to include intentions and requirements of the meat supply chain partners indirectly; e.g. GS1 Germany integrated the sector know-how built up by intense cooperation with various stakeholders.

The second main activity – specifying requirements for the transparency system and its apps – was more successful. It resulted in a substantial response to what the MIP trial asked in FIspace's Open Call, i.e. 16 proposals for the MIP trial apps. The selection procedure resulted in one new partner, the European EPC Competence Center (EECC), which has a lot of experience on setting up EPCIS-based transparency systems.

The MIP trial raised awareness for it at several occasions including the GIL Conference in Bonn (2014), Germany, the SmartAgriMatics Conference in Paris (2014), the European Conference on the Future Internet in Munich (2014) and the EURID (International Exhibition and Conference for Identification) in Frankfurt (2014).

2.6.3.2   Progress M19 – M24

At FIspace month 19 the MIP trial transparency system for meat and its four tools were available in a first release (draft prototype) and were tested at a technical level. The reporting period M19 – M24 is used to review the transparency system and its apps. Based on the review, the apps have been improved, leading to a second release (improved prototype). This improved prototype has been used for experimentation, following a range of use cases that will be discussed in the next section.

In addition to this experimentation, the system has also been tested with data generated by a model that aims at simulating representative events in the history of meat from the farm until the retailer shop.

2.6.3.3   App Development

The development of the meat transparency system started after entering of EECC into the MIP trial through the open call. The first part consisted of realizing one or more EPCIS repositories, which are based on Frequenz's Information Repository & Intelligence Server (IRIS)[1], one of only a few EPCIS implementations that can handle the new EPCIS standard 1.1 (released in summer 2014). On top of the EPCIS repositories, four apps were developed by EECC, based on the requirements by the MIP trial team. These will be discussed below.

Next to this data infrastructure with functional interfaces for capturing and querying events, a series of apps has been developed by the open call MIP trial partner, European EPC Competence Center, in collaboration with the other partners GS1 Germany and Wageningen University, consisting of the following:

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[1] http://frequentz.com/solutions/information-repository-intelligence-server/.

Figure 25:   The four apps developed in the MIP trial

1. Farm Capture App: a simple web-page-like app to enable farmers to copy animal passport data (and more) as EPCIS events and master data on other aspects to an EPCIS repository. Other supply chain parties should capture and upload their events from their ERP systems.
2. Query App: to enable standard EPCIS query operations, i.e. queries about raw, intermediate or end-meat products for specific business locations, processes, time intervals, etc.
3. Discovery App: to discover which business party has information about a specific object, e.g. a product identified via Global Trade Item Number (GTIN).
4. Aggregation App: to collect and aggregate automatically traceability information about a given end or intermediate product and their presentation. This app will be based on the Query App and the Discovery App.

A fifth app, the Consumer App will be co-designed in collaboration with FIspace's Tailored Information for Consumers (TIC) trial. This collaboration can build on previous experiences in FI-PPP phase 1 project SmartAgriFood.

The improved prototype version of the apps have been tested in a series of experiments, each based on a realistic use case.

1. Farmer: In case of problems with a processor: where are my products?
   This use case needs first the Farm Capture App for entering data (e.g. birth of a calf) and subsequently the Aggregation App to show the data. This Aggregation App uses the Query App to find the data and – in case the data are in several EPCIS repositories – the Discovery App is needed too. A farmer has to enter his GLN[2] only.
2. Discovery App use case: Where are all relevant event data located? Which business party has information about a specific object?
   This use case uses only the Discovery App. Enter the (S)GTINs[3] to find the location of the object.
3. Slaughterhouse: Which processors handled my products?
   If the slaughterhouse wants to find a suspect meat processor that handles the carcasses of his slaughterhouse, the Query App will be used to determine it. This can be done by entering the GLN of the suspected processor.
4. Meat Processor: Do all my beef burgers come from a certain farmer?
   This use case uses the information from the Aggregation App, that in turn uses the Query App and – if needed – the Discovery App. The meat processor enters the SGTIN of his products.
5. Distributor: When was the animal slaughtered and how old was the animal?
   This use case also uses the Aggregation App and indirectly the Query App and – in case of more than one EPCIS repository – the Discovery App. This can be done by entering LGTIN of a product..
6. Authorities: Where are all products now to which processor X had custody?
   This use case also uses the Aggregation App and indirectly the Query App and – in case of more than one EPCIS repository – the Discovery App. Enter GLN and timeframe to find all products of processor X.
7. Consumer: What is the history of my piece of meat?
   The TIC app for consumers is used to provide the history of the meat. Consumers scan the QR-code on the meat. The TIC app will than invoke the Aggregation App to show the history of the piece of meat, from farm to shop.

Each of the four MIP trial apps, being the Farm Capture App, the Query App, the Discovery App and the Aggregation App, is described in more details in a showcase.

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[2] Global Location Number (http://www.gs1.org/gln).
[3] Global Trade Item Number (http://www.gs1.org/gtin).

2.6.3.4   Balanced Scorecard

As the MIP Transparency System aims at serving three classes of end-users (consumers, supply chain partners and authorities/regulators) the MIP trial objectives can be made explicit by specifying an adapted balanced scorecard), which will be translated into KPIs.

#	subjective	objective	measure	target	activity
1	all user types	real-time information on meat items	fast, ubiquitous and real-time access to all events along meat supply chains	realised in experiments	realisation of the MIP Transparency System
2	authorities	surgical response to meat crises	fast access to locations of suspected meat items	within one hour	Discovery App in combination with the MIP Transparency System
3	authorities	one single point to get access to the information	prepared data at discovery service server	always available (but in practice it will be updated once or twice a day)	Discovery App in combination with the MIP Transparency System
4	authorities	completeness of meat related data for proper analysis	checks on completeness of these data	realised in experiments	running experiments with the MIP Transparency System
5	farmer	integrate farmers to the chain of information	affordable infrastructure and know-how	cheaper than € 1.000	Farm Capture App in combination with the MIP Transparency System
6	farmer	provide data very easily to the transparency system	usable web-form to provide data, according existing rules	100% content from cow pass (EC1760/2000)	Farm Capture App in combination with the MIP Transparency System
7	farmer	direct communication with consumers	consumer interview	yes, if this can help me to get better food	Farm Capture App in combination with the MIP Transparency System and the Consumer App; farmer should provide email address and/or social media URL
8	meat processors	not high investment, but based on existing systems (ERP)	affordable infrastructure and know-how	cheaper than € 5.000	Enabling meat processor's ERP system to upload data to an EPCIS repository
9	meat processors	more than one step back and one step forward information	testing potential steps forward and backward in SC	3 companies in total in half an hour	Query App in combination with the MIP Transparency System
10	meat processors	direct communication with consumers	consumer interview	yes, if this can help me to get better food	Capturing data with ERP or otherwise in combination with MIP Transparency System and the Consumer App; meat processor should provide email address and/or social media URL

#	subjective	objective	measure	target	activity
11	retailer	batch based origin of a specific piece of meat can be shown to consumers	consumers' attitude on acceptance and turnover plus for retailers	degree of acceptance by clients and turnover raise few percent for the retailer	Convincing retailers on business case and implementing the MIP Transparency System
12	consumer	most relevant information on the piece of meat	display of dynamic and static information on a piece of meat	minimum set of provenance plus 3 user required information items	Consumer App in combination with the MIP Transparency System
13	consumer	tailored information on the piece of meat	user interview	good or better	Consumer App in combination with the MIP Transparency System
14	consumer	ease of use, e.g. smartphone, WWW	user interview	good or better	Consumer App in combination with the MIP Transparency System
15	consumer	promptness of information on the piece of meat	time of output	5 sec and realised in experiments	Consumer App in combination with the MIP Transparency System

Figure 26:   Balanced Scorecard of the MIP trial

2.6.3.5   Key Performance Indicator

The MIP trial had planned 3 different series of experiments. In the first set of experiments (also referred to as the simulation experiment) starting in the autumn of 2014, the first release of all apps was tested for beef, without the Consumer App that will be developed by the TIC trial. The emphasis was on correct functioning of the apps and what had to be changed according to the test perceptions of (potential) end-users. This series of experiments with simulated data was performed in the last part of the project, i.e. in month 24.

In the second set of experiments (also referred to as realistic experiments) the whole integrated MIP Transparency System is tested for beef. This includes but is not restricted to (1) tracing of the beef history for consumers by using the MIP Transparency System and the TIC Consumer App, (2) tracking and tracing of the whole supply chain for beef supply chain partners (bi-directional with simple and more complex queries concerning data for which they have authorization to see) and (3) simulating meat alerts for beef and associated functionalities and how authorities/regulators can use it. This set of experiment could not be performed in a real beef supply chain, as the meat industry was barely interested and not willing to cooperate in MIP experiments. Therefore the MIP trial defined use cases to test the new transparency system and its apps. The results of testing with these use cases were used for further improvements.

Around month 12 of FIspace an opportunity appeared from contacts with interested parties that are affiliated with authorities/regulators (e.g. UN/CEFACT). In collaboration with these parties a third set of experiments was executed with the MIP Transparency System for other types of meat, i.e. pork in the Netherlands and poultry (chicken, duck and goose) in France. It has not been realized within the FIspace project period.

From the Balanced Scorecard a series of Key Performance Indicators was derived to serve three classes of end-users (consumers, supply chain partners and authorities/regulators). The KPIs are specified for the same three subjectives. The category supply chain partners is further decomposed into farmers, meat processors and retailers, as these have largely different perspectives too.

Figure 27:   Key Performance Indicators of the MIP trial. The numbers (#) refer to the coinciding rows of the balanced scorecard

#	subjective	kpi explanation	result	unit
1	all user types	access to events	fast access to events	h:m:s
2	authorities	found locations of suspected meat items	all locations should be found	
3	authorities	measured time lag meat crisis	time to find all suspected meat	h:m:s
4	authorities	completeness of information	all information that is re-quired, is provided	yes/no/partly
5	farmer	integration farmer	farmers have access and can provide all event related information	yes/no/partly
6	farmer	easy entering cattle data in epcis re-pository	farmers can provide all event related information	< € 1000
7	farmer	direct communication with consumer	farmers that want response from consumers can get it	qualitatively
8	meat pro-cessors	integrating meat processors	meat processors have ac-cess to provide data at rea-sonable costs	< € 5000
9	meat pro-cessors	access to all relevant information (whole supply chain)	meat processors have ac-cess to all data that is con-nected to the meat they processed (from farm to retailer)	yes/no/partly
10	meat pro-cessors	direct communication with consumer	meat processors that want response from consumers can get it	qualitatively
11	retailer	communicate origin of batch to con-sumer	retailer should be enabled to communicate the origin of all their consumer meat products to their customers	yes/no/partly
12	consumer	consumer app provides complete in-formation	consumers should get ac-cess to meat related infor-mation with their smart phone and a product label	yes/no/partly
13	consumer	consumer app provides tailored infor-mation	information for consumers should be filtered according to the preferences	qualitatively
14	consumer	consumer app is easy to use	consumers should get ac-cess to meat related infor-mation on an easy way	qualitatively
15	consumer	consumer app is fast	consumers should get fast access to meat related in-formation	h:m:s

2.6.3.6   Evaluation and Conclusion

In the MIP trial an innovative transparency system for meat has been developed, which is based on the new EPCIS standard that can handle irrevocable events, e.g. a slaughtered cow can never become alive again or even one single piece as it was in the beginning. The system consists of one or more EPCIS repositories that contain all events of a meat item starting at the farm, and subsequently passing the slaughterhouse, meat processors, distributors and or cold store to arrive finally in the supermarket. At the end of the FIspace project the transparency system is a rather well tested prototype that forms the main result of the MIP trial.

During the two years of the FIspace project, another competitive service has been developed that is also based in EPCIS and intends to provide the meat history to meat consumers. It is called fTrace and is more or less in its current version during spring 2015. The MIP trial transparency differs from fTrace in several decisive aspects. Opposite to fTrace that starts to collect information in the slaughterhouse, the MIP transparency system collects already data at the farm, starting with the birth of a calf and even including medical treatments, feeder regimes and other relevant events. Moreover, fTrace serves only consumers that want more information, while the MIP transparency system for meat serves consumers, supply chain partners and authorities. These intended end-users get information from the same data, but as answers on different questions that these users may have and with a different view on the information.

With the progress of the trials there was the plan to test the functionalities of the MIP apps together with the TIC trial in a supermarket environment. A first workshop took place in Spain at the end of M22. A group of 19 end-consumers was asked to fill in a questionnaire after having experienced the different MIP apps in combination with the smartphone apps provided by the TIC trial. After a simulated Data Capture on the Farm Level: the present individuals easily could use their smartphone to query and get access to different transparency data.
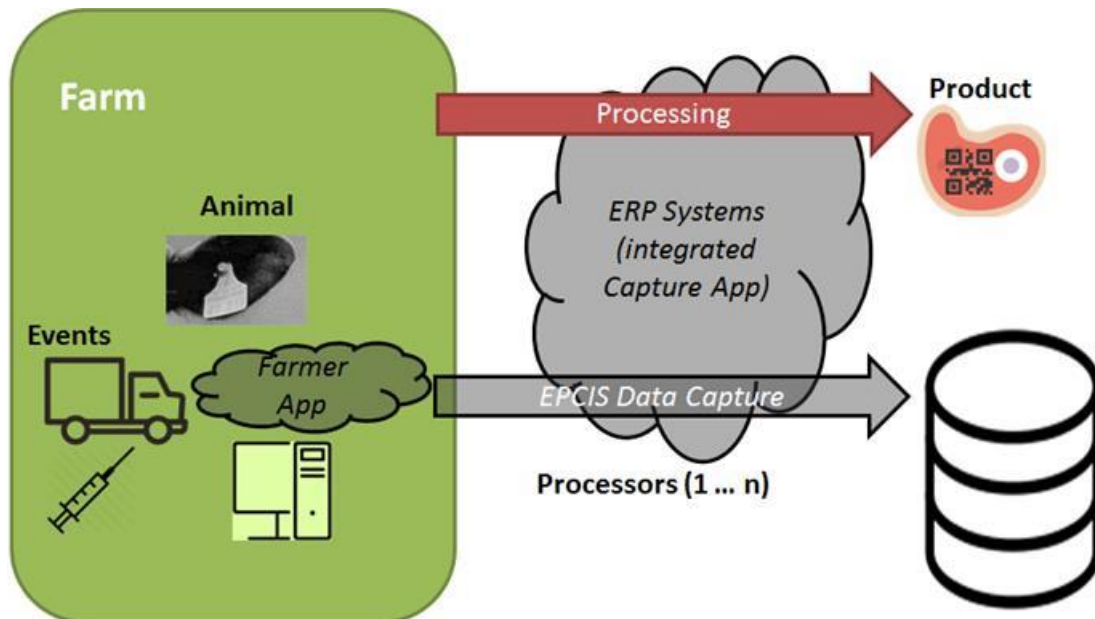
Figure 28:   Data Capture – Upload on Farm Level.
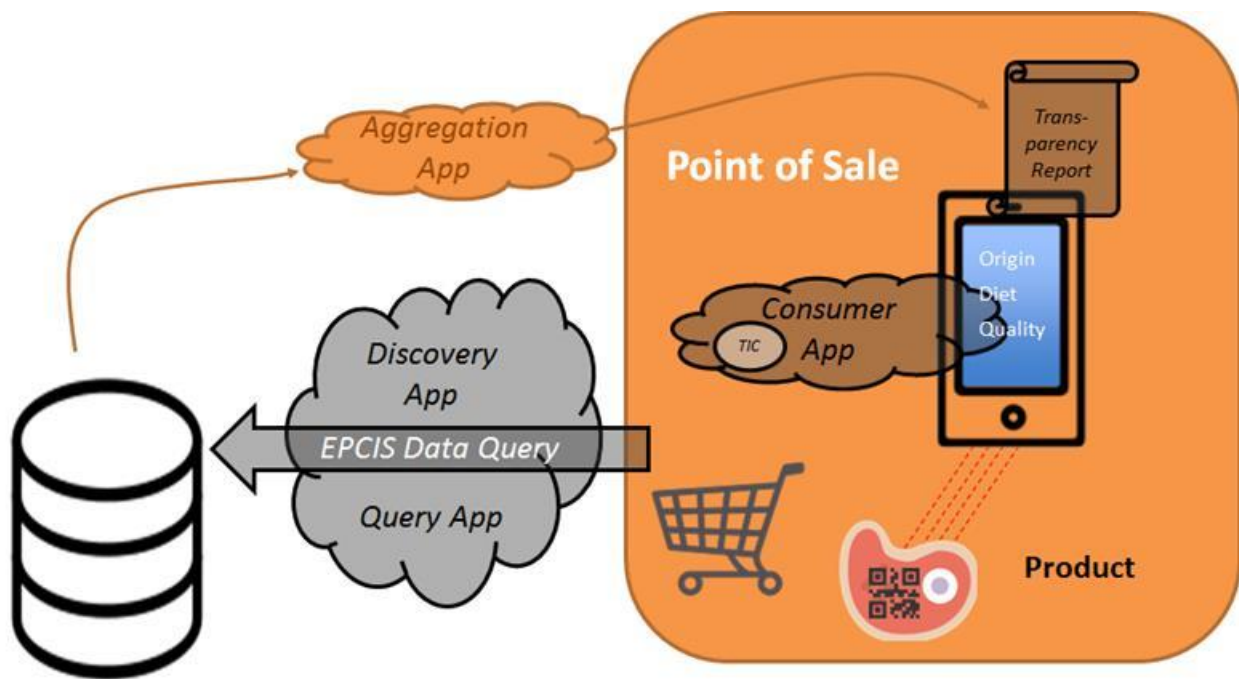
Figure 29:   Data Query – Direct Information Output to Consumers.

In the workshop for example 87% of the responses pointed out that knowing the origin of the meat will lead to higher quality of the product and better health. But at the same time a comparable percentage of people announced that they were not willing to pay for additional information at all. This discrepancy shows the gap between the expectations and reality in the market. Thus it was the right opportunity to present a new transparency system to all stakeholders.

The functionality of MIP's innovative transparency system for meat is as is agreed in FIspace's Description of Work. This prototype therefore can serve as a good starting point for further development.

Based on the results of FIspace's MIP trial results, two tracks will be followed:

1. A pilot in H2020 Fast Track to Innovation program, aiming at a realization of the transparency system in practice.
2. A science oriented research project funded by for instance H2020 to include more events, especially treatment of animals at the farm, the history of animal feeder to raise animals, other types of food, processed food and food for specific health diets and/or religious diets, e.g. halal, kosher.

The MIP trial transparency system can easily be extended to more meat supply chains and to other types of food, at a national base, in Europe or worldwide. Therefore there is a business perspective to introduce it in food supply chains in real food supply chains. The open call partner in the MIP trial, EECC, plans to initiate a pilot in H2020's Fast Track to Innovation program.

2.7   Trial 442- Import and Export of Consumer Goods

2.7.1   Trial Overview

2.7.1.1   Purpose of the Trial

FIspace aims at developing and validating novel Future-Internet-enabled solutions to address the challenges arising in collaborative business networks. FIspace trials contributes to achieve such impact by creating application scenarios that will demonstrate the usage and the benefits of the FIspace technology.

The Import and Export of Consumers Goods Trial is developed to demonstrate the capabilities of the collaboration platform to support business processes during the intelligent management of inbound materials to a production facility and outbound of finished products from the production to the end customer. For this end, the applications listed below were developed and are being testing within the scope of the trial:

- Transport Demand App (TDA)

- Shipment Status App (SSA) and Manual Event & Deviation Reporting App (MEDRA) (two applications combined into the same mobile app)

In addition to the applications given above, the trial scenario heavily relies on the Logistics Planning Application (LPA) hence trial partners are taking active role in the testing and improvement of LPA.

2.7.1.2   Expected benefits through FIspace

FIspace is expected to create an impact towards business collaboration platforms offering better satisfaction of customer requirements explained within the scope of this trial such as end-to-end visibility and event management during the transport planning and execution i.e. enhanced monitoring and tracking of goods; less costly and better tailored service offers, more transparent operations etc.. FIspace is also expected to substantially increase business efficiency and optimization throughout the entire value chain and to facilitate new business opportunities by providing more efficient and transparent service offer management, optimizing partner contract negotiations, facilitating new business partner interactions and collaboration opportunities, and providing access to true end-to-end business and consumer performance metrics.

2.7.1.3   Business relevance

Transport Demand Application (TDA):

The application supports the operators of the Transport & Logistics domain starting from transport demand creation till the end of the execution of the associated shipment by reducing the manual workload and delays that are present in the current information exchange between the actors. The app connects different users during the creation process of a new demand, in this way each interested party can perform their tasks on the same demand and the status of the process can be monitored. Notifications are being sent when a new action is requested to a different interested party.

Shipment Status App (SSA):

The objective of the application is to provide the users with a tool for monitoring of their shipments with the possibility to access real-time (or nearly real-time) information thanks to the information supplied by other automatic services or manually reported through MEDRA. The App can access to the Map service feature which provides a view on the status of the transport on the map and it offers to its users the possibility to define several types of alerts associated to the associated check-points. Thanks to the functionalities offered by the underlying capabilities of the FIspace platform, the Mobile application can track when the product reaches each checkpoint, highlighting the delays if any and provides an up-to-date forecast on the next checkpoints delivery date/time which facilitates re-planning in case of major deviations.

Manual Event & Deviation Reporting Application (MEDRA):

The app improves the information exchange during the transport execution through mobile technologies.

The purpose of this app is to allow the users, who are responsible from handling the actual execution of shipments, to report events and deviations from the original plan at the time they happen. Thanks to this app also the SMEs that don't have automated tracking services will be able to report in real-time (or close to real-time) the situation of the ongoing shipments. The carrier that has access to the mobile application identifies the transport/shipment of interest and reports the status of the checkpoint according the real time (close to real time) shipment status. The status updates are used as an input by SSA and Logistics responsible can monitor the shipments of their interest using SSA and manage the decisional process more effectively via automated notifications and triggers for re-planning.

2.7.2 Trial Team

The Import and Export of Consumer Goods trial is realized by:

Lead: ARC

Participants: ARC, KN, FINCONS (Open call partner)

Supporting partner: KOC

2.7.3 Report on Trial Work

2.7.3.1 Overview across the work done thru M1-M24

The main activities performed through the entire project are listed below:

- The concept of the trial was described in terms of its vision, goals, business relevance, challenges and requirements from the FIspace platform to achieve the goals of the trial.
- The workplan was establised.
- Functional and technical requirements for the open call domain specific applications were identified:
    - Process, actors, input data, output data
    - User right management (role of each actor and their rights)
    - Parameter specifications
- Use case applications were developed and updated in line with the provided feedbacks.
- Real life data was collected and modified to fit to the trial scope and test scenarios.
- The trial team is currently working on interface development between LPA and 442 trial apps.
- The trial is being presented at conferences via presentations, brochures and through a video demon-strations and feedback is being collected from the potential users.

2.7.3.2 Progress M19 – M24

The progress of the development and testing of the trial apps during the period of M19-M24 are described in the following sub-sections of the report. Each subsection describes the progress and the current status of the development and testing activitity for the associated application.

2.7.3.2.1 Transport Demand Application (TDA):

Operational features of the transport demand order item were implemented and tested. A set of internal rules were defined and roles and their capabilities were completed. The operational activities associated to each role satisfy the functional requirements defined in the Deliverable 400.12 and ensure an high level of privacy on the data that come from different business entities.

In the final release, Fincons has implemented the necessary features for the import of the SAP file and visualization of the order item according a specific filter based on user rights. The management of the data privacy was focal point of this release. According to this features, the user right management was implemented internally within the applications.

During M18-M22 the parameter list that can be exchanged with the LPA system was updated and a set of internal rules were implemented in order to validate the data and ensure that the plan request associated to each transport demand could be processed successfully.

In the last month the notification management, based on the EPM module, was implemented in order to ensure the correct information exchange between the different interested parties.

2.7.3.2.2 Shipment Status App (SSA):

In order to provide a complete smart distribution solution, the application needs to be supported by TDA and MEDRA. The three apps are working in synergy and provide an effective solution that supports the user during the planning and monitoring of the transportation activities with a set of user-friendly features.

In the last months, one of the tasks of the development and testing activity was to implement the integration between the trial apps (Web and Mobile). Fincons has realized the integration of TDA and SSA in order to make available a congruent and coherent shipment data set and ensure that the real time notifications are being exchanged between the different stakeholders of the two applications.

The main focus of the final release was the implementations on the data management thru the application of a pre-defined filters based on the user rights. During the period of M19-M24, the internal logics for retrieving the transport demand data from the Back End were been completed. A set of internal rules were defined that ensure the correct communication between the interested parties for this reason Fincons has included in the solution the integration of the Event Processing Module in order to ensure the correct notificaion management. In addition role management features were implemented ensuring a high level of privacy on the data that come from different business entities.

During M18-M22 the parameter list that can be exchanged with the LPA system was updated and a set of internal rules were implemented in order to validate the data and ensure that the plan associated to the specific transport activity could be processed successfully.

2.7.3.2.3 Manual Event & Deviation Reporting Application (MEDRA):

Similar to what was explained in the previous sections, the main focus of the final release of this app and the related testing activity was the user rights management. Login and authentication processes were implemented internally to the mobile application. The definition of the roles and their capabilities were completed and operational activities can be executed now according to the defined role filters. In addition, the implementation of the notification system was completed integrating the EPM module for the event management.

In the last months, the parameters which are needed by the app to retrieve data from the LPA system were updated to realize the integration with the LPA in the FIspace platform and ensure the correct checkpoint management, associated to the plan of the transport demand.

2.7.3.3 App Development

The results of the 14 different scenarios that were previously identified for testing the trial app functionalities are summarized as below:

2.7.3.3.1 Scenario - User Authentication

Below table summarizes the scenario and its current status for user authentication during user login.

Figure 30:   Scenario – User Authentication

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Tap the application and add User and Password	SS App	SS App	Back End SDI	Implemented.
2	The system will return the transport demand list/shipment List	SS App	Back End	SS App	Implemented.

2.7.3.3.2 Scenario- User Authorization

Below table summarizes the scenario and its current status for user authorization during user login.

Figure 31:   Scenario – User Authorization

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Access to Back End with User and Password (Ad-min role)	Back End	Back End	Back End	Implemented.
2	Define the role Grant	Back End	Back End	Back End	Implemented.

2.7.3.3.3 Scenario- Shipment Search

This functionality enables the user to search for the shipment of interest using the filtering parameters that are defined. The scenario and its current status is explained in the table below:

Figure 32:   Scenario – Shipment search

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementa-tion
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	In "Shipment List View" tap on search icon on content menu	SS App	SS App		Implemented.
3	The SS App returns the search form with the following info: - Shipment Code - Shipment Status - Shipment Date - Delivery Location - Receiver	SS App	SS App		Implemented.
4	Click on Ok	SS App	SS App	Back End	Implemented.
5	The SS App returns the selected shipment in the shipment List with the following details: - Shipment Code - Shipment Date - Shipment Status - Pickup Location - Delivery Location - Sender - Receiver	SS App	Back End	SS App	Implemented.
6	Tap on Shipment	SS App	SS App	Back End	Implemented.
7	Visualize the Shipment Details View **Section 1** Shipment and Transport Demand Details **Section 2** Checkpoint List **Section 3** Replanning & Notification Button Tab - OrderItem List	SS App	LPA SS App	Back End	Integration with LPA is current-ly being implemented. The services were implement-ed. The LPA integration is still in progress (waiting LPA feed-backs).

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Business Collaboration

2.7.3.3.4 Scenario - Status and Event Monitoring, Map Service

The user can tap on Map icon in order to visualize the status of the checkpoints on the map. The scenario and its current status is explained in the table below:

Figure 33:   Scenario - Status and Event Monitoring, Map Service

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	Shipment Search Scenario	SS App	SS App Back End	Back End	Implemented.
3	Tap on Map Icon	SS App	LPA SS App	Back End	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in progress (waiting LPA feedbacks).
4	Visualize the Transport Map with coloured Checkpoints	SS App	LPA SS App	Back End	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in progress (waiting LPA feedbacks).
5	Tap on CheckPoint	SS App	Back End	SS App	Implemented.
6	Tap on Cloud image	SS App	Back End	SS App	Implemented.
7	Visualize the CheckPoint Details	SS App	Back End	SS App	Implemented.

2.7.3.3.5 Scenario-Check Point Details

The user can tap on each pin in order to visualize the checkpoint details. The scenario and its current status is explained in the table below:

Figure 34:   Scenario – Check Point Details.

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	In Shipment List View tap on Search icon on Content Menu	SS App	SS App		Implemented.
3	The SS App returns the search form with the following info: - Shipment Code - Shipment Status - Shipment Date - Delivery Location - Receiver	SS App	SS App		Implemented.
4	Click on Ok	SS App	SS App	Back End	Implemented.

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
5	The SS App returns the selected shipment in the shipment List with the following details: - Shipment Code - Shipment Date - Shipment Status - Pickup Location - Delivery Location - Sender - Receiver	SS App	Back End	SS App	Implemented.
6	Tap on Shipment	SS App	SS App	Back End	Implemented.
7	Visualize the Shipment Details View **Section 1** Shipment and Transport Demand Details **Section 2** Checkpoint List **Section 3** Replanning & Notification Button	SS App	LPA SS App	Back End	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in progress (waiting LPA feedbacks).
8	Tap on a CheckPoint	SS App	LPA SS App	Back End	Implemented.
9	Visualize the CheckPoint Detail View	SS App	Back End	SS App	Implemented.

2.7.3.3.6 Scenario- Replanning

From the "Shipment Detail View" the user can tap on replanning button in order to request a new Plan from LPA. The scenario and its current status is explained in the table below:

Figure 35:   Scenario - Replanning

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	Shipment Search Scenario	SS App	SS App Back End	Back End	Implemented.
3	According the checkpoint Status the user can tap on Replanning Button	SS App	SS App	LPA	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in progress (waiting LPA feedbacks).
4	In the Shipment Details view the status is changed in Replanning Requested	SS App	Back End	SS App	Implemented.

2.7.3.3.7 Scenario- Real-time Notification

The user can manage the notification associated to each checkpoint. The scenario and its current status is explained in the table below:

Figure 36:   Scenario – Real-time Notification

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	Shipment Search Scenario	SS App	SS App Back End	Back End	Implemented.
3	According the checkpoint Status the user can tap on Notification Button	SS App	SS App	Back End	Implemented.
4	SS app returns the Notification Screen with the CheckPoint List with their status	SS App	SS App	Back End EPM	Interaction with EPM still ongoing (Deadline 27.03.2015).
5	Tap on CheckPoint	SS App	SS App	Back End	Implemented.
6	The Notification Setting view and add the details	SS App	SS App	Back End EPM	Interaction with EPM still ongoing (Deadline 27.03.2015).
7	Save it and verify in the Checkpoint Details the Notification value	SS App	SS App	Back End EPM	Interaction with EPM still ongoing (Deadline 27.03.2015).

2.7.3.3.8 Scenario- Shipment Notification Management

The user will choose the event from a defined list and the notification type for each checkpoint. The scenario and its current status is explained in the table below:

Figure 37:   Scenario- Shipment Notification Management

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	Shipment Search Scenario	SS App	SS App Back End	Back End	Implemented.
3	Tap on Notification Button	SS App	SS App	Back End	Implemented.
4	SS app returns the Notification Screen with the CheckPoint List with their status	SS App	SS App	Back End	Implemented.
5	Tap on CheckPoint	SS App	SS App	Back End	Implemented.
6	The Notification Setting view and modify the details or remove the notification	SS App	SS App	Back End EPM	Interaction with EPM still ongoing (Deadline 27.03.2015).
7	Save it and verify in the Checkpoint Details the Notification value	SS App	SS App	Back End EPM	Interaction with EPM still ongoing (Deadline 27.03.2015).

2.7.3.3.9 Scenario-Report Event or Deviation

User with specific privileges will be able to report relevant events and deviations from the original delivery plan for a specific shipment during the execution phase of the shipment. The scenario and its current status is explained in the table below:

Figure 38:   Scenario-Report Event or Deviation

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	Shipment Search Scenario	SS App	SS App Back End	Back End	Implemented.
3	SS App returns the search form with the following info: - Shipment Code - Shipment Status - Shipment Date - Delivery Location - Receiver	SS App	SS App	Back End	Implemented.
4	Click on Ok	SS App	SS App	Back End	Implemented.
5	SS App returns the selected shipment in the shipment List with the following details: - Shipment Code - Shipment Date - Shipment Status - Pickup Location - Delivery Location - Sender - Receiver	SS App	Back End	SS App	Implemented.
6	Tap on Shipment	SS App	SS App	Back End	Implemented.
7	Visualize the Shipment Details View Section 1 Shipment Details Section 2 Checkpoint List Section 3 Report Event/Deviation/CheckIN /CheckOut Buttons	SS App	SS App	SS App LPA	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in progress (waiting LPA feedbacks).
8	Tap on Report Event Button	SS App	SS App	Back End	Implemented.
9	Tap on a Report Deviation	SS App	SS App	Back End	Implemented.

2.7.3.3.10 Scenario- Check In & Check Out

When the user starts the process with the associated check point, he chooses the checkpoint and check in. When the user have completed all activities associated to a specific checkpoint, he can tap the check out button. In this case the checkpoint status will change from "Not Passed" to "Passed". The scenario and its current status is explained in the table below:

Figure 39:   Scenario- Check In & Check Out

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login scenario	SS App	Back End SDI	Back End SDI	Implemented.
2	Shipment Search Scenario	SS App	SS App Back End	Back End	Implemented.
3	SS App returns the search form with the following info: - Shipment Code - Shipment Status - Shipment Date - Delivery Location - Receiver	SS App	SS App	Back End	Implemented.
4	Click on Ok	SS App	SS App	Back End	Implemented.
5	SS App returns the selected shipment in the shipment List with the following de-tails: - Shipment Code - Shipment Date - Shipment Status - Pickup Location - Delivery Location - Sender - Receiver	SS App	Back End LPA	SS App	Implemented.
6	Tap on Shipment	SS App	SS App	Back End	Implemented.
7	Visualize the Shipment Details View **Section 1** Shipment Details **Section 2** Checkpoint List **Section 3** Report Event/Deviation/CheckIN/CheckOut Buttons	SS App	SS App LPA	Back End	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in pro-gress (waiting LPA feedbacks).
8	Tap on CheckIN Button	SS App	SS App	Back End	Implemented.
9	Tap on CheckOut Button	SS App	SS App	Back End	Implemented.

2.7.3.3.11 Scenario- Create Transport Demand

The user with specific privileges will be able to create a new transport demand in a dedicated form. The scenario and its current status is explained in the table below:

Figure 40:   Scenario- Create Transport Demand

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login	Production Planner Logistics Responsible Supplier	TD App	SPT System	Implemented.
2	Visualize Homepage	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
3	Import Sap Order	Production Planner	TD App	Backend	Implemented.
4	Create a new Transport Demand	Production Planner	TD App	Backend	Implemented.
5	Selection of Order Item from SAP List	Production Planner	TD App	Backend	Implemented.
6	Save Changes	Production Planner	TD App	Backend	Implemented.
7	Click on Request Shipment Details (TD STATUS = Shipment Details Requested)	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
8	Sending Notification	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
9	The user can add the Shipment Details	Supplier	TD App	Backend	Implemented.
10	Save Changes. (TD STATUS = Shipment Details Submitted)	Supplier	TD App	Backend	Implemented.

2.7.3.3.12 Scenario- Transport Demand Search

This functionality enables the user to search for the transport demands of interest using the filtering parameters that are defined. The scenario and its current status is explained in the table below:

Figure 41:   Scenario- Transport Demand Search

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login	Production Planner Logistics Responsible Supplier	TD App	SPT System	Implemented.
2	Visualize the Transport Demand List	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
3	Transport Demand Search. Click on the Search Icon	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
4	Transport Demand List	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
5	Selection of specific Transport Demand	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
6	Visualize the Transport Demand Details, Packaging Details, Shipment Details Sections	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
7	Visualize the Order Item list	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.

2.7.3.3.13 Scenario- Request Shipment Details

The user with specific privileges will be able to request the details of the shipment by clicking on the „Request Shipment Details" button and a notification will be created accordingly.

Figure 42:   Scenario- Request Shipment Details

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login	Production Planner Logistics Responsible Supplier	TD App	SPT System	Implemented.
2	Visualize the Transport Demand List	Production Planner Logistic Responsible Supplier	TD App	Backend	Implemented.
3	Selection of specific Transport Demand with the Status = 'New Transport Demand'	Production Planner Logistic Responsible Supplier	TD App	Backend	Implemented.
4	Visualize the Transport Demand Details, Packaging Details, Shipment Details Sections	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.
5	Select the button Request Shipment Details	Production Planner	TD App	Backend	Implemented.
6	The Supplier will add the details and will save them	Supplier	TD App	Backend	Implemented.
7	The Supplier can submit the Details	Supplier	TD App	Backend	Implemented.
8	Verify TD STATUS = Shipment Details Submitted	Production Planner Logistic Responsible Supplier	TD App	Backend	Implemented.

2.7.3.3.14 Scenario- Submission of the demand to LPA

The user with specific privileges will be able to submit the demand to LPA by clicking on the "Submit Shipment" Button. At the end of the process the status will be updated to "Submitted to LPS" in the demand list.

Figure 43   Scenario- Submission of the demand to LPA

#	Scenario steps	Actor	Source / System	Data sent to (System)	Status of the Implementation
1	Login	Logistics Responsible	TD App	SPT System	Implemented.
2	Visualize the Transport Demand List	Logistics Responsible	TD App	Backend	Implemented.
3	Selection of specific Transport Demand with Status "Shipment Details Submitted"	Logistics Responsible	TD App	Backend	Implemented.
4	Submit demand to LPA	Logistics Responsible	TD App	Backend LPA	Integration with LPA is currently being implemented. The services were implemented. The LPA integration is still in progress (waiting LPA feedbacks).
5	Verify TD STATUS = Submitted to LPA	Production Planner Logistics Responsible Supplier	TD App	Backend	Implemented.

2.7.3.3.15 Logistics Planning App (LPA)

Below scenarios were identified and tested related with the internal development of LPA:

Figure 44:   Test Scenarios

#	Scenario steps	Actor	Source / System	Data sent to System	Status of the Implementation	Further Improvement
1	Transport service creation	Logistics service provider	LPA	LPA	Implemented.	▪ MoS GE has no functionality that supports the definition re-occurring services. ▪ In real life the prices are generally company specific and secured through long term contracts hence might not be valid for every stakeholder who is asking the service of his interest. ▪ Service validity period and the schedule of the service should be separated.
2	Overview of the service list	Logistics service provider	LPA	LPA	Implemented.	▪ It is not possible to edit already defined services that are shown in the list since the services that are submitted to MoS can not be edited afterwards.
3	Transport order definition	Logistics responsible (service client)	LPA	LPA	Implemented.	▪ The vocabulary will be improved including all transport modes and transport means and associated transport units.
4	Service - demand match	Logistics responsible (service client)	LPA	LPA	Implemented.	▪ The system returns all the defined services and does not match the demand with the relevant available services due to the restrictions in the MoS service which are currently being improved.

2.7.3.4 Key Performance Indicator & Balanced Scorecard

The suggested balance scorecard for evaluating the performance enabled by FIspace were refined after further assessment as below. No measurement could be done in the real life business setting since the development process is still going on. This will be done during the extended project period and the results will be reported in deliverable D400-13.

Shipment Status Monitoring:

Vision: Efficiency, Transparency

Stakeholders: Consumer Goods Manufacturer, Customers, Logistics Service Provider

Understanding: Transparency throughout the chain

Perspectives for improvements:

Processes <> Employees <> Customers (Market) >> Finances

Major initiatives:

Initiatives   Shipment Status App & Manual Event and Deviation Reporting App

    a. Investment   Consumer Goods Manufacturer

                                  Consumer Goods Manufacturer, Customers (Subsidiary or Retailer),

    b. Utilization   Logistics Service Provider

Experimental evaluation:

    KPI   Lower Operational Costs

                 Efficient Process Management

                 Higher Customer Satisfaction

	Perspective	Objective	Measure	Target	Activity
Process Perspective	Consumer Goods Manufacturer	Reduction in time spent for monitoring (per shipment)	Avg.time spent for shipment monitoring (per shipment)	-30%	Automatic and on-time detection of deviations
	Consumer Goods Manufacturer	Reduction in effort used for monitoring (per shipment)	Number of deviations pre-informed or detected without effort (automatically) / All deviations	+20%	Automatic and on-time detection of deviations
	Logistics Service Provider	Reduction in process time to notify shippers on deviation	Avg. ((Time of deviation notification - Time deviation occurs))	-30%	Automatic and on-time detection of deviations
Customer Perspective	Consumer Goods Manufacturer	Improved collaboration due to up-to-date info from one source	Avg. daily manual communication frequency per person per shipment	-30%	Automatic and on-time detection of deviations
	Customers (Subsidiary or Retailer)	Better planning in customer service	Avg. Lead time (delivery - order)	-5%	Utilization of Shipment Status

					App - product view
	Logistics Service Provider	Better customer relation-ships	No of complaints per day	-30%	Increasing Transparency
Learning Perspective	Consumer Goods Manufacturer	Increased flexibility	Freed time in pro-cess activity (mins per process)	-30%	Automatic and on-time detec-tion of devia-tions
	Customers (Sub-sidiary or Retailer)	Increased flexibility	Freed time in pro-cess activity (mins per process)	-30%	Automatic and on-time detec-tion of devia-tions
	Logistics Service Provider	Increased flexibility	Freed time in pro-cess activity (mins per process)	-30%	Automatic and on-time detec-tion of devia-tions
Financial Perspective	Consumer Goods Manufacturer	Lower operational costs	Manhours spent for shipment monitor-ing	-30%	Reduction in time and per-sonnel
	Customers (Sub-sidiary or Retailer)	Lower operational costs	Manhours spent for shipment monitor-ing	-30%	Reduction in time and per-sonnel
	Logistics Service Provider	Lower operational costs	Manhours spent for shipment monitor-ing	-30%	Reduction in time and per-sonnel

Figure 45:   Experimentation Plan
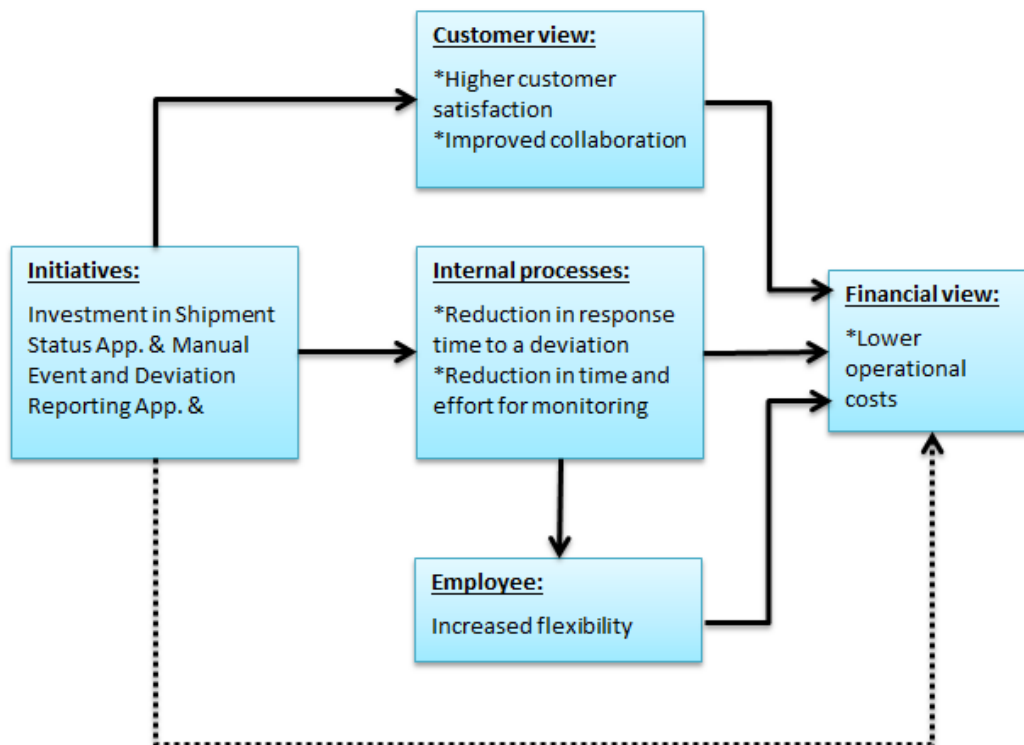
Relationships between objectives and activities:

Figure 46:   Relationships between objectives and activities

Transport Order Management:

Vision: Efficiency
Stakeholders: Consumer Goods Manufacturer, Material Suppliers/ Customers (Subsidiary/Retailer)

Understanding: Improved Collaboration & Follow up in trandport demand description

Perspectives for improvements:

Processes <> Employees <> Customers (Market) >> Finances

Major initiatives:

Initiatives: Transport demand app

- a. Investment   Consumer Goods Manufacturer
                   Consumer Goods Manufacturer, Material Supplier/Customer
- b. Utilization

Experimental evaluation:

KPI   Lower Operational Costs
       Improved process efficiency

	Perspective	Objective	Measure	Target	Activity
Process Perspective	Consumer Goods Manufacturer	Less time to follow up transport demands	Avg.time spent for transport demand processing & follow ups (per shipment)	-30%	Utilization of transport demand app
	Material Suppliers/ Customers (Subsidiary/Retailer)	Less time to follow up transport demands	Avg.time spent for transport demand processing & follow ups (per shipment)	-30%	Utilization of transport demand app
Customer Perspective	Consumer Goods Manufacturer	Improved collaboration due to higher transparency	No of complaints per day	-30%	Utilization of transport demand app
	Material Suppliers/ Customers (Subsidiary/Retailer)	Improved collaboration due to higher transparency	No of complaints per day	-30%	Utilization of transport demand app
Learning Perspective	Consumer Goods Manufacturer	Increased flexibility	Freed time in process activity (mins per process)	-30%	Reduciton in process time
	Material Suppliers/ Customers (Subsidiary/Retailer)	Increased flexibility	Freed time in process activity (mins per process)	-30%	Reduction in process time
Financial Perspective	Consumer Goods Manufacturer	Lower operational costs	Manhours spent for transport demand management	-30%	Reduciton in time and personnel
	Material Suppliers/ Customers (Subsidiary/Retailer)	Lower operational costs	Manhours spent for transport demand management	-30%	Reduciton in time and personnel

Figure 47:   Experimentation Plan

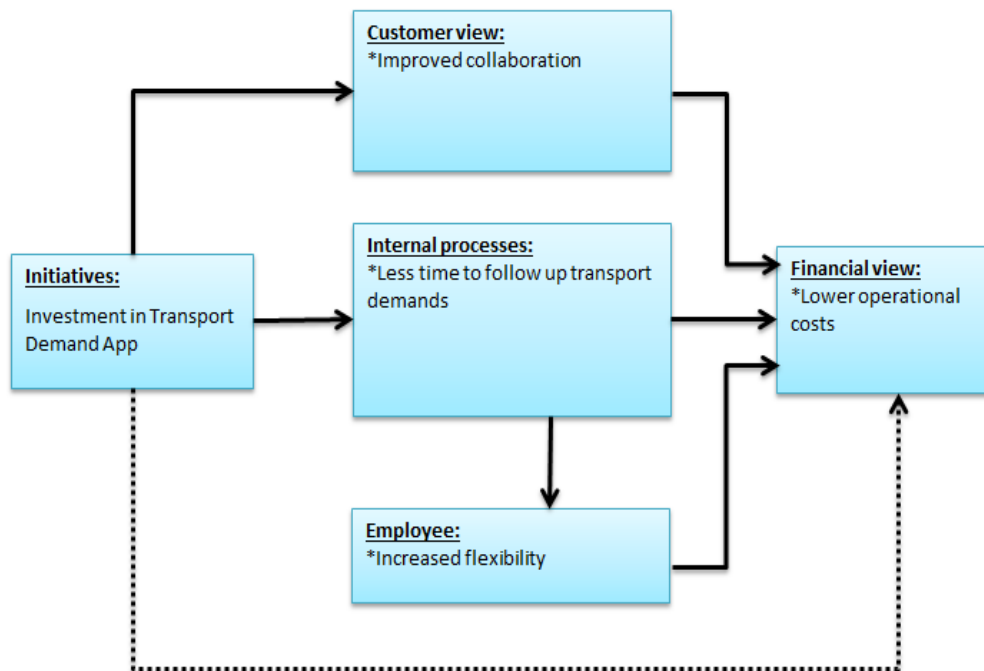**Relationships between objectives and activities:**

Figure 48:   Relationships between objectives and activities

2.7.4 Evaluation and Conclusion

Three applications were developed within the scope of Import and Export Consumer Goods trial as a result of the succesful collaboration between the trial's partners (ARC, FINCONS and KN). The support of KOC thru the implementation of LPA and technical consultancy on several issues add value to the out-come of the trial. The open call partner FINCONS demonstrated highly satisfactory performance durint the development of trial applications. All of the trial apps were developed succesfully incorporating the requirements that were defined previously. The only remaining open issues are the integration of the trial apps to the FIspace platform (EPM) and the integration between trial apps and LPA. The trial activity has enabled the trial team to better understand the challenges of transport demand management and ship-ment tracking and created an environment where industry stakeholders (logistics service provider and logistics service clients) with different view points could discuss about the solutions supported by FIspace platform.

The trial results are theoretical at this stage (not based on real life testing) hence the assessment of the KPIs could not be completed. The next step will be further testing the applications with real life data until the end of the extended

project duration. The final results will be reported in the final deliverable (D400.13).

The trial content and its applications are being presented at several conferences via presentations, bro-chures and through a video demonstrations and feedback is continuously being collected from potential users. Commercial success depends on the features of the products, marketing strategy and the ability to reach the targeted audience. The project delivered convincing prototype applications which satisfy the needs of the identified users from the Transport and Logistics domain however the prototype applications should be transferred into operational systems for further success in the market.

2.8   Trial 443 –Tailored Information for Consumers (TIC)

2.8.1   Trial Overview

Several food safety issues have prompted questions regarding the role of origin labeling, traceability, and food safety in consumers' perceptions of food safety and quality. Most of the times, food transparency is not clear and accessible to the final consumer. We as consumers have the right to have information about the food we are eating, and may be concerned with several attributes related to the food such as origin, chemical content, allergens content, environmental aspects, etc. These information requirements need to be accessible anytime and anywhere in a rigorous, truthful and clear way. For this, tracking and tracing is crucial but also information provision to the last link of the food chain, the consumer.

From this context, the apps in the Tailored Information for Consumers (TIC) are born with the aim of improving transparency and awareness of agri-food products by giving access to information about the products to the final consumers and taking into account their purchase preferences and interests.
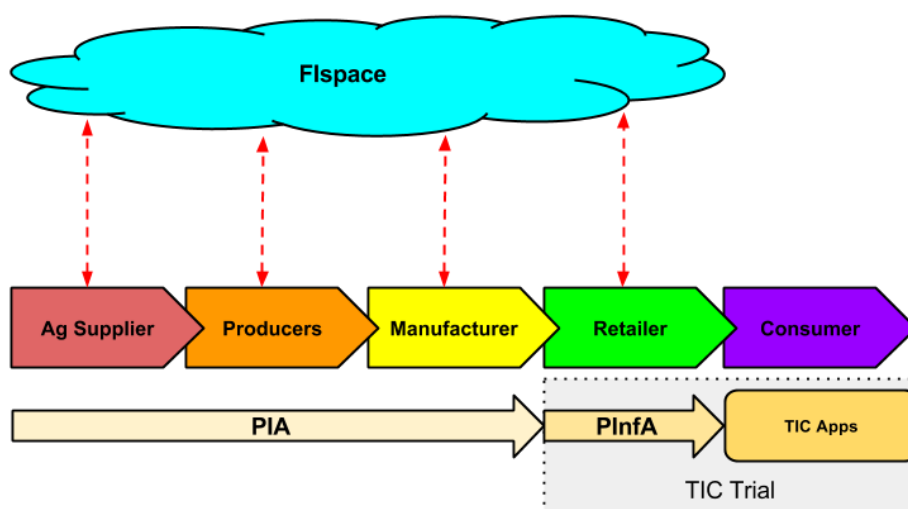
Figure 49:   TIC Trial in FISPACE

The TIC Trial aims at giving the consumers the possibility of having as much information as possible coming directly from the food supply chain, as well as, gives the possibility to the consumers to give their feedback about the products they consume. The information given to the consumers is collected from each of the actors in the chain entirely by the FIspace application PIA and received by the retailer with the FIspace application PInfA – TIC. This application allows the retailer, among other features, filter the information received and give consumers access to the information received.

Consumers' feedback are received by PInfA - TIC and based on them, the retailer will be able to take decisions as well as inform the actors in the chain about the feedback received by sending to the desired actor a custom feedback through FIspace.

The functionalities and requirements of TIC trial will be covered by the following apps:

TaPIA - Tailored Product info app: This App allows end users to access tailored information through the mobile application and scan different products located at the supermarket. It also allows the consumer to provide feedback on products to retailers and producers. If any food alert arises, the FIspace platform should communicate it to the retailer that will contact affected customers (if they have provided previously their contact data).

Food traffic light app: By means of this App, product data gathered from different actors can be transformed into knowledge based on a set of rules

Shopping list & recipe app: This App will allow consumers to manage shopping lists, and suggest products to elaborate selected recipe.

Augmented reality product info app This Specific App will allow the retailer to push specific to the consumer, and the consumer to access tailored product information at the supermarket in its mobile device by means of augmented reality.

Push information app: This App will allow the retailer to push specific information (offers, alerts, birthday greetings...) to the consumer, as well as alerts regarding product issues.

The TIC trial can provide to consumers static and dynamic information of a product according to a profile where each consumer can choose which product attributes he/she want to know with TaPIA app. This application is adapted to each profile and range of information needs of consumers. The integration of TIC trial with other trials of FIspace project means that the apps are prepared for working with a real standardized tracking and tracing model. Besides, the logo recognition functionality improves awareness of logos and signs by providing the criteria that they must accomplish. Moreover, the Traffic light app will allow consumers get product information transformed into knowledge, which will facilitate the comprehension of some product characteristics. Furthermore, the TIC Apps will improve consumers shopping experience by allowing and facilitating the creation of shopping lists, downloading recipes and providing a means for receiving alerts and providing product consumer feedback.

The trial will provide a clear value for consumers with better information on origin, production method, quality, safety, nutrition, sustainability and other aspects of agri-food products; retail companies, by providing a differentiation service that will attract new customers, increase their satisfaction and fidelity; and for producers, with improvements in assuring that their products reach consumers which are informed of all product attributes. Communicating attributes of their products will add a clear value.

2.8.2   Trial Team

Leader: ATOS

Participants: UPM, PlusFresc, CBT

2.8.3   Report on Trial Work

2.8.3.1   Overview across the work done thru M1-M24

Project development:

The following diagram shows an overview of the activities conducted by the trial team across the project:
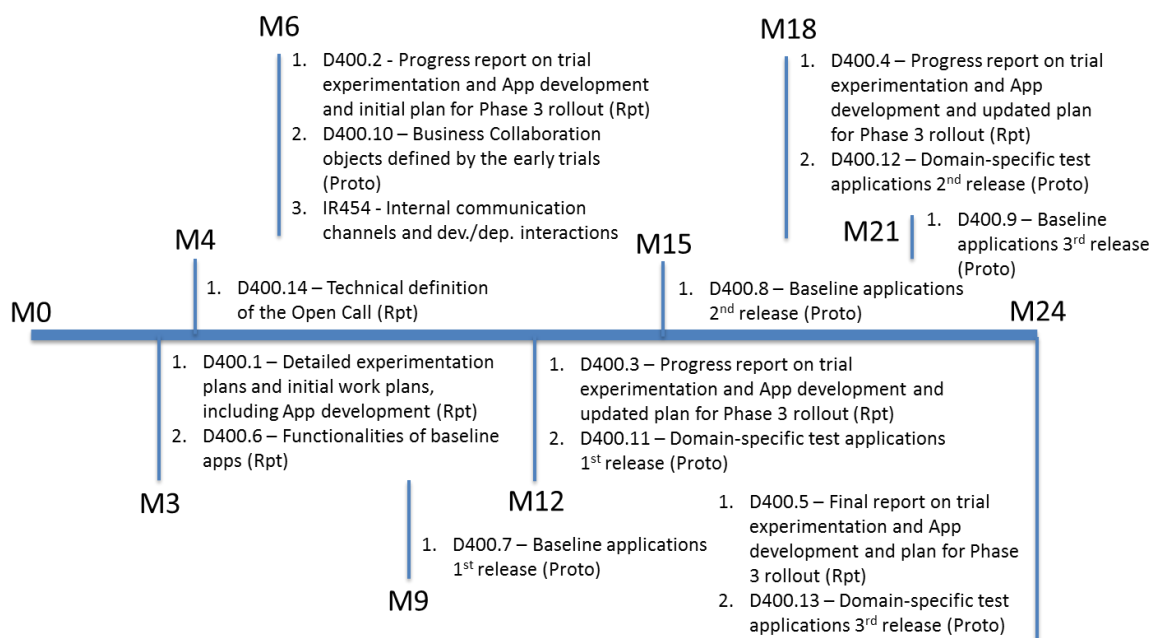

Figure 50:   TIC trial project plan

On the firsts 3 months the foundations of the project were set. The team defined the initial work plans, identified the legacy systems to integrate to and defined the apps functionalities for the open call.

In the M4, the trial team started working on several tasks for the refinement of the trial experimentation definition and App requirement elicitation. In this sense, the TIC trial team was in charge of defining the functional and technical requirements for the 3 open call applications.

Once the open called was launched and CBT started working in the trial, the team keep on working on the refinement of functional and technical requirements of Product Info; as well as the development its interaction with the Initial Apps, the Product Information Tailored Information for Consumers – PInfApp TIC.

In the second half of the project CBT joined the trial, this partner was incorporated through the Open Call and it has been in charge of the development on 3 apps. Those 3 apps where basically designed to improve the shopping experience and the information provided to the end user.

Last months were basically focused on the further app development and refinement of functional and technical details of all apps: Product Information Tailored Information for Consumers, Traffic Light App, Shopping List Recipe App, Augmented Reality Product App and Push Info App.

Workshops

Along the project, the TIC trial has conducted 2 workshops with consumers and stakeholders to assess the functionalities that should be integrated in the apps developed. Furthermore, it is planned to celebrate a 3rd workshop to evaluate the final apps of the TIC trial.

The workshops took place in the Sunka Supermarket, one of the facilities of Plusfresc in Lleida. The supermarket consist of two floors: The ground floor is the supermarket itself and the first floor with the consumers' space room.

Above the supermarket, is the Consumer's Space named Sunka Room. It is a place where part of Plus-Fresc communication and marketing department is situated, and is used for consumer-retailer interaction in order to have feedback from its regular consumers (the ones with PlusFresc fidelity card) about different subjects such as new products offered by the supermarket, cooking classes, master classes of nutrition, etc. It is a room with capacity for maximum 40 people with all the facilities for carrying out workshops, talks, cooking classes, and so on. The room is also used for book launches, conferences and children activities. The figures below represent top and ground floor facilities

Top floor	Ground floor

Figure 51:   Top floor facilities

Facilities in Calle Bisbe Ruano have been chosen as the best site for pilot deployment because of the following reasons:

- The medium size of the supermarkets represents the best conditions for a prototype test.
- The location of the Sunka supermarket and the consumers' space Sunka Room is in a young and dynamic neighbourhood, more likely to be used and interested in new technologies.
- Sunka supermarket has always been at state-of-the-art of innovation and activities for consumers.
- The Consumers' space represents a perfect place for developing TIC pilot tests in a closed and controlled environment, using pilot products from the supermarket and totally equipped for the development of the workshops with consumers.

The computer equipment is installed in a room located in the Sunka Room, next to the room where workshops with consumers will be carried out (Figure 52).

Figure 52:   Top floor facilities and ground floor facilities

Below there is a detailed description of the apps:

- 1st Workshop: At the end of January 2014, PlusFresc celebrated the first workshop with consumers in the context of the TIC trial. There was a wide and relevant representation from PlusFresc side, including the Managing Director and representatives of the Board of Directors, Sales Department and Customer Service.

  More than 20 consumers attended the workshop. They followed the session with active participation and contributed with profitable comments. The objective of this first session was identifying the main functionalities that the clients would like to have in their apps to improve their shopping experience and attributes and characteristics of the products that costumers would like to know.

- 2nd Workshop: At the end of January 2015, Plusfresc celebrated the second workshop in its Sunka premises. The Workshop aimed at obtaining feedback from the consumers on the apps ready for the public: Tailored Information for Consumers, Shopping List Recipe App and Push Info App.

  Again, more than 20 consumers attended the workshop and all of them were really enthusiastic about the apps and the new options that FIspace offers. The results and suggestions gathered from the consumers were analyzed and integrated in the apps (see more details in next point of the report)

- 3rd Workshop: Planed to be conducted at mid-April, this workshop aims to be a final evaluation of the apps. The idea is to assess if the apps are intuitive, if include all the functionalities required and if the information provided is relevant for consumers.

Thus, the workshops with consumers in a closed environment enabled detecting and improving all the apps of the TIC trial in order to decide on an open deployment in a real supermarket. Following figure pictures the objectives of the workshops.
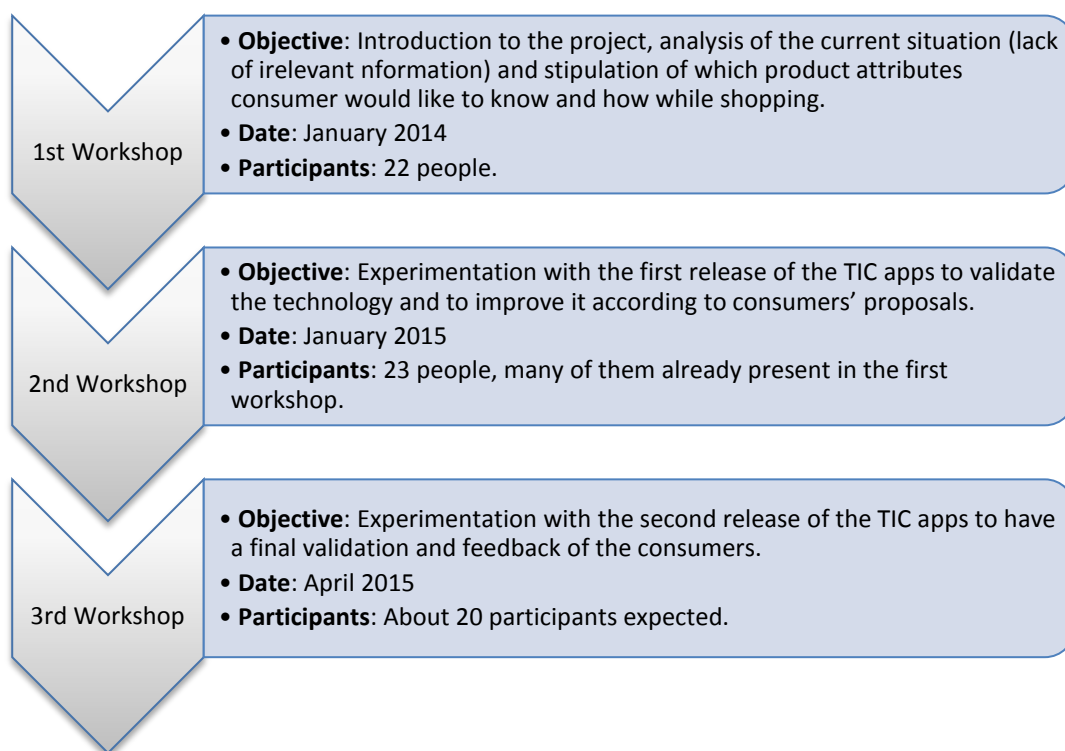
Figure 53:   Objectives of the workshops

Trial team meetings

The trial team has hold regular meetings every two weeks in order to follow-up on the advances achieved by each partner and to define the next steps. Meetings have been mostly on-line and always represented by one member of each trial partner.

Dissemination

Along the project, the team has been also working on dissemination activities of the trial and FIspace project. Below there is a description of the different activities conducted:

EVENTS:

- Open call Welcome meeting (27th May 2014): The FIspace project held a meeting in order to welcome the Open call partners incorporated to the FIspace project and the TIC pilot made a detailed presentation about the Application Product Info App – TaPIA.

- SmartAgriMatics Event held in Paris (18-19 June 2014): the TIC pilot organized a session into the SmatAwareness Topic to present the Tailored Information for Consumers App.

- ECFI (European Future Internet conference): conference held in Munich on the 17-18th of September 2014. The conference aimed at bringing together key stakeholders to discuss how Europe can achieve global leadership in ICT by 2020 through innovative Internet technologies.

- FI-WARE Jump Conference: Held on the 5th September 2014 in Palácio da Bolsa –Porto, Portugal, the event served to boost SME's and Startups with FI-WARE,

- I Cities and Waste Prevention Workshop Barcelona (20/10/2014): Plusfresc was invited to talk on waste prevention and the possibilities that FISPACE and FIWARE offer in this topic.

- Multi-site FI-WARE Event on the 15-17th of October 2014 in Seville, Valencia and Las Palmas de Gran Canaria. The event was to present the FIWARE project. Plusfresc and ATOS were invited to explain potential possibilities that FIWARE offered to developers.

DISSEMINTATION MATERIALS

- A set of educational material giving an overview of the trial, describing it and presenting its objectives.
- The trial brochure which can be downloaded from the following link

  http://www.fispace.eu/Documentations/Leaflets/tailored-information-leaflet.pdf

- Press release in the Spanish press and sector magazine done by Plusfresc

- It is planned to have a demo video of for all the apps developed by the TIC trial. Below there are the links to one of the videos designed:

  https://www.dropbox.com/s/rehpoiub7oxmo4c/Demo%20FISpace%20iOS.mp4?dl=0

2.8.3.2   Progress M19 – M24

During these lasts months of the project, the team has been working on several tasks for the refinement of functional and technical requirements of all the apps. Furthermore, the team has been active participating in some of the dissemination activities described in the previous point (FI-WARE Jump Conference, I Cities and Waste Prevention Workshop Barcelona, Multi-site FI-WARE Event).

One of the most relevant activities conducted during this term, has been the 2nd workshop with consumers. In this workshop the team not only presented the most advanced apps of TIC trial but also collaborated with MIP trial to integrate their apps in the workshop. Thus in the workshop the following apps were presented:

- Tailored Information for Consumers (TaPIA)

- Shopping List Recipe App (SL & recipes)

- Push Info App

- MIC app

The following figure shows the methodology used for the workshop organization and development.
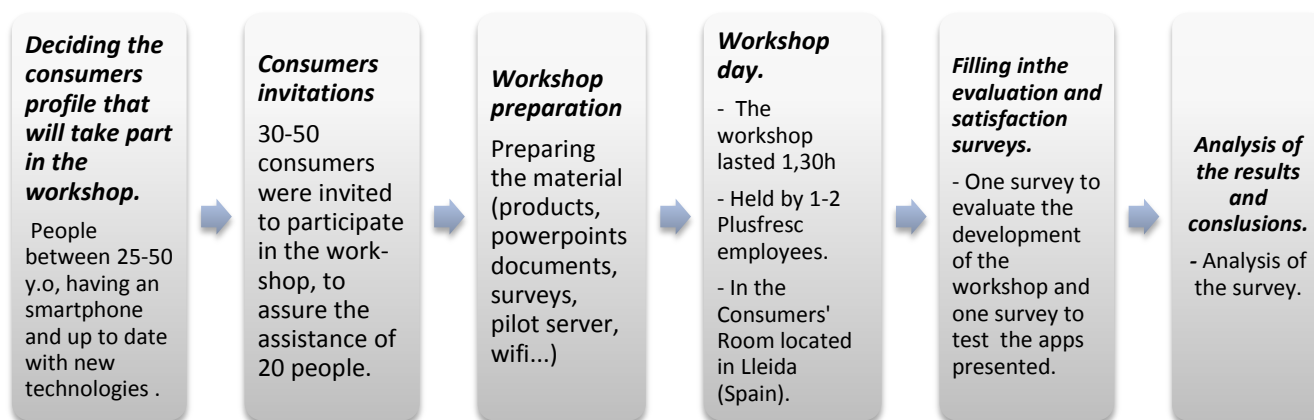
Figure 54:   workshop methodology

In total, there were 23 participants and all of them were really enthusiastic about the apps and the new options that FIspace offer. Participants were asked to fill in a questionnaire after having experienced the different apps in their Smartphones. The results showed that the participants considered the apps intuitive, useful to obtain relevant information of the products and to improve the shopping experience.

Figure 55:   Pictures of the Workshop

Among the results obtained in the workshop, it was interesting to see what functionalities the participants valued most from the apps.
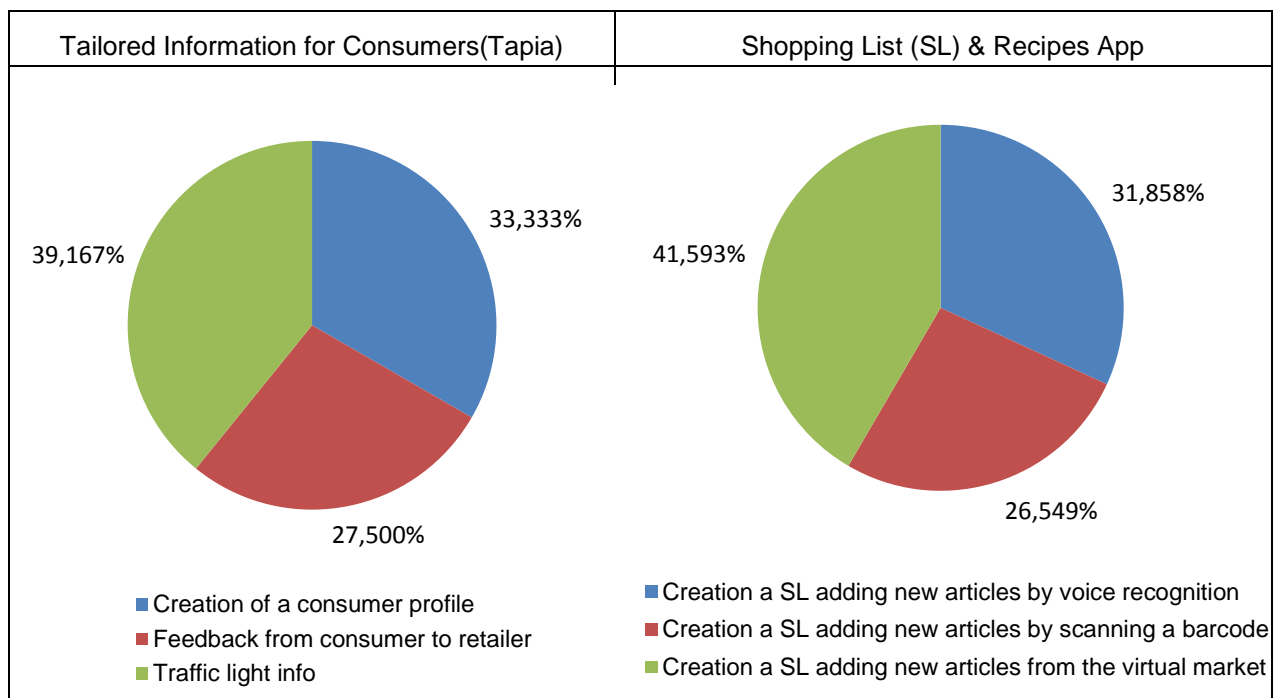

Figure 56:   Apps functionalities assessment

From the Tailored Information for Consumers app, the participants consider that the main properties that the app offers are:

1. Traffic light info: integrating the functionality of visualizing the healthiness of products through a color code.
2. Creation of a tailored consumer profile based on individual questions.
3. Feedback from consumer to retailer: participants consider useful having the option to send a feedback notification to the retailer.

From the app Shopping List & Recipes App, the participants consider that the main properties that the app offers are:

1. The Creation a Shopping List adding new articles from the virtual supermarket, where they can see all the options available and compare all products.
2. Creation a Shopping List adding new articles by voice recognition.
3. Creation a Shopping List adding new articles by scanning the barcode of products they have at home.

Regarding the Push info App, which provides a bidirectional communication channel between consumers and retailers, the supermarket is able to send tailored offers and discounts, etc, to costumers and in its turn, customers can send feedback about products. Costumers expressed the interest on this app to receive useful notifications. Particularly for obtaining specific offers that directly apply to them (birthday offers, offers in the supermarket where they usually do the groceries, etc)

The general opinion on the apps was really positive, the participants were asked to give a grade the apps from 0 to 10 and TaPIA obtained 8.1 and Shopping list and recipes and Push info app got an 8.7.

2.8.3.3   App Development

The defined apps for the TIC trial are:

- Product Info App - TaPIA: This app allows end users to access tailored information from products located in the supermarket. The products can be scanned or search manually by entering its EAN code. It also allows the user to provide feedback on products.

This app has gone under deep changes to allow data directly from the supermarket. It has been also added support to ease the integration of data models from other sources in the future.

Support for user profile is being added and there some changes are being added to improve user experience.

- Food Traffic Light App: By means of this App, product data gathered from different actors can be transformed into knowledge based on a set of rules.

This app recently evolved from a web html prototype to an app and will be tested on the 3r Workshop. The app has defined rules for three attributes, these rules area applied to four sample products and the attributes appear on a color depending on its value.

- Shopping List Recipe App: This Specific App allows consumers to manage its shopping list, and based on product info and consumer preferences, suggest products to elaborate selected recipe. This app has been developed through the Open Call and has been already successfully evaluated by the consumers on the 2nd Workshop. Currently the CBT team is working on the IOs version.

- Augmented Reality Product Info App: This Specific App allows consumers to access tailored product information at the supermarket in its mobile device by means of augmented reality. This app is being developed through Open Call and it is already in the testing phase with real products of the supermarket.

- Push Info App: This Specific App allows the retailer to push specific information (offers, alerts, birthday greetings...) to the consumer. This app is being developed through Open Call and the team is working now on the adaptation of the app to different segments of clients.

As stated on the development plan, the apps have been released in 3 phases, months M12, M18 and M24.

M12	M18	M24
• TaPIA - V1	• TaPIA - V2 • Traffic Light App - V1 • ShoppingList App - V1 • Push Info App - V1	• TaPIA - FINAL • Traffic Light - FINAL • ShoppingList App - FINAL • Push Info App - FINAL • Augmented Reality App - FINAL

Figure 57:   TIC - Summary of developed apps on each release.

2.8.3.4   Key Performance Indicator & Balanced Scorecard

For the KPI a Balance Score approach is used.

Vision: Improve shopping experience.

Stakeholders: Providers, retailers and consumers.

Understanding: Improve food information to consumers to increase food trust.

Perspectives for improvements:

Farmers, Manufacturers and Providers >> Traders >> Retailers >> Consumers

Five major initiatives:

1. Product Info

   1a. Investment: FIspace platform, providers and retailers.

   1b. Utilization: Retailer and Consumers.

2. Food Traffic Light App

   2a. Investment: FIspace platform, providers and retailers.

   2b. Utilization: Retailer and Consumers.

3. Augmented Reality App

   3a. Investment: FIspace platform, providers and retailers.

   3b. Utilization: Retailer and Consumers.

4. Shopping List & Recipes App

   4a. Investment: Retailers and Consumers.

   4b. Utilization: Retailer and Consumers.

5. Push Information App

   5a. Investment: Retailers.

   5b. Utilization: Retailer and Consumers.

perspective	Objective	Measure	Target	Activity
Product Info				
Process perspective	Increase available product information for consumers	N of products with information from app/Total N of products *100	+50%	Investment in PInfApp - TIC
	Provide new information channels to increase efficiency of product requests	N of info requests from app/N of total info requests	+25%	Investment in Product Info
Customers perspective	Better trust in food products through feedback from consumers	N of product feedback petitions/Total N of products *100	+5%	Utilization of Product Info
	Successful rate of feedback petitions	N of successful feedback petitions/Total N of petitions *100	+75%	Utilization of Product Info
	Better trust in food products through consumers petitions of product info	N of product info petitions/N of product requests * 100	+25%	Utilization of Product Info
	Improve consumers shopping experience through the use of apps	Number of app downloads /Number of total costumers	+20%	Investment in Product Info
	Better trust in food products through number of attributes selected for each product	N of attributes selected by product/ Total N of attributes by product *100	+25%	Investment in Product Info
Learning Perspective	Inclusion of new food products in the shopping list	Number of new food products purchased / Number of total food product	+10%	Investment in Product Info
Financial Perspective	Increase in new costumers	Turnover / Year	+5%	Better trust and transparency for consumers
	Increase of consumers with fidelity card	Number of customers with fidelity card / Total number of costumers	+10%	Increase of sales
	Increase of marginal purchase per	Average purchase ticket	+5%	Increase of sales

	consumer			
	Cost reduction through lower per-sonnel costs (per-sonnel spend less time providing info to consumers)	Personnel for growth / Year	-5%	Reduction in time and per-sonnel. Re-duction in internal costs.

Figure 58:   Scorecard Product Info

Perspective	Objective	Measure	Target	Activity
Food Traffic Light App				
Process perspective	Increase available product information for consumers	N of products with information from app/Total N of products * 100	+50%	Investment in PInfApp - TIC
	Provide new information channels to increase efficiency of product requests	N of info requests from app / N of total info requests	+25%	Investment in Food Traffic Light App
Customers perspective	Better trust in food products through consumers petitions of product info	N of product info petitions / N of product requests * 100	+25%	Utilization of in Food Traffic Light App
	Improve consumers shopping experience through the use of apps	Number of app downloads /Number of total costumers	+20%	Investment in in Food Traffic Light App
Learning Perspective	Inclusion of new food products in the shopping list	Number of new food products purchased / Number of total food product	+10%	Utilization of in Food Traffic Light App
Financial Perspective	Increase in new costumers	Turnover / Year	+5%	Better trust and transparency for consumers
	Increase of consumers with fidelity card	Number of customers with fidelity card / Total number of costumers	+10%	Increase of sales
	Increase of marginal purchase per consumer	Average purchase ticket	+5%	Increase of sales
	Cost reduction through lower personnel costs (personnel spend less time providing info to consumers)	Personnel for growth / Year	-5%	Reduction in time and personnel. Reduction in internal costs.

Figure 59:   Scorecard Food Traffic Light App

Perspective	Objective	Measure	Target	Activity
Augmented Reality App				
Process perspective	Increase available product information for consumers	N of products with information from app/Total N of products *100	+50%	Investment in PInfApp - TIC
	Provide new information channels to increase efficiency of product requests	N of info requests from app/N of total info requests	+25%	Investment in Augmented Reality App
Customers perspective	Better trust in food products through consumers petitions of product info	N of product info petitions/N of product requests * 100	+25%	Utilization of Augmented Reality App
	Improve consumers shopping experience through the use of apps	Number of app downloads /Number of total costumers	+20%	Investment in Augmented Reality App
	Better trust in food products through number of attributes selected for each product	N of attributes selected by product/ Total N of attributes by product *100	+25%	Investment in Augmented Reality App
	Improve consumers shopping experience through augmented reality	Number of reality app downloads /Number of total costumers	+10%	Investment in Augmented Reality App
Learning Perspective	Inclusion of new food products in the shopping list	Number of new food products purchased / Number of total food product	+10%	Utilization of in Augmented Reality App
Financial Perspective	Increase in new costumers	Turnover / Year	+5%	Better trust and transparency for consumers
	Increase of consumers with fidelity card	Number of customers with fidelity card / Total number of costumers	+10%	Increase of sales
	Increase of marginal purchase per consumer	Average purchase ticket	+5%	Increase of sales
	Cost reduction through lower personnel costs (personnel spend less time providing info to	Personnel for growth / Year	-5%	Reduction in time and personnel. Reduction in internal costs.

				consumers)			

Figure 60:   Scorecard Augmented Reality App

Perspective	Objective	Measure	Target	Activity
Shopping List & Recipes App				
Process per-spective	Increase available product information for consumers	N of products with information from app/Total N of products *100	+50%	Investment in PInfApp - TIC
Customers perspective	Improve consum-ers shopping expe-rience through the use of apps	Number of app downloads /Number of total costumers	+20%	Investment in Shopping List & Recipes App
Learning Perspective	Increase of con-sumers food knowledge through number of recipes downloads	Number of Shopping list & Recipe app downloads / Number of app downloads * 100	+10%	Utilization of Shopping List & Recipes App
	Inclusion of new food products in the shopping list	Number of new food products purchased / Number of total food product	+10%	Utilization of Shopping List & Recipes App
Financial Perspective	Increase in new costumers	Turnover / Year	+5%	Better trust and transparency for consumers
	Increase of con-sumers with fidelity card	Number of cus-tomers with fidel-ity card / Total number of cos-tumers	+10%	Increase of sales
	Increase of mar-ginal purchase per consumer	Average pur-chase ticket	+5%	Increase of sales

Figure 61:   Scorecard Shopping List & Recipes App

Perspective	Objective	Measure	Target	Activity
Push Information App				
Process perspective	Better early warnings to consumers	N of warnings sent to consumers	+25%	Investment in FIspace platform
	Improve retailer communication to consumers	N of push info communications from retailer	+25%	Utilization of Push Information App
Customers perspective	Improve consumers shopping experience through the use of apps	Number of app downloads /Number of total costumers	+20%	Investment in Push Information App
Learning Perspective	Inclusion of new food products in the shopping list	Number of new food products purchased / Number of total food product	+10%	Utilization of Push Information App
Financial Perspective	Increase in new costumers	Turnover / Year	+5%	Better trust and transparency for consumers
	Increase of consumers with fidelity card	Number of customers with fidelity card / Total number of costumers	+10%	Increase of sales
	Increase of marginal purchase per consumer	Average purchase ticket	+5%	Increase of sales
	Lower process costs with Push Information App	Used offers vouchers from apps / Total used offers vouchers (app+paper)	-20%	Reduction in time and personnel
	Increase of sales through push info offers vouchers	Offers sales € / Total sales €	+2%	Increase of sales of specific products (offer products)
	Cost reduction though reduction use of paper	€ used in offers brochures and vouchers	-10%	Reduction in internal costs

Figure 62:   Scorecard Push Information App

2.8.4   Evaluation and Conclusion

The App development is following the plan and it is expect to have all the apps finished and ready to be presented to the consumers on month M24

According to stakeholders' opinion and the results obtained in the Workshops conducted so far, the apps are aligned with parts interests and provide a solution to the current problems that all parts are facing:

Consumers:

- • Lack of consumers awareness and trust
- • Increasing interest (health, safety, sustainability…)

Public bodies:

- • New regulations at European level
- • EU farmers empowerment

Retailers:

- • Fulfill regulations and consumer demands
- • Increase shopping experience

Farmers/traders:

- • Creation of added value, both providing information and in information itself
- • Getting feedback from downstream stakeholders

A final workshop with consumers will be conducted next month in order to have a final evaluation of the finished apps. Nevertheless, so far all indicators show that the results are positive and the objectives of the TIC trial are successfully fulfilled.

All these conclusions envisage an optimistic future for the TIC apps in the next years, helping to improve the buying of more health and less environmental-injurious products by the consumer.

3   Update on collaboration and harmonization and large scale expansion activities of the use case trials in Phase 3

3.1   Update on collaboration and harmonization

This chapter will reflect all the activities and actions having been taken by the trial community in order to increase and share the experience and know how gained through the whole project cycle.

Most of the trials in the FIspace project have some sort of supply chain associated with them. This fact makes collaboration across these trials logical. Trials 431 (Fish Distribution), 432 (Fruit and Vegetables QA), 433 (Flower and Plant SCM), 441 (Meat Provenance), 442 (Consumer Product Export/Import), and 443 (Tailored Information for Consumers) all involve the need to track information through the supply chain. While the trials themselves focus on different aspects of information tracking, and thus exercise the FIspace service differently, they share common requirements for supply chain event management, visibility, tracking, monitoring and notification. These common needs provide the foundation for leveraging services across trials and for collaboration between trials to ensure that the common services are capable of addressing all of the various trials' needs.

Additionally, there has been identified the potential for "trial specific apps" to be shared across trials once they are developed keeping a certain generic level in mind.

Most of the work was focused on the development of the Apps, including their specification, description of concept in use, preparation of tests, tests and preparation for evaluation (KPIs).

The intensive communication among the trials as well as with other work packages enabled to collaborate in the cross trial/domain utilization of Apps and harmonization approaches in regards of the development of FIspace.

In the following certain activities of trial will be listed displaying the immense effort which has been spend in collaboration and harmonization.

The activities which have been performed of Trial 431 (examples):

- Collaboration for App tests: MARINTEK and Arcelik have organized common demonstration online sessions for WP450-developers of the LPA (Koc), MOS (NTUA) and the Event Monitoring & Management module (IBM). This enabled looking at the functionalities of the Apps from the perspective of the carrier (fish trial) and shipper (Consumer goods trial), and provide common feedback to the developers.
- Harmonization of evaluation method and KPIs: MARINTEK, CentMat and KN have exchanged about how to evaluate the business value of using FIspace, and presented their methods for identifying KPIs, providing a template to the rest of the trials.
- Harmonization of GSM model design: MARINTEK and IBM have collaborated for updating the fish trial's GSM model (WP300)
- Interaction with WP300 about the Experimentation Environment and provision of necessary data and information to test the Fish trial in the EE.
- Dialog with MOS for integration CSW-MOS,
- Dialog with BizSLAM for checking potential connection with CSW to follow up contracts.
- Dialog with WP200 to support the definition of business and commercialization models for FIspace.

The activities (examples) of Trial 441 state the significant amount of cross trail interaction as well:

The MIP trial (T441) worked together with the Tailored Information for Consumers trial on a Consumer App, developed by the TIC trial. This app is positively tested in two workshop with clients of a Plusfresc supermarket in Lleida, Cataluña, near Barcelona.

- The MIP trial cooperates with the Fresh Fruits & Vegetable trial on developing the PIA (Product Information App);
- The MIP trial initiated the development of a common and shared data model with the Fresh Fruits & Vegetable trial, the Flowers & Plant trial, the Tailored Information for Consumers trial and several others.
- The MIP trial works together with the Tailored Information for Consumers trial on a Consumer App, to be developed by the TIC trial.

Next to this collaboration, the MIP trial discusses other collaboration opportunities, e.g. the Ebbits project (http://www.ebbits-project.eu/news.php), UN/CEFACT (United Nations Centre for Trade Facilitation and Electronic Business), and its project to realize transparency for pork and poultry. Furthermore interest is shown from GS1 Netherlands and GS1 Global Office (US).

Further examples of collaboration within the FIpace trial community:

T432 - Fruits & Vegetables Quality assurance

The trial is working closely with the trial on Flowers and Plants which is developing Apps that respond to needs of stakeholders in the FFV trial that reach beyond the problems dealt with by the Apps developed within the FFV trial. This includes especially the monitoring of quality developments during the distribution process as well as the monitoring of the delivery activity. However, the monitoring of quality developments is product specific and requires individualized solutions that build on the general concept developed within the trial Flowers and Plants. In follow-up activities the trial will work on Apps that support logistics (transportation) activities. A supportive development is dealt with in the Fish trial which will provide a basis for further developments in the logistics part of the trial.

T443 – Tailored Information for Customers

The TIC trial collaborated with MIP trial in the integration of MIP functionalities in TaPIA. Thus, MIP functionalities could be tested together with TIC apps in the 2nd TIC trial workshop that took place in Plusfresc premises at the end of M22. Furthermore, it is expected that MIP trial will also participate in the 3rd TIC Workshop to obtain a final assessment of their apps.

The trial content and its applications are being presented at several conferences via presentations, brochures and through a video demonstrations and feedback is continuously being collected from potential users. Commercial success depends on the features of the products, marketing strategy and the ability to reach the targeted audience. The project delivered convincing prototype applications which satisfy the needs of the idefined users from the Transport and Logistics domain however the prototype applications should be tranffered into operational systems for further success in the market.

The above are some examples. All trial were intensively involved in these activities.

These activities will be the prove the envisioned FIspace platform as a real generic multi domain collaboration platform.

The trial results are theoretical at this stage (not based on real life testing) hence the assessment of the KPIs could not be completed. It will be till M27. The next step will be further testing the applications with real life data until the end of the extended project duration.

The final results will be reported as add on in the deliverable (D400.13) issued by T450..

3.2 Update on large scale expansion

This task did involve all leading partners from the different WP. Its objective has been to aggregate relevant results concerning the FIspace platform, the required and deployed infrastructure and the performed trials as well as the progress towards ecosystem building, business modeling, regulation, standardization and exploitation, in order to draft specific requirements, deployment options and recommendations for

eventual FI-PPP Phase III projects and to draft detailed plans for the large scale expansion of platform usage facilitated by local and regional stakeholders including SME.

It includes the identification of potential large scale trials, identification of potential trial sites and development of a large scale trial rollout plan. This includes:

- Selection of specific trials that have business value for large scale rollout tests
- Development rollout test plans for the rollout
- Identification and documentation of rollout site requirements
- Identification of potential rollout sites
- Documentation of the above in a plan for the conduct of large scale trials

This task did interact with T570 where the overall large scale rollout of FIspace has been developed.

For this activity the FIspace community will pro-actively approach the relevant communities of stakeholders in order to engage larger user groups and external IT solution providers in taking up and contributing the large scale expansion results, this shall be achieved by

:

- Engaging players and associations from relevant industrial sectors and the IT industry
- Exploiting contacts to existing communities and stakeholders in the Agri-Food and the Transport & Logistics domains as well as Living Labs and IT partner networks
- Leveraging on the local ecosystems on the Experimentation Sites established in project by engaging the business partners and customers of the Early Trial owners (see above)
- Collaborating with the other FI-PPP Phase II and Phase III projects, in particular with the other phase II use cases and capacity building project,
- Conducting knowledge transfer and education activities, and
- Providing a thorough and detailed documentation of the FIspace project results available to the public to support easy exploitation and community building.

The basis for large scale expansion is the availability of the chain encompassing Apps. They describe the difference to solutions already on the market and focus on pressing issues in the sector. In continuation of ongoing initiatives, trial participants are engaged in working groups of business stakeholders of the sector organized.

Furthermore, trial participants engage in business stakeholder meetings with presentations. These initiatives are complemented by presentations at IT oriented meetings. Of special relevance are IT meetings where whole workshops are dedicated to FIspace developments.

Presentations did raise awareness in the scientific community and provide the base for scientific business support towards new levels of transparency that could be reached with FIspace technology. This support is crucial for matching technology with new process organizations that might evolve in logistics and communication along the chain.

- 1.ECFI, Brussels
- IFSA conference, Berlin (conference on Systems Research in Agriculture), Paper on ICT and FIspace
- Annual SRII Global Conference 2014, Silicon Valley, San Jose, CA, USA
- Horizon 2020 National Launch Event – Turkey, FInest/Fispace success story presentation
- Intern. Conference of the International Food and Agribusiness Management Association, Cape Town (www.ifama.org)
- SmartAgriMatics 2014, Paris, France
- ECFI, Munich

Certain trials are the core of the accelerator programs FINISH and FRACTALS which officially did start in September 2014. First preparations for linking up with potential system development groups have been and are going on. The FINISH and FRACTALS projects will prepare the way for larger scale expansion.

Some of the trials are preparing a Horizon2020 proposal to organize the funding of a follow-up project to improve transparency, tracking & tracing in fresh food supply chains for consumers, supply chain parties and authorities.

Further and future activies of the trials beyond the FIspace project cycle:

The Fish trial (T431), CargoSwApp and partners involved in the Fish Trial will not participate in the next project. However, actions for local adaptation of the concept designed in FIspace are being planned.

The Fruits & Vegetables Quality Assurance trial (T432) developed the PIA, RISKMAN, and BOXMAN apps, which are all of a generic basis and can easily be adapted to any specific requirements. They are being integrated into the follow-up accelerator project FINISH which deals with the spread of applications based on the FIWARE and FIspace technology.

However, the FINISH project will allow an intensification of the trial development and a further intensification of the link of the trial stakeholder interests with the FIware and FIspace technology. It is obvious that in an old established sector such as the food sector with its established routines and management activities, the acceptance of change and the acceptance of a certain technology take time. Moving forward can build on successful implementations in leading representatives of the sector or on solutions which build on services of industry associations which provide solutions to its members.

TIC trail (T443) apps are developed based on Portability, Scalability, Flexibility and Extensibility principles what provide to them an easy path through commercial exploitation. The opinion of stakeholders and potential parts interested on the apps have been consulted and taken into consideration through all project. Furthermore, studying and analyzing the needs of stakeholders involved in the retail supply chain sector, the need for more apps related to information to consumers has been identified and will be presented as project proposals in the phase 3.

Plusfresc has been invited to participate in a group of the FIspace B2B open collaboration platform in contact with the Innovation Subgroup of the High-Level Group on Retail Competitiveness of the European Commission to look for further opportunities to promote the B2B in the future. A first conference call was conducted the last 5th of March and the following participants took part representing FISPACE.

4   Summary

The community of the trials in WP400 did specify and developed applications (apps) within the scope of the agri-food and transport& Logistics domains.

The apps were developed successfully incorporating the requirements that were defined previously. The only remaining open issues are the integration of the trial apps to the FIspace platform (EPM) and the integration between trial apps and LPA. The trial activity has enabled the trial team to better understand the challenges of transport demand management and shipment tracking and created an environment where industry stakeholders (logistics service provider and logistics service clients) with different view points could discuss about the solutions supported by FIspace platform.

The trial results are theoretical at this stage (not based on real life testing) hence the assessment of the KPI could not be completed so far. The next step will be further testing the applications with real life data until the end of the extended project duration.

The trial content and its applications are being presented at several conferences via presentations, bro-chures and through a video demonstrations and feedback is continuously being collected from potential users. Commercial success depends on the features of the products, marketing strategy and the ability to reach the targeted audience. The project delivered convincing prototype applications which satisfy the needs of the defined users from the Transport and Logistics domain however the prototype applications should be transferred into operational systems for further success in the market.

Within the 24 month since the FIspace project has started WP400 has achieved it set goals in defining and the development of domain specific apps in a highly collaborative approach.

Some of the projects results are even on the way to be used commercially beyond the duration of the project.