



# PROJECT PERIODIC REPORT

**Grant Agreement number: 314468**

**Project acronym: MODULUSHCA**

**Project title: Modular Logistics Units in Shared Co-modal Networks**

**Funding Scheme: Coordination and support action (Coordinating)**

**Date of latest version of Annex I against which the assessment will be made: 31/07/2012**

**Periodic report:**                    1<sup>st</sup>     2<sup>nd</sup>

**Period covered:**                    from 1<sup>st</sup> of October 2012 to 31<sup>st</sup> of March 2014

**Name, title and organisation of the scientific representative of the project's coordinator<sup>1</sup>:**

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<sup>1</sup> Usually the contact person of the coordinator as specified in Art. 8.1. of the Grant Agreement.

<sup>2</sup> The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: [http://europa.eu/abc/symbols/emblem/index\\_en.htm](http://europa.eu/abc/symbols/emblem/index_en.htm) logo of the 7th FP: [http://ec.europa.eu/research/fp7/index\\_en.cfm?pg=logos](http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos)). The area of activity of the project should also be mentioned.

## Declaration by the scientific representative of the project coordinator

I, as scientific representative of the coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;
- The project (tick as appropriate) <sup>3</sup>:
  - has fully achieved its objectives and technical goals for the period;
  - has achieved most of its objectives and technical goals for the period with relatively minor deviations.
  - has failed to achieve critical objectives and/or is not at all on schedule.
- The public website, if applicable
  - is up to date
  - is not up to date
- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.
- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of scientific representative of the Coordinator: ..... Marcel Huschebeck.....

Date: 22/05/2014

For most of the projects, the signature of this declaration could be done directly via the IT reporting tool through an adapted IT mechanism and in that case, no signed paper form needs to be sent

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<sup>3</sup> If either of these boxes below is ticked, the report should reflect these and any remedial actions taken.

### **3.1 Publishable summary**

#### **Project context and objectives**

The objective of Modulushca is to achieve the first genuine contribution to the development of interconnected logistics at the European level, in close coordination with North American partners and the international Physical Internet Initiative. The goal of the project is to enable operating with developed iso-modular logistics units of sizes adequate for real modal and co-modal flows of fast-moving consumer goods (FMCG), providing a basis for an interconnected logistics system for 2030. Modulushca integrates five interrelated working fields:

1. developing a vision addressing the user needs for interconnected logistics in the FMCG domain,
2. the development of a set of exchangeable (ISO) modular logistics units providing a building block of smaller units,
3. establishing digital interconnectivity of the units,
4. development of an interconnected logistics operations platform leading to a significant reduction in costs and CO2 emissions that will be
5. demonstrated in two implementation pilots for interconnected solutions.

#### **Work performed and main results achieved**

During the first reporting period of the project, the main working areas and main achievements have been:

- A framework on how Physical Internet can enable an interconnected FMCG logistics system has been developed in several workshops with experts from industry partners, also explaining obstacles and success factors to a Physical Internet enabled system
- The optimal sizes and functionality for modular boxes in the FMCG sector have been assessed, a box design has been developed and the first M-Box prototype has been produced
- Existing IT systems have been analysed and an IT architecture including coding and information format recommendations to enable interconnection have been developed
- A demonstration set up for the implementation pilots has been developed with all involved partners
- An active promotion of the Physical Internet and MODULUSHCA has been made, accompanied by dedicated dissemination material (brochure, templates, website, internal working space to share information, mailing lists, etc.)
- The Advisory board (Board of Directors) with experts from 13 industry and science institutions has been established

#### **(Expected final) results and their (potential) impact and use**

The first scenarios of an interconnected system in the FMCG market with and without the MODULUSHCA boxes have been very promising.

The high number of participants in the second Board of Directors meeting and good feedback from industry showed that MODULUSHCA is tackling the right problems and has shown good results so far.

## **3.2 Core of the report for the period: Project objectives, work progress and achievements, project management**

### **3.2.1 Project objectives for the period**

The first half of the project lifetime has been dedicated to these main objectives:

- Develop a framework on how Physical Internet can enable an interconnected FMCG logistics system
- Assess obstacles and success factors to a Physical Internet enabled system
- Define optimal sizes and functionality for modular boxes in the FMCG sector, develop a box design and produce a first prototype
- Analysis of existing IT systems and developing a common coding and information format to enable interconnection
- Modelling a Physical Internet system for the FMCG market to assess and evaluate the impact
- Creating a design and set up for the implementation pilot
- Develop a dissemination strategy
- Creation of dissemination material (brochure, templates, website, internal working space to share information, mailing lists, etc.)
- Establish an industrial Advisory board (Board of Directors)

### **3.2.2 Work progress and achievements during the period**

MODULUSHCA was successful, all objectives, an most milestones and deliverables have been achieved.

An overview on the deliverables and milestones is given in the project time table (Figure 1) and in detail in chapter 3. Fifteen deliverables and four internal reports were due in the reporting period:

In WP2, two important Deliverables (D2.1 and D2.2) have been published, paving the way as a baseline for all other WPs by developing a vision and a roadmap.

The first physical thing in the Physical Internet has been developed and produced in WP3 and explained in D3.1, D3.2 and D3.3. The box was presented at the Partnership meeting in Graz and to the Industrial board in Brussels. At the first International Physical Internet Conference in Quebec, Canada, it will be presented to experts from different research fields.

WP4 worked on the analysis and first steps towards an IT system that enables the interconnection between different partners. The work package summarised the work in 3 Deliverables (D4.1, D4.2, D4.3) and three Internal Reports.

Scenarios, Cost/benefit calculations and KPIs have been researched and developed in WP5 documented in D5.1. D5.2. is to the time of submitting this report under preparation and shows a delay according to the DoW

The current status of the Implementation Pilots was assessed and accompanied by both coordinators in WP6. Plans, experiences and validation will be put to paper in July 2015 in D6.1 and D6.2.

Dissemination started with the development of many different channels, such as a website (D7.2), social media channels, brochure (D7.3), templates for consistent design, etc. A dissemination report

has been compiled that shows all partners how the consortium wants to disseminate the idea and results of MODULUSHCA.

All mayor actions and decisions were accompanied by WP1 and WP8, the Project Management and Technical Project Management.

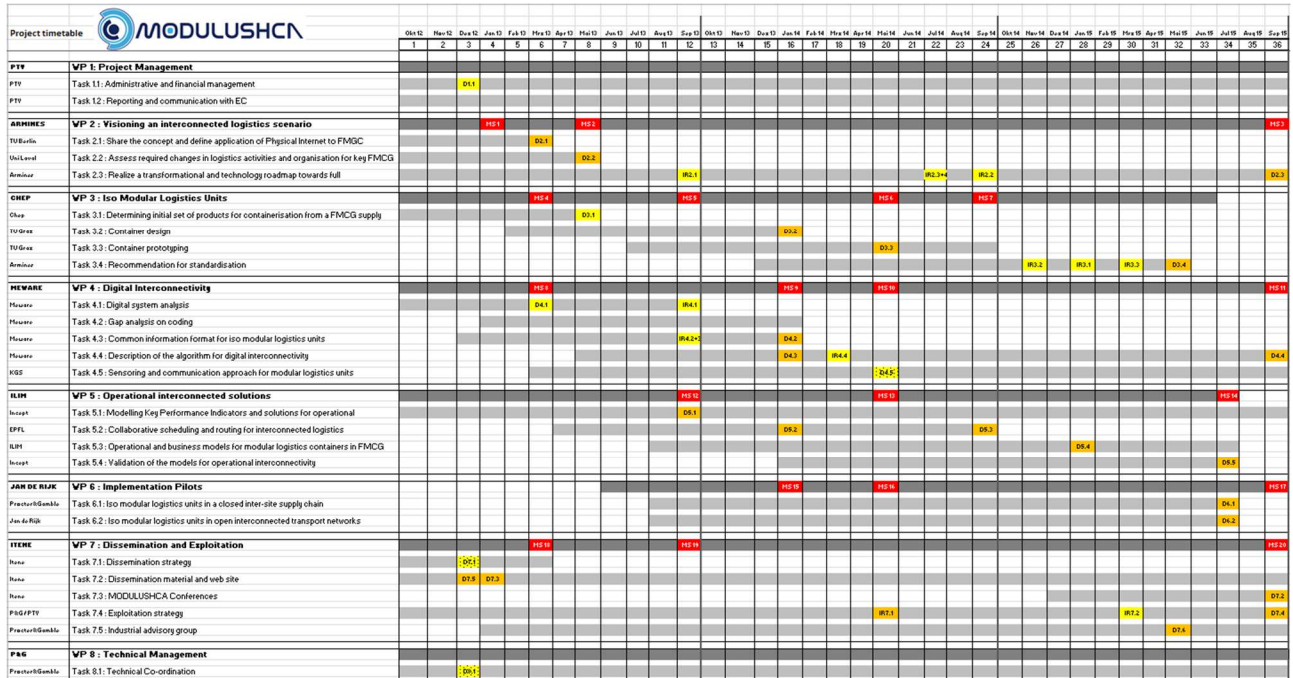


Figure 1: Modulushca timetable

In the following, a concise overview of the progress of the work in line with the structure of Annex I to the Grant Agreement is given for **each work package**, except project management, which will be reported in section 3.2.3.

Periodic report WP2 Visioning an interconnected logistics scenario	
<b>Summary of progress</b>	
<p>The WP2 has the task to develop the visioning an interconnected logistics scenario. The work package contains 3 tasks:</p>	
<p><b>Task 2.1:</b> Share the concept and define the application of the Physical Internet to FMCG. The task developed the vision on how interconnected logistics could be realised in the FMCG market. The idea is, that the usage of modular boxes would enable inter-supply chains operations. Objectives in such a system would be that the quicker the loop of the boxes is the better. The speed could be increased with tracking &amp; tracing applications. A robust handover process is also very important because it's done many times. Sorting should be limited to a minimum and grouping and ungrouping of m-boxes should be done at a dedicated facility (m-hub). The management of empty m-boxes has to be considered as well, because not all boxes will be used in a constant loop.</p>	

The consortium discussed in progress and management meetings about the ideal operator of the box pooling system, a way of payments for the usage of boxes, valid business models and about obligations and duties of hub operators.

Those question were answered in D2.1 or taken care of in the dedicated WPs, e.g. WP3 and WP4, and answered there.

This Task 2.1 was completed by the end of January 2013. The deliverable D2.1: Framework for Physical Internet enabled interconnected FMCG logistics was released accordingly.

**Task 2.2:** Assess required changes in logistics activities and organisation for key FMCG supply chain actors within the project.

The methodology to assess barriers and success factors for the implementation of interconnected logistics in the FMCG market included workshops with industrial representatives. The workshops were conducted in Paris and Berlin (22 April 2013) with experts from industry, involved in operations in the FMCG supply chain.

Overall the participants to the workshops were:

- Suppliers: DANONE, Tchibo
- Retailers: CASINO, Tchibo
- LSP: FM Logistics, Tchibo
- IT: Orange Business, Orange Lab, Siemens
- Standard: GS1 France, DIN
- Institution : Ministère des Transports
- Equipment: Fives

The deliverable D2.2: Assessment of critical success factors and obstacles to implementation of PI was released at the end of the task in the end of June 2013 and is based also on the findings gathered during the workshops with the industry.

**Task 2.3:** Realize a transformational and technology roadmap towards full implementation of interconnected FMCG logistics by 2030.

The roadmaps that are currently being developed in WP2 are based on an analysis of all logistics roadmaps that have already been done (by DHL, PwC, WEF, etc.). Constrains are being distinguished between

- known constraints (older people, higher energy prices, etc.) and
- possible constraints (regulations, etc.).

The main activities are:

- A survey of transportation interfaces to address the “IR 2.2: Interconnected logistics in European transport systems”. The report is due by the end of July 2014.
- A new series of workshops with industrial representatives in Spain, Belgium and France to assess the technical obstacles and solutions towards the implementation of the Physical Internet in the FMCG sector. The workshops will be based on the roadmap inputs and will include brainstorming sessions with the industrial representatives to identify obstacles and foreseeable technology answers. The report will be released after all workshops will be completed by the end of October 2014.
- The global report based on scenario analysis and workshop will be released by the end of 2014.

This task started in July 2013 and will progress until the end of the project. A first version of the roadmap was presented at the second board of director in Brussels March 7<sup>th</sup> 2014 and the “IR2.1: Validated MODULUSHCA vision and roadmap” was released.

This task will continue in 2014 and 2015 until the end of the project and will be finally wrapped up in the Strategic roadmap towards interconnected FMCG logistics in 2030 released at the end of the project by the end of September 2015.

### Significant results

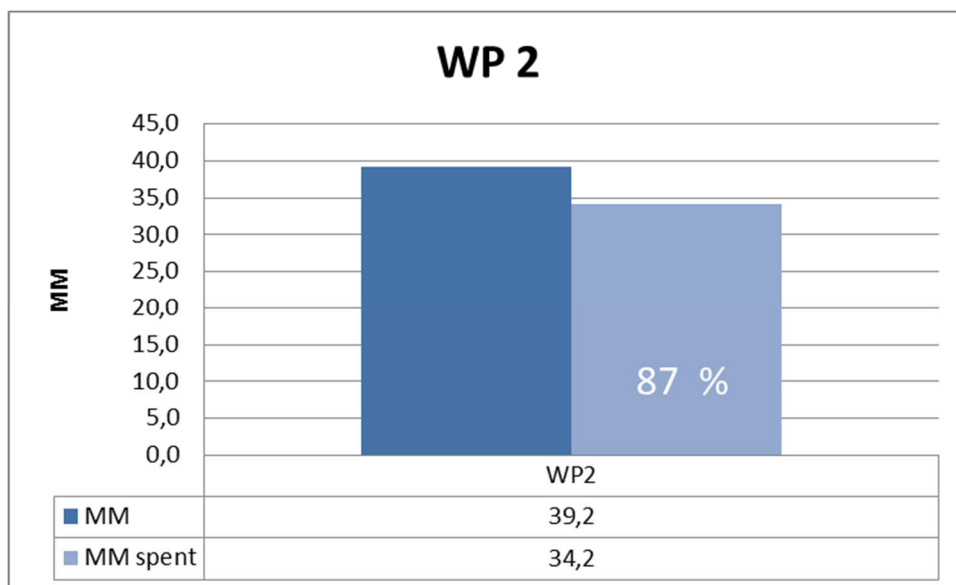
The significant results of WP2 so far are:

- Contribution to other WPs in the Modulushca project. The WP2 was responsible to supply a vision and to share it with other WPs. The alignment of needs and point of view was done during project meetings and specific meetings dedicated to WP3, WP4, WP5 and WP6 specific needs.
- Increase awareness and involvement of FMCG industrial partners outside of the project through the workshops and conferences participations. The concept is usually very well received, grabs interest and the industry provides a valuable feedback.

### Deviations from Annex I

The main deviation was on the schedule. The start-up of the project took more time than planned and the results were delayed in task 2.2 and 2.3. We will use the timing of task 2.3 to put the end of the task on time.

### Use of resources



WP2s objective is to build the baseline of MODULUSHCA that all other WPs are built upon. This work has been delivered so the spending of 87% of the total planned working effort is in line with that. 34,2MM have been spent from the 39,2MM initially planned.

**Corrective actions**

No

**Periodic report WP3 Iso Modular Logistics Units**

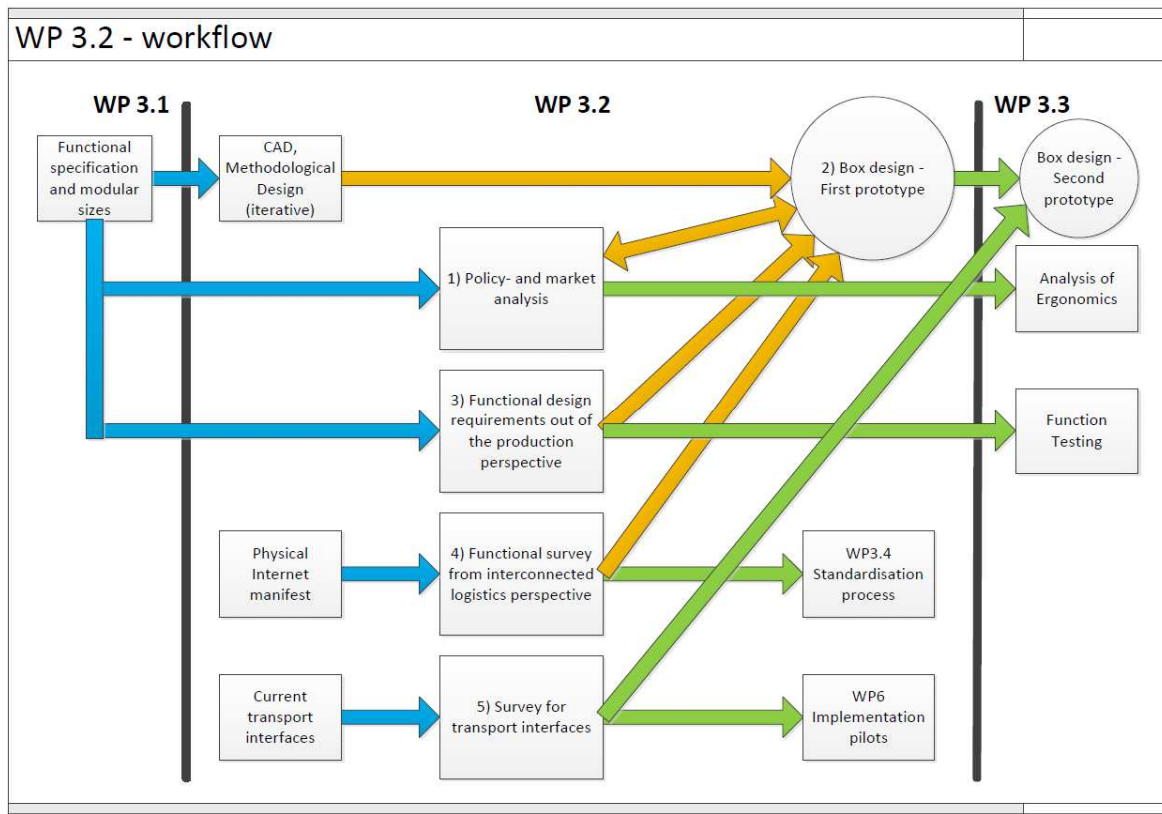
**Summary of progress**

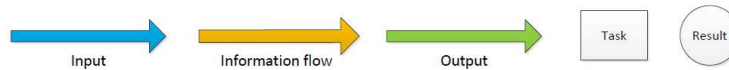
**Task 3.1:** Determining initial set of products for containerization from a FMCG supply chain. The requirements of the boxes were assessed via interviews and a survey of requirements of boxes and distributed via the networks of all partners. The participants had to classify their functional requirements on the box design.

The results have been discussed in the consortium and agreed upon. Discussed were mostly questions about the necessary density of the boxes, interlock-ability, protection and the right material. The first task of WP 3 was completed as a functional specification based on the modular sizes that can be found in “D3.1 Functional Specification of iso modular logistics units in FMCG”.

**Task 3.2:** Container Design.

Afterwards, the focus has been on task WP3.2 for which different actions were carried out to design the M-Box:





Several analysis have been carried out in order to design the M-Boxes:

- 1) Policy- and market analysis following the objective of measuring and validating the quality of the new M-box. The market analysis is done, the survey is closed and assessed.
- 2) The development of a M-Box prototype  
This section deals with the development and design and production of the first prototype which represents the first physical object of the Physical Internet and is the first iteration in the design process and the first step to a future modular unit. The first prototype is built and ready for testing. Focus of the first prototype has been on developing a capsulation mechanism.
- 3) Defining functional (design) requirements out of the production perspective.  
In this section each individual requirement is analysed and reviewed to address how this requirements needs to impact the end product design.
- 4) Including functional aspects from interconnected logistics perspective.  
This section deals with a survey from interconnected logistic perspective addressing the future vision of the MODULUSHCA- and Physical Internet concept.
- 5) Survey for transport interfaces.  
Using the results of the functional requirements survey of existing and future transport interfaces a survey has been made among possible users.

The conclusion we can make regarding the fit of the M-box into the logistics infrastructure is that it is not likely to change the current logistics transport interfaces drastically. It will take time to adjust these interfaces in a way that the equipment can better support and handle the M-box.

The M-BOX should be designed in a way that the current transport interfaces can handle the box without modifications and that the box will bring stability, flexibility and strength. All results are shown in detail in Deliverable D3.2.

**Task 3.3: Container Prototyping.**

The design, developed in Task 3.2 has been put into realisation with the first Modulushca box, a first prototype. Experiences gathered will be content of D3.3, due in May 2014.

**Task 3.4: Recommendation for standardisation.**

Work has started and will be published in the IR 3.1 to 3.3 and as a public deliverable “D3.4 Recommendations for standardisation for iso modular loading units”.

In WP3 several different working meetings were necessary to communicate with partners from the consortium and external experts from industry to assure the involvement from retailers:

- 27 February 2013, London – meeting with M&S retailer
- 7-8 March 2013, Madrid – meeting with Mercadona retailer
- 20 March 2013, Brussels – meeting with Delhaize retailer
- 12 April 2013, Brussels – meeting with ECR
- 29 April 2013, Brussels – meeting with Colruyt retailer

## Significant results

After several iterations in the design process the drafts are evolved to the design of the first prototype.



**First M-box prototype design**

### KPI's of the first M-box prototype

KPI - M-box (actual prototype design)	
Outer dimensions [in mm]	300x400x300
Inner dimensions [in mm]	270x360x275
Volume usage	74.25%
Weight	6.7kg

This design was then used to produce the first prototype of the M-box by 3D printing technics. By presenting this prototype in the consortium meeting in Graz (01.2014) and at the directors board meeting (03.2014) it was well discussed and feedback will be considered when designing the second version of the prototype.



**First physical M-box prototype**

M-Box functions	fulfilled now	fulfilled at 2 <sup>nd</sup> gener.
fold unit	x	x
encapsulate product	✓	✓
carry product	✓	✓
Fold doors/sides	x	x
combine units	✓	✓
stack units	✓	✓
Distinguish boxes	x	✓
Open/close box	✓	✓
include a passive track & trace system	x	x
Identify contents	x	✓
Handle units	x	✓
withstand normal usage	✓	✓
Secure box	x	✓

### List of realized functions



**Second M-box prototype**

KPI - M-box (new prototype design)	
Outer dimensions [in mm]	300x400x300
Inner dimensions [in mm]	270x360x275
Volume usage	74.25%
Weight	4.5kg

With these prototypes, functional tests will be carried out and the design will be evaluated. The results will then help to evolve the design to the next generation.

#### Market Analysis:

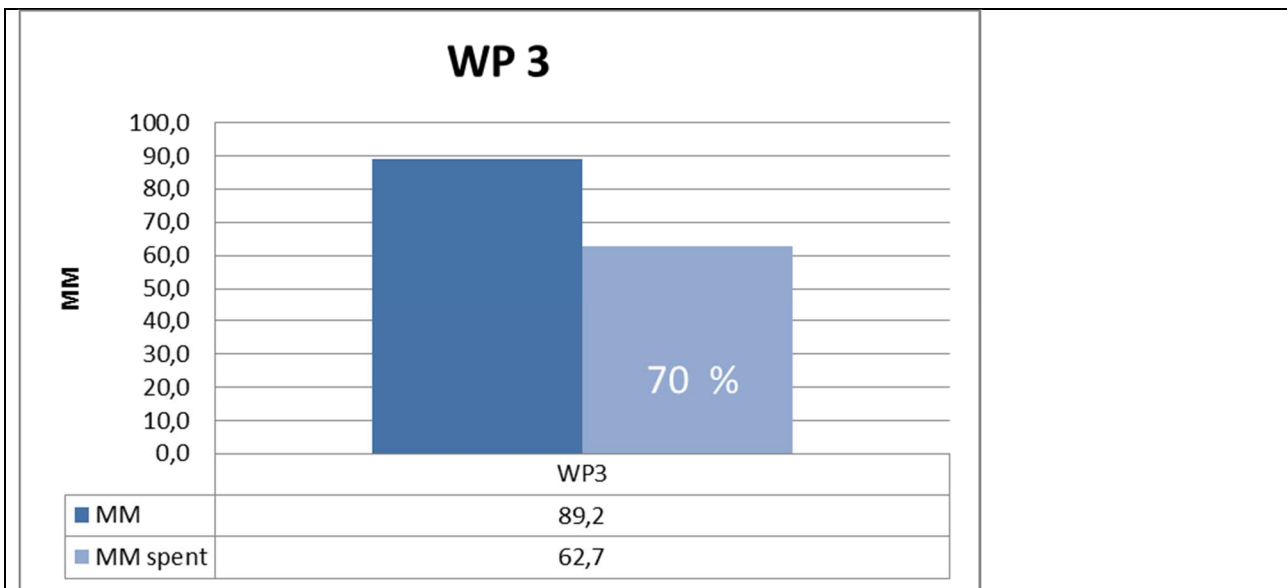
The first important remark out of the Market and policy analysis is that the M-box has a high degree of compliance (79% over 100%) of the initial design requirements (Functional groups). But at the same time, there is a lot of room for improvement. Improvements in folding/collapsing, strength and durability would have a very positive impact because these functional groups have a high relative weight. The second important remark is that some current market packaging solutions have also a good level of compliance. Foldable/Stackable plastic (injection) group has a 75%, rigid plastic box pallet group has a 71%; ISO rigid plastic box group and ISO rigid metallic box group have a 61%. This implies that any of these groups could be used for some of the functional test of the pilots instead of the M-box prototypes, in order to prove some aspects of the physical internet concept.

#### **Deviations from Annex I**

To better evaluate and test the prototype design, the consortium decided to build a first version of the prototype already in this stage of the project - in WP3.2. The advanced version will then be built as planned in different sizes in the WP3.3.

Due to the changes in the production process the number of boxes will be reduced from 100 to 14 to 16 boxes, depending on the final production costs. The prototype boxes will be used to demonstrate the block building of a unit load.

#### **Use of resources**



In Work package 3, 62,7 MM have been spent in the first half of the project representing 70% of a total number of 89,2 MM.

The assessment of functionality, sizes and market requirements and the development of a first box prototype were done in this reporting period. Most of the work in WP3 has been spent which correlates with the figures.

**Corrective actions**

The iterative development of the boxes will take longer than initially planned. However, the consortium considers this as highly valuable since additional learning steps can be realised and integrated into the development process of the boxes.

**Periodic report WP4 Digital Interconnectivity**

**Summary of progress**

The main goal of WP4 is to start with the vision from WP2 and create a concept that can be put into operation, a conceptual architecture that can then be simulated.

**Task 4.1: Digital System analysis.**

The analysis activities have focused on the identification of the information needed to establish a digital interconnectivity for the whole supply chain process. The analysis of the related work has discovered interesting convergences, in several projects, of which we summarize here the more relevant. Outcome from the eFreight project such as European Single Transport Document and an appropriate framework for carriage of goods with all the necessary legislative support were analysed and integrated into the overall system assessment.

This analysis is captured in “D4.1 Overview on digital systems in use”.

**Task 4.2: Gap analysis on coding.**

The analysis of the system in use, in Poste Italiane, has reached an important result, in identification of information and processes, in some selected scenario, to be used for the prosecution of the WP4 activities. Following activities have been aimed at definition of a conceptual model for the management of the information related to the handling of modular units, i.e. the M-Boxes, and also

in defining a conceptual approach to the interoperability between partners. The results are documented in “IR4.1 Information needs of postal services in interconnected logistics” shows the results of this analysis. In parallel the information approach of transport industry have been analysed in detail using processes and IT system of Jan de Rijk as reference (IR 4.2: Information needs in transport planning systems within interconnected logistics). Both reports are integrated into a common approach for coding and information exchange D4.2: Common coding and information format. The report is finalised and submitted.

**Task 4.3:** Common information format for iso modular logistics units.

An approach for handling the information about modular boxes, in an interconnected logistics scenario using the Canonical Data Model (CDM), enterprise application integration pattern, which is based on the definition of a common data model. The proposed Modulushca Common Data Model is especially considering the encapsulation approach, proposed by the Physical Internet and highlights on the (future) definition of interfaces and protocols. A set of operations has been identified as a “minimum data set” allowing IT systems to interoperate one with the other as part of an open interconnected Modulushca Common Data Model. The latter, is the work to be done related to description of interaction between actors using the defined interfaces and the types proposed in the Modulushca Common Data Model.

The model has been defined using XML and XSD, in order to be platform independent, extensible and human readable. It is based on supporting standards and proposals: the GS1 and EPCIS. Moreover, it is inspired by the results of the eFreight project, for defining and using XML based documents.

The outcome of this task can be found in “D4.2 Common coding and information format for digital interconnectivity”.

**Task 4.4:** Description of the algorithm for digital interconnectivity.

The information format developed in Task 4.3 and the requirements analysis done in Task 4.1 and 4.2 is the basis for the development of an algorithmic procedure that can be used to match information from the material flow with information related to the transport process.

“D4.3 Common information format for interconnected logistics” reports on this algorithm.

**Task 4.5:** Sensoring and communication approach for modular logistics units.

In task 4.5, two existing smart mobile devices from Kirsen Global Security, specified for the usage on deep see containers, were developed further and adapted to the m-boxes according to the requirements as part of the track and trace system development for modular logistics units (M-Box Level 0 and M-Box Level 1). General logic of the devices and mountings were changed since the requirements are different.



Figure 2: Kirsen Global Security: Device 1



Figure 3: Kirsen Global Security: Device 2

In WP4, besides phone calls and telephone conferences, one working meetings has taken place:

- 21 January 2014 in Rome

### Significant results

The basic idea focuses on the IT architecture, interfaces and protocols for M-Boxes in open interconnected networks, considering the handling of the M-Boxes in the operations of pick-up and drop-off and the reverse logistic for the empty boxes delivered within a business process, using a structured network, with a common carrier approach across multimodal logistics domains.

WP 4 achieved progress in the following fields:

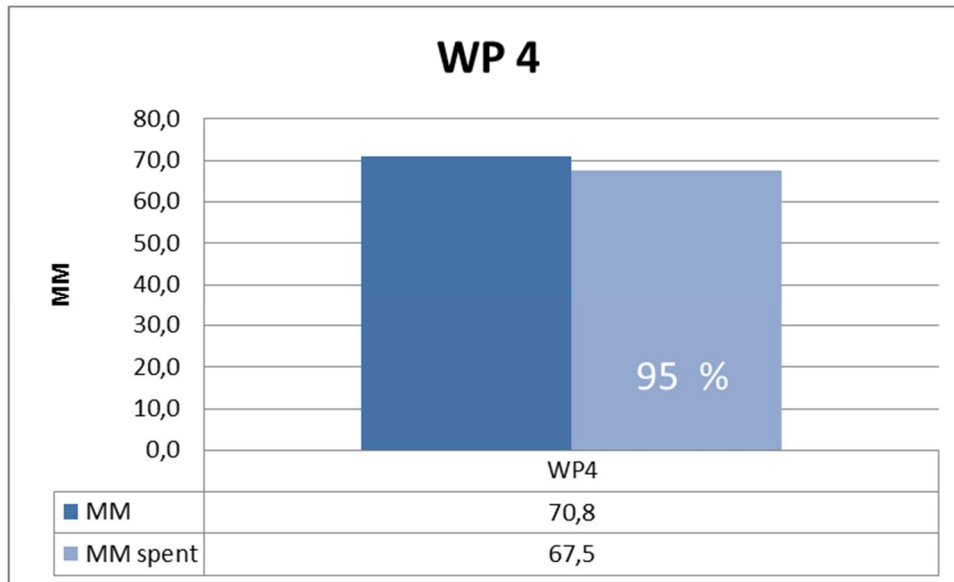
- Conceptual basis for IT systems in open interconnected networks
- Requirements on common information needs
- Development of an overall architecture approach
- Specification of common coding and information system

An approach for a tracking and tracing solution could be realised. However due restrictions from the energy supply (batteries sizes) these devices can only be employed for larger box sizes

### Deviations from Annex I

None

### Use of resources



WP4 has spent 95% of its planned ManMonth till the beginning of the Project. The results in 67,5MM from the 70,8MM estimated. WP4 has worked extensively on Tasks 4.1, 4.2, 4.3 and 4.5. Task 4.4 will now be based on those results.

### Corrective actions

No specific corrective actions are needed.

## Periodic report WP5 Operational interconnected solutions

### Summary of progress

**Task 5.1:** Modelling key performance indicators and solutions for operational interconnectivity in FMCG

The work of WP5 started from defining the frame for scenarios that would be a base for creating models of FMCG supply systems for evaluation of potential benefits by reducing logistics costs and emission of CO<sub>2</sub> coming from common utilisation of logistics infrastructure and fleet of vehicles.

All together 7 scenarios were agreed upon for evaluation of impact received by undertaking consecutive measures leading to positive results. Within each scenario the usage of two alternative loading units were analysed, euro pallets and modular boxes:

- Scenario No 1 – distribution model with 3 separate shippers using own transport channels sending complete loads from factory to own distribution centre at a neighbouring market and then distributing smaller lots of cargo to 5 local receivers.
- Scenario No 2 – the competing shippers decided on usage of the common distribution centre at export market in order to reduce warehousing expenses as well as obtaining synergies in distribution.
- Scenario No 3 - the shippers decided on creating a common consolidation centre, close to factories in order to consolidate cargo for better fill rates of the vehicles
- Scenario No 4 – besides road deliveries between consolidation and distribution centres the partners implemented new intermodal connections using short sea or rail solutions.
- Scenario No 5 – the multimodal network became open, the outside cargo owners were invited to ship their cargo through consolidation centre up to their receivers at the neighbouring market.
- Scenario No 6 – the shippers disposing back loads were invited to use the network in the reverse direction.
- Scenario No 7 – the network becomes the network of Physical Internet Terminals network.

Afterwards, a full set of necessary data was worked out - including locations, distances, volumes, processes at hubs with its productivities, loading units with determined weights, cubage and stackability etc.

Basing on these assumptions and after receiving dimensions of M-Boxes (elaborated by WP3) the NVM type model was filled with elaborated scenario data in order to run simulations. A large number of simulations were made in order to compare costs and emissions at product level by route to market, location and activity.

All scenarios show at least 20-30% savings, even without implemented m-boxes.

The scenarios with the m-box show a reduction of up to 60% of chain level costs or savings of 0,84€ per case and 36% CO<sub>2</sub> (transport).

Most of the savings (about 32% of costs) come from better utilisation of transportation and

handling. Main savings can be succeeded because of improved handling in the store, a perspective that logistics stakeholders usually don't have.

“D5.1. KPI and demonstration scenario for interconnected logistics” publishes the scenario results in details.

**Task 5.2:** Collaborative scheduling and routing for interconnected logistics.

In WP5.2, there are two independent optimization problems that were investigated:

- the last mile problem in the context of Physical Internet (PI) and
- vehicle dispatching problem for a PI hub.

In the first sub problem, the situation is postulated that when cargos (encapsulated in Modulushca boxes) arrive at the last PI hub, there is one important decision, that is, to distribute the cargos to their ordered customers. Such a problem is a typical Vehicle routing problem (VRP) with capacity constraint. However, in the world of PI, since all the cargos are stored inside of Modulushca boxes, in the process to check the feasibility of a route in the VRP, not only do the weight and volume capacity of a vehicle need to respect, but also the dimensions of the boxes are required to take into account as well. Therefore, to some extent, the first problem that we have tackled is a dreadful combination of the VRP and the Bin Packing Problem. For solutions, we devised a two-level algorithm whose upper level is a heuristic to generate route for each vehicle and lower level aims to check the feasibility of the route constructed in the previous decision process. In the upper level, we proposed the Insertion heuristic and the Tabu search for refinement. In contrast, for the lower level, two different approaches have been tried. The first one is to use IBM ILOG Cplex constraint programming solver to check whether all the boxes associated with one route can be packed into a vehicle or not (considering the restrictions on weight, volume, box non-overlapping, and last in first out, etc.) and the other is to adopt a bottom-left-first like heuristic to pack all the boxes ( in the case that a least one box cannot be contained in the vehicle, an infeasibility message would be raised). To assess the merits of collaborative scheduling, we have created a set of testing instances (60 in total and use the results from WP 3.1). In each instance, two logistics companies are requested to deliver Modulushca boxes to a set of customers. There are two scenarios: independent scheduling and collaborative scheduling. By solving the special VRP with the aforementioned algorithms under different circumstances, we are able to quantify the pros and cons of collaborative scheduling for the proposed last mile problem.

The objective of the second sub problem is to investigate how to maximize the utilization rate of vehicles which are at a PI hub or heading to the PI hub. At a PI hub, there is a bunch of Modulushca boxes that need to be transported to its neighbouring PI hubs. For the delivery, three kinds of resources can be utilized. That is, the vehicles currently at the PI hub, the vehicles heading to the PI hub, and the vehicles that can be chartered from a third party logistics company. The ultimate goal of this optimization problem is to minimize the total operational costs related to vehicles and meanwhile to maximize the average filling rate of vehicles. There are some important constraints for the proposed problem, like the time windows for the cargo delivery, total weight/volume capacity of vehicles and availability of vehicles (in terms of ready times). The problem is formulated as a mixed integer linear programming problem and is solved by IBM ILOG CPLEX optimization solver.

The results were published in “D5.2 Demonstration layout on optimised MODULUSHCA solutions”. Problems occurred in the availability of real data delaying the production of the deliverable as planned. The report will be postponed to July 2014.

**Task 5.3:** Operational and business models for modular logistics containers in FMCG.

Task 5.3 will be based on the findings from Task 5.1 and 5.2 and develop operational business models as well as investments and benefits that can be expected in the implementation of such a model.

This Task will be finished with the submission of “D5.4 Business Models and operational benefit of interconnected logistics in FMCG” in January 2015.

**Task 5.4:** Validation of the models for operational interconnectivity.

All results from the previous tasks will be validated with regard to the operational interconnectivity in 5.4. The results will be feedback to the MODULUSHCA vision developed in WP2, an assessment of the operational interconnectivity and validated business models.

Findings from task 5.4 will be published in “D5.5 Consolidated results on operational interconnectivity of modular logistics containers in FMCG” that is due in July 2015.

Several Working meeting took place:

- 18-20 Nov 2012, ILIM Project setup meeting, Poznan
- 15-16 April 2013, Participation in outbound session in order to collect data for WP5
- 14-15 May 2013, WP 5.2 KPI model review Brussels
- 15 July 2013, WP 5.2 KPI ILIM model workshop, London
- 14 October 2013, Genève
- 22-24 January 2014, Dorking near London

### **Significant results**

The final result of WP5 works is the NVM model providing very comprehensive picture of the FMCG logistics networks that allow to calculate the scale of cost savings as well as CO2 emissions level globally and locally at each location or kind of process.

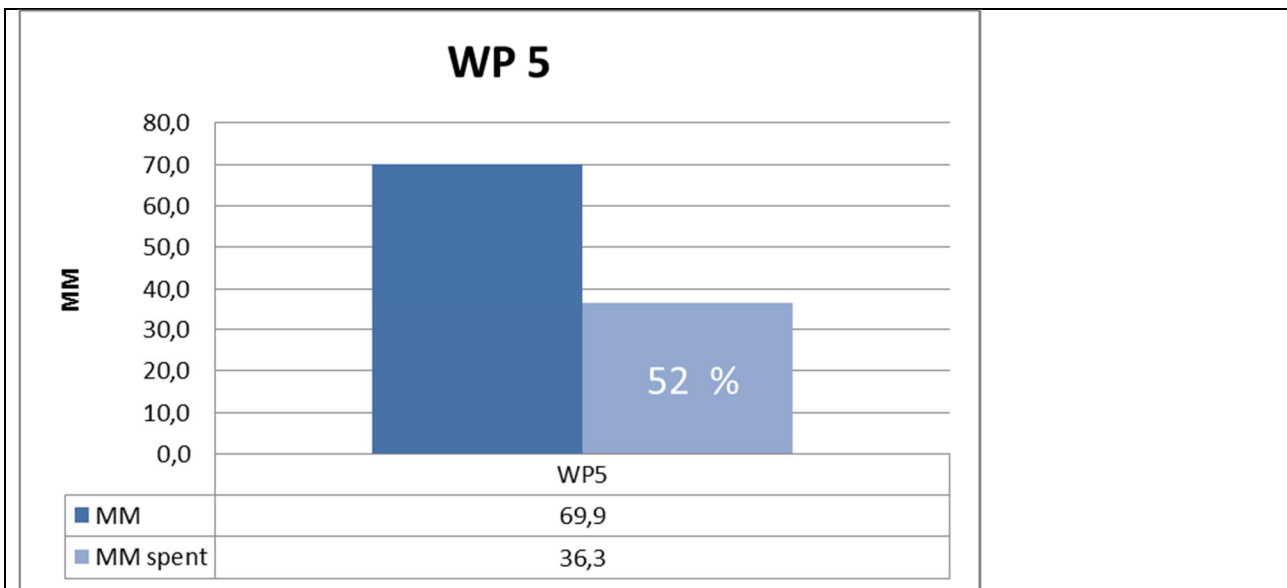
Some main findings :

- The scale of cost savings on the total end to end supply chain between all the scenarios on a pallet platform, versus the M-Box solutions was estimated (60% of chain level costs.)
- The scale of reduction of CO2 emissions (limited to transport only) was calculated (36% what is the equivalent of saving 46,000 Km's or 230 HGV journeys of 200 km)
- The Pareto analysis was carried out defining the kind of costs contributing to 80% of the total per scenario and type of platform (pallets, vs. M-Boxes). Process, location, activity group costs were taken into account.
- Critical success factors were determined
- For the both routing problems, mathematical models have been successfully developed and their corresponding solving algorithms have been proposed and tested as well.

### **Deviations from Annex I**

The deliverable D5.1. “KPI and demonstration scenario for interconnected logistics” was delivered in Dec'2013. It was slightly delayed due to late input from WP3 in which the dimensions of M-Boxes were determined. D5.2 showed also a delay in submission due to delays in data availability. It is planned to finalise the work in July 2014.

### **Use of resources**



In WP 5, 36,3 Man months have been spent so far, representing 52% of a total number of 69,9 MM. WP5 has focussed on the development of scenarios to prove the benefits of m-boxes as well as the whole Physical Internet system. The basis has been created, now the WP focusses on developing business models and the validation of the scenarios. 52% of work done after half of the project lifetime can be seen as reasonable.

**Corrective actions**

No.

**Periodic report WP6 Implementation Actions**

**Summary of progress**

In the first half of the project, the possibilities of using the interconnected logistics principle during the pilot phase were researched. Via several workshops with the partners, telephone conferences and the analysis of input from WP1, 2, 3, 4 and 5, a plan of approach had been set-up where the pilots will consist of three steps.

**Task 6.1:** Iso modular logistics units in a closed inter-site supply chain.

To test handling and transport in a closed network between two locations, two steps have been planned:

- Urban transport:  
Repacking of SKU's (stockkeeping unit) from cardboard boxes into standard plastic boxes provided by Poste Italiane where the handling will be part of the practical research.
- Box handling tests with prototypes of the Mboxes:  
The Mboxes will be designed and provided by TU Graz.

All findings will be put into "D6.1 Consolidated results of the iso modular logistics units in inter-site supply chains".

**Task 6.2:** Iso modular logistics units in open interconnected transport networks.

The testing of interconnected transport networks can only be done with different partners, involved in the transportation. In MODULUSHCA those partners are Poste Italiane, P&G and Jan de Rijk. For Task 6.2, those three partners have already planned the implementation pilot, which will consist of two practical tests demonstrating the interconnected logistics. Freight will be loaded at a P&G DC (Distribution Center) in Pomezia, loading empty trolleys at a DC in Rome, unloading empty trolleys at a DC in Bologna and finally unloading freight at a DC in Gattatico.

- a. Poste Italiane
- b. Jan de Rijk Logistics

All finding will be put into “D6.2 Consolidated results of the iso modular logistics units in interconnected transport system”.

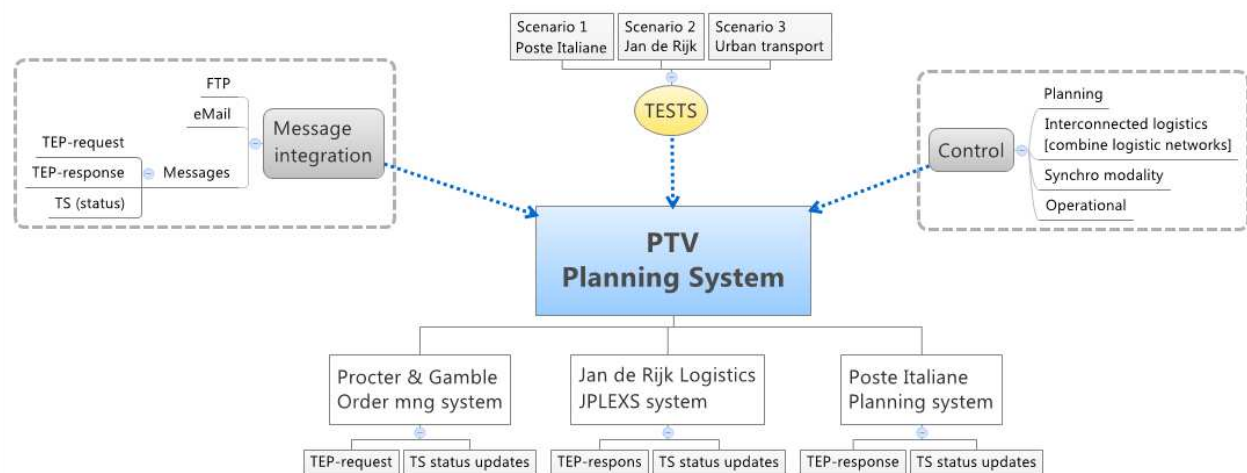
WP6 relies on close communication and discussions, so several working meetings were necessary to match requirements and ideas of all different stakeholders involved:

- April 2013, Belleville with Uni Laval and P&G
- 16 April 2013 in Roosendaal
- 3/4 December 2013 in Brussels
- 24 February 2014 in Rome

### Significant results

All actions have been planned and agreed upon with all involved actors.

In addition, a design has been made to use a certain IT architecture in order to support the pilots. This can be represented by this diagram:

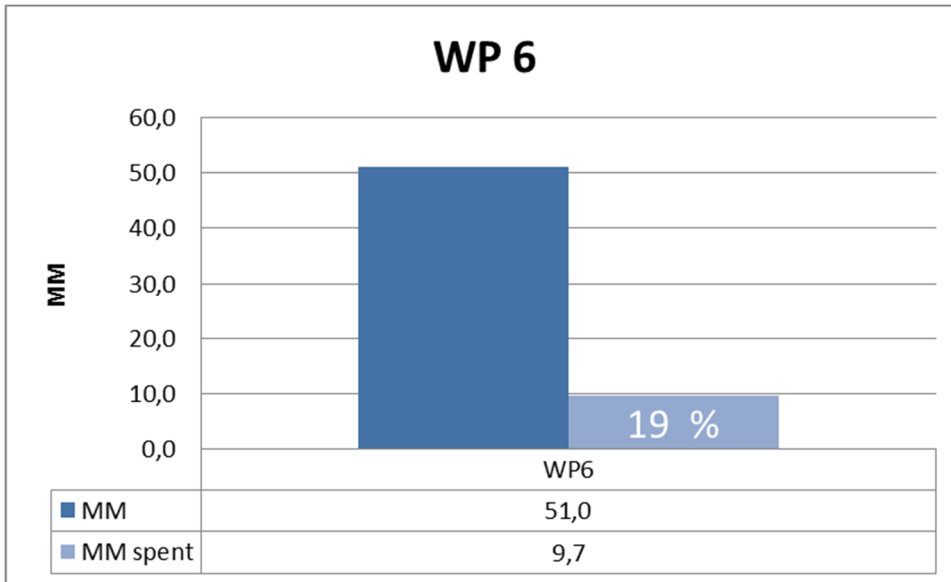


### Deviations from Annex I

There will be no prototypes of the Mboxes available during the start of the pilots. Together with the pilot partners, a solution came up by means of using plastic boxes from the partner Poste Italiane in order to pilot the handlings. At a later stage during the pilots the official prototype Mboxes will become available. These prototypes will be part of pilot tests at two DC's, a DC from Procter & Gamble and a DC from Jan de Rijk Logistics.

Poste Italiane and PTV will be involved in the implementation pilot. A shift of resources from P&G to Poste Italiane is planned. PTV will handle this within their budget.

**Use of resources**



In WP 6, 9,7 MM have been spent representing 19% of a total number of 51 MM planned in WP 4. This is normal since the Pilots haven't started and only the preparation work has been done. The working efforts will increase in the next month when the pilots will be executed.

**Corrective actions**

No specific corrective actions are needed

**Periodic report WP7 Dissemination and Exploitation**

**Summary of progress**

**Task 7.1. Dissemination strategy**

The dedicated Communication and Dissemination Strategy was presented as D7.1: Dissemination strategy. It outlines in detail which public and private target groups the project intends to reach, by means of which project communication tools and through which dissemination channels at the European, national and local level. This is an alive document and will therefore be constantly updated during the project lifetime.

**Task 7.2 Dissemination material and web site**

- A dedicated project website was set up as D7.5: MODULUSHCA web site <http://www.modulushca.eu/>. It allows the internal and external community to follow up on new developments and results.
- 2.0 social media web channels have been set up and are used for communication:

- Twitter: @modulushca
- YouTube: Modulushca
- Facebook: Modulushca
- LinkedIn: Physical Internet Initiative group
- A WIKIPEDIA article was developed, improved and can be visited under [http://en.wikipedia.org/wiki/Physical\\_Internet](http://en.wikipedia.org/wiki/Physical_Internet)
- A press release was sent to media in Spain (general and specialized ones).
- A project brochure was produced and presented as D7.3: MODULUSHCA brochure. It presents the project's main objectives and expected results at a glance and has been distributed widely since then.
- A project poster to be used at exhibitions and public meetings was also produced.
- The first newsletter has been produced to keep the interested project community informed of the project's progress and results.

### **Task 7.3: MODULUSHCA Conferences**

- This task is not part of this period.

### **Task 7.4: Exploitation strategy**

In Task 7.4, several actions were taken to exploit the MODULUSHCA results. An exploitation strategy has been developed placing the focus on the following fields

- Box development and bringing it into the market
- Improved network logistics through sharing capacity
- Enhance supply chain co-operation of manufacturer, retail and transport
- Information management for co-operative logistics

Dedicated exploitation approaches have been developed consisting of:

- Awareness creation on the Physical Internet and MODULUSHCA
- Individual exploitation plans towards the exploitation focus of the partners

Within the first year focus has been given to the awareness making while individual strategies on technical exploitation will be the focus in the second half. P&G and PTV have presented the project at several occasions:

- 10/24/2012 BVL congress in Berlin with an invited session on MODULUSHCA
- 09/01/2013 visit Lund University. Mats Johnsson, PhD Packaging Logistics, (www.plog.lth.se), Assoc professor, Appointed Scientist of China Packaging Research (China National Packaging Corporation, CNPC), Adjunct professor, School of Packaging, Michigan State University
- 22/04/2013 Present the Modulushca project to CO3 General Assembly.
- 09/06/2013 AIM. European Brands Association. Association of industrial manufacturers logistics WG meeting. Around 20 companies attending. The project is introduced and informal cooperation is established. As next steps we would like them in a RM session for WP 2.
- 27/06/2013 Assologistica. Italian Logistics association biggest Conference. Around 100 attendees (picture attached)
- 15/04/2014 Presentation of the project to external suppliers in PG Geneva. More than 50 attendees.
- 17/04/2014 Participation in ALICE GA. Presenting the concept within the TRA Conference.

- 20/04/2014 Presentation of the project to GS1 Spain. Agreed further presentation to its logistics committee after summer (11 retailers+11 shippers+ 3 LSP)
- 09/05/2014 Visit to INTERPACK. Dedicated meetings with packaging suppliers introducing the project. Dissemination activities carried out together with ITENE.

In parallel specific meetings with companies/organizations have been organized to identify field of cooperation within the Modulushca project:

- Siemens AG Infrastructure & Cities Sector Mobility and Logistics Division
- Nestle
- ECR
- Schoeller Allibert
- Utz
- TESCO
- DM
- AXIT

In addition, a close partnership has been established with the sister project in Canada in order to set up a clear and structures framework of cooperation. As a first step, it was the presence of one of its industry members of the project who participated in the 2nd Board of Directors of Modulushca.

#### **Task 7.5 Industrial advisory group**

An Industrial Advisory Group composed of key industrial stakeholders has been established involving now the following external experts:

- Prof. Georges Huang (University of Hong Kong)
- Prof. Dr. J. Rod Franklin (Kuehne & Nagel)
- Mr. Guillaume Tilquin (Renault)
- Mr. Max Winkler (SSI Schäfer)
- Mr. Michiel Nielsen (IRU)
- Mr. Roeland van Boeckel (CEN/TC 320)
- Mr. Dirk Thooft (Holland International Distribution Council)
- Mr. JeanLuc Azzani (P&G)
- Mr. Jean Fortin (SOUTHSHORE)
- Ms. Anna Ivers-Tiffée (DHL)
- Mr. Dave Sheldon (Nestle)
- Mr Ludo Gielen (Schoeller Allibert)
- Mr. Christof Weis (IFCO)

#### Two Advisory Board meetings have been carried out:

The first one in Munich on the 4<sup>th</sup> of June 2013 on the Transport Logistics 2013, the International Exhibition for Logistics, Mobility, IT and Supply Chain Management

The second Advisory Board meeting with 29 participants has been carried out on 7<sup>th</sup> of March 2014 in Brussels. The project board discussed and agreed upon u.o.

- the overall approach of Modulushca,
- the progress and results,
- further proceeding of the project.

## **Significant results**

### **Task 7.1. Dissemination strategy**

- Communication and Dissemination Strategy presented as D7.1.

### **Task 7.2 Dissemination material and web site**

- Project website set up as D7.5: MODULUSHCA web site (<http://www.modulushca.eu/>)
- 2.0 social media web applications: Twitter, YouTube, Facebook and LinkedIn.
- Press release sent to media
- Project brochure presented as D7.3.
- Project poster to be used at exhibitions and public meetings.
- First newsletter has been produced.

### **Task 7.3: MODULUSHCA Conferences**

This task is not part of this period.

### **Task 7.4: Exploitation strategy**

- ALICE meeting
- Two MODULUSHCA Board of Directors meetings
- Several presentations held from different partners to disseminate idea and results from MODULUSHCA

### **Task 7.5 Industrial advisory group**

- The Industrial Advisory Group has been established.
- Two meetings have taken place.

### **Meetings that MODULUSHCA has been presented or present:**

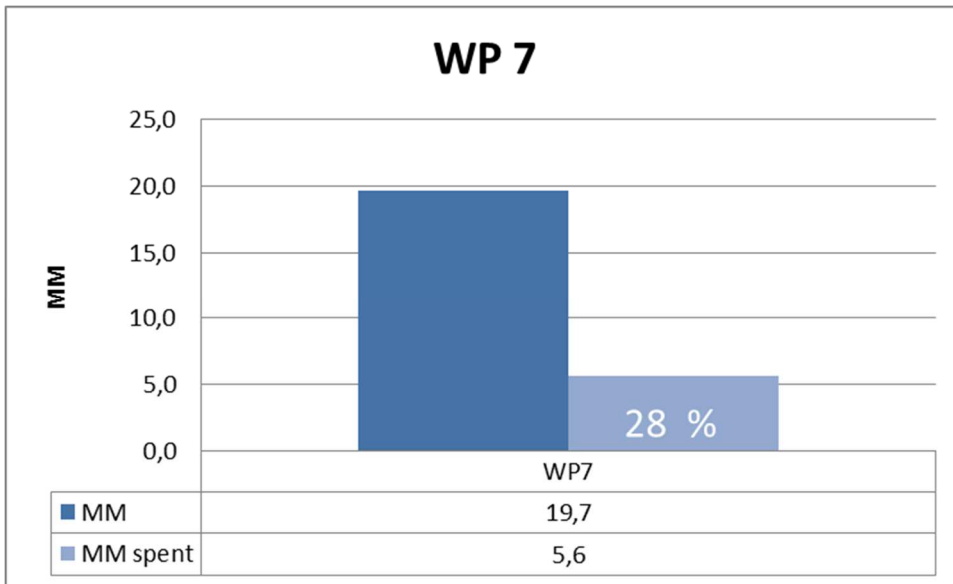
All partners were encouraged to disseminate the idea and results of their work in the MODULUSHCA project. That way, the project was presented at several workshops or conferences:

- 11.10.2012, Gdynia, Representing the project during the debate "Development of Logistic of Trólmiaasta and the needs of employers in the industry TSL"
- 22-23.04.2013, High Level Industry Board from CO3 project, Amsterdam
- 6-8.05.2013, GERAD conference - Optimisation Days - in Montreal, Canada
- 4-6.09.2013, hEART 2013, 2nd Symposium of the European Association for Research in Transportation in Stockholm
- 11-18.10.2013, Participation in ITS Wowld Congress 2013, Tokyo
- 23-25 October 2013, ECITL 2013 the European Conference on ICT in Logistics, Zaragoza
- 7-8.11.2013, Logistics conference by the European Commission in Brussels

## **Deviations from Annex I**

The periodicity of the Newsletter up to now is not the six months defined at the beginning of the project.

**Use of resources**



In WP 7, 5,6 MM have been spent representing 28% of a total number of 19,7 MM planned in WP 4. Dissemination has started with the setting of templates, a website and other communication channels. It will increase their efforts in the next month to disseminate the results of the project. The Advisory Board will be increasingly involved in the project and the MODULUSHCA conference will be planned.

**Corrective actions**

The next newsletters will have a periodicity of 5 months instead of six in order to catch up some of the delay.

**Periodic report WP8 Technical Management**

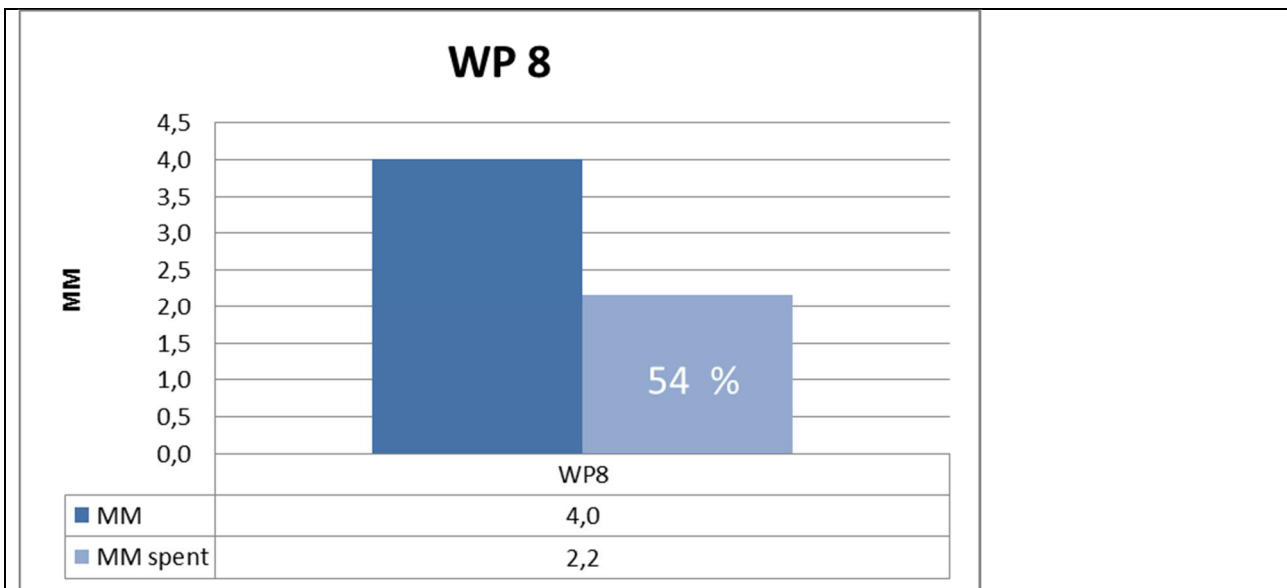
**Summary of progress**

To ensure a smooth communication among all partners at all stages of the project execution, and, in order to archive the expected technical results of the Project we held periodical “Technical Coordination Conference”. At these calls, were discussed al problems that had a potential impact on technical developments defining afterwards the necessary contingency plans.

**Technical Coordination Conferences**

Attendants	Technical Coordinator (TC) plus all WP Leaders
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Frequency	<p>Monthly. First Friday of every month during the whole lifetime of the project.</p> <ul style="list-style-type: none"> <li>• <a href="#">Tuesday 22th January 2013</a></li> <li>• <a href="#">Friday 1st February 2013</a></li> <li>• <a href="#">Friday 1st March 2013</a></li> <li>• <a href="#">Friday 5th April 2013</a></li> <li>• <a href="#">Friday 3rd May 2013</a></li> <li>• Friday 7th June 2013</li> <li>• <a href="#">Friday 19th July 2013</a></li> <li>• Friday 2nd August 2013</li> <li>• <a href="#">Friday 6th September 2013</a></li> <li>• Friday 4th October 2013</li> <li>• Friday 1st November 2013</li> <li>• <a href="#">Friday, 7th February 2014</a></li> <li>• <a href="#">Friday, 4th April 2014</a></li> </ul> <p>** In blue all Technical Coordination Conferences held and which their minutes have been produced. In black, those sessions that were cancelled and substituted by Project Board Meeting or Advisory Board Meetings.</p>
Means	Webex
Objectives	<ol style="list-style-type: none"> <li>1. Monitoring of project progresses, achievements and roadblocks.</li> <li>2. Tracking of the main elements and discussion of critical elements.</li> <li>3. Solution of problems that have a potential impact on technical developments and definition of the necessary contingency plans.</li> </ol>
<p>In addition, an Advisory Board [Board of Directors] was created in order to validate all main outcomes of the Project (see WP7).</p>	
<p><b>Significant results</b></p> <p>The structure established has helped the Project to face obstacles during the continuous work establishing a continuous flow of information through the different partners and work packages. A smooth information sharing process among WP Leaders has been guaranteed giving a coherent and harmonic development of the Project with no remarkable deviations.</p>	
<p><b>Deviations from Annex I</b></p> <p>No</p>	
<p><b>Use of resources</b></p>	



In WP 8, 2,2 MM have been spent representing 54% of a total number of 4 MM planned. The technical coordinator has closely accompanied the technical progress of the project and has spent half of its budget at the halftime of the project.

**Corrective actions**

No specific corrective actions are needed.

**3.2.3 Project management during the period**

**Periodic report Work package 1 Project Management**

**Consortium management tasks and achievements**

The objectives of WP 1 are:

- To ensure the interface between the EC and the consortium
- Administration of Community financial contribution and distribution of community funds
- Keep records and financial accounts of the distribution of the Community financial contribution
- Review of reports to verify consistency with the project tasks
- Monitoring of compliance by beneficiaries with their obligations under the grant agreement
- Compilation of periodic and final reports.
- Preparation and post-processing of EC reviews.
- Administrative tasks involved in the preparation, execution and post-processing of major project meetings (agenda, invitation, location of meetings, organisation of rooms and equipment, distribution and archiving of materials, minutes and action lists)
- Handling of legal and IPR issues.
- Handling project correspondence and day-to-day requests from partners and external bodies
- Designing and maintaining partners specific templates for collecting input to the required EU documents

- Implementing and maintaining a project specific database for reporting and controlling, including the adaptation of the structures after changes in the work plan and consortium after GA amendment
- Maintenance of the consortium agreement
- Organisation

### **Project Progress Control**

The project progress is mainly controlled by means of milestones and deadlines for the deliverables. In addition, workshops and events are planned and monitored.

Project Management meetings took place on

- 22/23 October 2012 in Brussels (Kick-Off)
- 17/18 December 2012 in Karlsruhe
- 14/15 March 2013 in Valencia
- 13/14 June 2013 in Rome
- 21-23 October 2013 in Zaragoza
- 16/17 January 2014 in Graz

PTV organised and prepared the consortium meetings and kept the minutes. All meeting included a dedicated management sessions.

P&G established regular telephone conferences and management meetings over the reporting period in order to present, discuss and monitor the project status and progress (WP8).

The Project Management has closely accompanied the production of the deliverables in the first half of the project. Only after being quality checked they have been submitted to the EC.

All project related deliverables due in the reporting period have been accompanied in the final stage of preparation in order to meet the formal and layout requirements. PTV is doing the final quality control of the deliverable and submit it towards the EC

### **Financial and contractual management**

For the preparation of the periodic report, templates have been produced and applied by the partners.

PTV managed the financial reporting in close communication with the EC providing all necessary documents for completion in due time. In the Kick-Off meeting, the consortium agreed that the pre-financing of 80% was split. One half has been paid at the beginning of the project while the other half will be paid after the midterm review. Regular budget control was made.

### **Communication with EC**

PTV acted as main contact point between the Modulushca consortium and activities and the EC. For doing this regular telephone conferences or exchange on request have taken place (at least on a monthly basis). PTV informed and included the EC in all major project issues in an open and constructive way:

- communication on delivery dates for deliverables
- external links and activities
- Board of Directors communication
- etc.

Comments were taken up, discussed and solved with the partners concerned.

### **Project Secretariat**

- Questions answered concerning the reporting
- All applications for reimbursement for travel costs of experts have been processed and the money paid to their bank account.

### **Problems which have occurred and how they were solved or envisaged solutions**

During the first year of Modulushca all objectives could be achieved. There are some deviations in the time planning of single WP and tasks to recognise. The deviations are analysed and can be linked among others to a longer project set up phase, defining the vision, the box development and the scenario. However, the longer time led also to improved outcome and was therefore tolerated. On the overall time planning - from the present perspective – there is no need for change

There are some changes are partner side to be mentioned:

- Poste Italiane is involved in WP6 with budget to be shifted from P&G to Poste Italiane. A contract amendment will be prepared
- The M-Boxes will be produced differently then described in the DoW and would need for a change in the subcontracting budget of partner TU Graz, also the number of total boxes will change, a contract amendment will be prepared

### **Changes in the consortium**

None

### **Project planning and status**

No major problems have occurred. The key activities planned for the second half of the project are:

- Project meetings
  - o Project Board Meeting in Dorking (UK) in July 2014
  - o Specific meetings and telephone conference (on demand)
- Deliverables & Publications
  - o Strategic Roadmap towards interconnected FMCG logistics in 2030 (D2.3) in September 2015
  - o Modulushca iso modular logistics units prototypes (D3.3) in May 2014
  - o Recommendations for standardisation for iso modular load units (D3.4) in May 2015
  - o Common Architecture for digital interconnectivity (D4.4) in September 2015
  - o Consolidated results on collaborative transport planning procedures (D5.3) in September 2014
  - o Business models and operational benefit of interconnected logistics in FMCG (D5.4) in January 2015
  - o Consolidated results on operational interconnectivity of modular logistics containers in FMCG (D5.5) in July 2015
  - o Consolidated results of the iso modular logistics units in inter-site supply chains (D6.1) in July 2015
  - o Consolidated results of the iso modular logistics units in interconnected transport systems (D6.2) in July 2015
  - o Modulushca conference (D7.2) in September 2015
  - o Modulushca continuous exploitation plan (D7.4) in September 2015
  - o Consolidated Advisory Group recommendations (D7.6) in Mai 2015

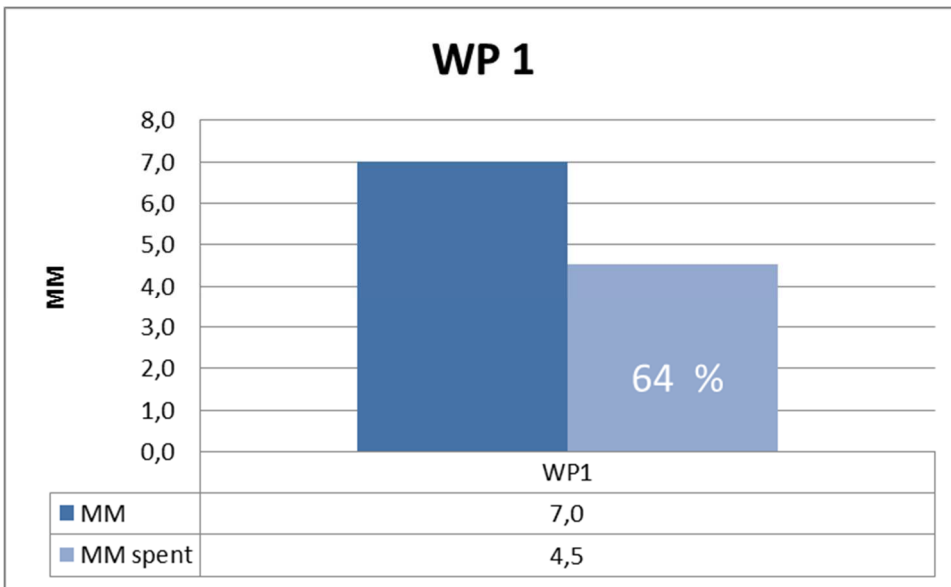
**Impact of possible deviations from the planned milestones and deliverables**

From present perspective the outstanding activities can be executed as planned

**Any changes to the legal status of any of the beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs;**

Partner P&G changed from Procter&Gamble Eurocor N.V. to Procter&Gamble Services Company N.V.

**Use of resources**



In WP 1, 8,5 Man months have been spent by PTV in year 2, representing 37% of a total number of 23 MM planned in WP 1.

PTV spent 74% of their overall working amount in year 1 and 2 to establish management and communication processes. While these processes are now established, the management effort won't stay the same in 2014 and 2015.

**Corrective actions**

No specific corrective measures are needed

### 3.3 Deliverables and milestones tables

#### Deliverables

The deliverables due between October 2012 and March 2014 are highlighted in green:

Del. no.	Deliverable name	WP no.	Lead beneficiary	Nature	Dissemination level <sup>4</sup>	Delivery date from Annex I (proj month)	Actual / Forecast delivery date Dd/mm/yyyy	Comments
D1.1	D1.1: Project Management and quality assurance plan	1	PTV	R	RE	3	Jan 2013	
D2.1	D2.1: Framework for Physical Internet enabled interconnected FMCG logistics	2	TU Berlin	R	PU	6	Mar 2013	
D2.2	D2.2: Assessment of critical success factors and obstacles to implementation of PI	2	Uni Laval	R	PU	8	Oct. 2013	
D2.3	IR2.1: Validated MODULUSHCA vision and road map	2	ARMINES	R	RE	12	Jan 2013	
D2.4	IR2.2: Obstacles and solutions for interconnected logistics in FMCG	2	Uni Laval	R	RE	24		
D2.5	IR 2.3: Technical obstacles and solutions on scenario level	2	ITENE	R	RE	22		
D2.6	IR 2.2: Interconnected logistics in European transport systems	2	P&G	R	RE	22		

<sup>4</sup> PU = Public

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).

D2.7	D2.3: Strategic roadmap towards interconnected FMCG logistics in 2030	2	ARMINES	R	PU	36		
D3.1	D3.1: Functional specification of iso modular logistics units in FMCG	3	CHEP	R	RE	8	Aug 2013	
D3.2	D3.2: Modular logistics unit design	3	CHEP	R	PU	16	May 2014	
D3.3	D3.3: MODULUSHCA iso modular logistics units prototypes	3	CHEP	P	PU	20		
D3.4	IR 3.1: Operational benefits of iso modular logistics units	3	ITENE	R	RE	28		
D3.5	IR 3.2: Standardisation requirements and development needs for iso modular logistics units	3	ILIM	R	RE	26		
D3.6	IR 3.3: Standardisation recommendations	3	CHEP	R	RE	30		
D3.7	D3.4: Recommendations for standardisation for iso modular loading units	3	CHEP	R	PU	32		
D4.1	D4.1: Overview on digital systems in use	4	MEWARE		RE	6	July 2013	
D4.2	IR 4.1: Information needs of postal services in in interconnected logistics	4	Poste It	R	RE	12	Nov 2013	
D4.3	IR4.2: Information needs in transport planning systems within interconnected logistics	4	JDR	R	RE	12	Nov 2013	
D4.4	D4.2: Common coding and information format for digital interconnectivity	4	MEWARE	R	PU	16	May 2013	
D4.5	IR4.3: Recommendations for transport documentation for iso modular logistics units	4	ILIM	R	RE	12	May 2013	
D4.6	D4.3: Common information format for interconnectd logistics	4	MEWARE	R	PU	16	May 2013	
D4.7	D4.4: Common architecture for digital interconnectivity	4	ILIM	R	PU	36		
D4.8	IR4.4: System concept for modular boxes in interconnected logistic networks	4	MEWARE	R	RE	18	Jun 2014	
D4.9	D4.5: Sensoring and communication approach for iso modular logistics units	4	KIRSEN	R	PP	20		
D5.1	D5.1: KPI and demonstration scenario for interconnected logistics	5	INCEPT	R	PU	12	Feb 2014	

D5.2	D5.2: Demonstration layout on optimised MODULUSHCA solutions	5	EPFL	R	PU	16	July 2014	
D5.3	D5.3: Consolidated results on collaborative transport planning procedures	5	ILIM	R	PU	24		
D5.4	D5.4: Business models and operational benefit of interconnected logistics in FMCG	5	ILIM	R	PU	28		
D5.5	D5.5: Consolidated results on operational interconnectivity of modular logistics containers in FMCG	5	INCEPT	R	PU	34		
D6.1	D6.1: Consolidated results of the iso modular logistics units in inter-site supply chains	6	P&G	R	PU	30		
D6.2	D6.2: Consolidated results of the iso modular logistics units in interconnected transport systems	6	JDR	R	PU	30		
D7.1	D7.1: Dissemination strategy	7	ITENE	R	PP	3	Jan 2013	
D7.2	D7.5: MODULUSHCA web site	7	ITENE	O	PU	3	Jan 2013	
D7.3	D7.3: MODULUSHCA brochure	7	ITENE	O	PU	4	Feb 2013	
D7.4	IR7.1: Interim exploitation results	7	PTV	R	PU	20		
D7.5	D7.6: Consolidated Advisory Group recommendations	7	P&G	R	PU	32		
D7.6	D7.2: MODULUSHCA conference	7	ITENE	O	PU	36		
D7.7	IR7.2: MODULUSHCA IPR issues and exploitation approach	7	P&G	R	RE	30		
D7.8	D7.4: MODULUSHCA continuous exploitation plan	7	PTV	R	PU	36		
D8.1	D8.1: Technical project management plan	8	P&G	R	PP	3	Jan 2013	

## Milestones

The milestones due between January 2012 and December 2012 are highlighted in green, the milestones due between January 2013 and December 2013 are highlighted in a darker green:

<b>TABLE 2. MILESTONES</b>						
<b>Milestone no.</b>	<b>Milestone name</b>	<b>Work package no</b>	<b>Lead beneficiary</b>	<b>Delivery date from Annex I dd/mm/yyyy</b>	<b>Achieved Yes/No</b>	<b>Actual / Forecast achievement date dd/mm/yyyy</b>
MS1	M2.1 Framework Physical Internet enabled interconnect. FMCG logistics defined, published on website	WP2	ARMINES	4	Yes	
MS2	M2.2 Obstacles and success factors to PI enabled interconnected FMCG	WP2	ARMINES	8	Yes	
MS3	M2.3 Strategic roadmap towards interconnected FMCG logistics in 2030 is available	WP2	ARMINES	36		
MS4	M3.1 Set of modular logistics containers is defined, functional specification is available	WP3	CHEP	6	Yes	
MS5	M3.2 Technical Spec. available, modelling feedback from WP5.1 is included, final design of container	WP3	CHEP	12	No	Delay due to user survey finalised Mai 2014
MS6	M3.3 Container prototype is available	WP3	CHEP	20		
MS7	M3.4: Prototype equipped with devise, operational tests took place	WP3	CHEP	24		
MS8	M4.1 Digital system analysis is completed	WP4	MEWAR E	6	Yes	
MS9	M4.2 Common labelling and information format available, algorithmic procedures available and tested	WP4	MEWAR E	16	Yes	Slight delay finalised in May 2014
MS10	M4.3 Sensoring and communication device available, real time platform adopted	WP4	KIRSEN	20		

MS11	M4.4: Real time monitoring concept available with feedback from demonstrators	WP4	MEWAR E	36		
MS12	M5.1 Impact evaluation on supply chain scenario for FMCG is executed, design descr. for WP6 demo	WP5	ILIM	12	Yes	
MS13	M5.2 Algorithm for collaborative scheduling and routing available, successful tests	WP5	ILIM	20		
MS14	M5.3 Business models developed and validated operational model for FMCG available	WP5	ILIM	34		
MS15	M6.1 Demonstration design finalised	WP6	JDR	16	Yes	
MS16	M6.2 Demonstration setup finalised	WP6	JDR	20		
MS17	M6.3 Demonstration finalised	WP6	JDR	36		
MS18	M7.1 Exploitation strategy plan first draft is available, Dissemination strategy is available, broch	WP7	ITENE	6	Yes	
MS19	M7.2 Advisory board established and one workshop organised	WP7	ITENE	12	Yes	
MS20	M7.3 Conference successfully organised, a lear exploitation strategy with follow up activities. Wor	WP7	ITENE	36		

### 3.4 Explanation of the use of the resources and financial statements

The overall spending is balanced and now exceeds 52% of the overall budget.

Within the first half of the project, costs of 1.517.214,23 € occurred which means 1.382.448.77 € of the overall EU contribution of 2.899.663 € are for the second half of the project lifetime.

The single partners differ slightly which is in line with their working efforts. While e.g. TU Berlin, Incept, Meware and TU Graz have a overspending with about 80% of their budget at this point in the project, this corresponds with their working timeline. TU Berlin was mainly involved in Tasks 2.1 and 2.2, which have been successfully finished with the submission of both deliverables. Incept developed, set up and analysed the scenarios regarding the operational Physical Internet system which was estimated at 10MM. Their next task 5.4 is estimated with 4MM, so the workload will decrease till the end of the project. Meware was mainly involved in WP4 in Tasks 4.1 to 4.4 and have produced three important deliverables about the IT system needed for interconnected logistics. TU Graz developed the first prototype of the MODULUSHCA box. Both their workload will also be less in the next month.

Despite that, all partners stated that they will finish all work related to them till the end of the project.

On the other hand, a few partners are slightly underspent, e.g. ILIM, PG, PTV and EPFL. ILIM will create D5.3 and D5.4 in the progress of MODULUSHCA, PG will be heavily involved in the Implementation Pilot and EPFL will finish Task 5.2. PTV will be involved in WP6 demonstration activities with IT solutions that will create more effort than planned in the following period.

To keep these differences balanced, the overall spending is monitored by PTV during the whole project.

## Budget, MM overview and use of resources per Partner

Partner 1	Budget PLAN					Budget SPENT				
PTV AG										
	Type of Activity					Type of Activity				
	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D
Personnel costs	92.400,00	0,00	53.000,00	41.250,00	186.650,00	14.071,98	0,00	23.112,32	20.419,20	57.603,50
Subcontracting	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other direct costs	0,00	0,00	8.000,00	53.000,00	61.000,00	0,00	0,00	3.865,98	16.400,25	20.266,23
Indirect costs (~100%)	93.500,00	0,00	60.500,00	33.500,00	187.500,00	14.071,98	0,00	23.112,32	20.419,20	57.603,50
Total costs	185.900,00	0,00	121.500,00	127.750,00	435.150,00	28.143,96	0,00	50.090,62	57.238,65	135.473,22
Requested EU contribution	92.950,00	0,00	121.500,00	127.750,00	342.200,00	14.071,98	0,00	50.090,62	57.238,65	121.401,24
	MM PLAN	MM spent								
WP1	7,0	4,5								
WP2	0,0									
WP3	0,0									
WP4	4,0	0,29								
WP5	5,0	1,74								
WP6	3,0	0,07								
WP7	5,0	3,74								
WP8	0,0									
Total	24,0	10,3								

Partner 1	PTV AG		
	<b>Indirect costs (100%)</b>	57.603,50 €	
	<b>TOTAL COSTS</b>	135.473,22 €	
work package (WP1-8)	Item description	Amount in €	explanations
	<b>Personnel direct costs</b>	57.603,50 €	<b>WP1:</b> Marcel Huschebeck 1,10MM, Philipp Lenz 3,01 MM, Werner Heid 0,37MM, Tamara Tamburlin-Nußkern 0,04MM <b>WP4:</b> Frank Radaschewski 0,1MM, Marcel Huschebeck 0,19MM <b>WP5:</b> Frank Radaschewski 0,07MM, Henry Kebel 0,31MM, Marcel Huschebeck 1,25MM, Philipp Lenz 0,1MM <b>WP6:</b> Stephan Rinnebach 0,07MM <b>WP7:</b> Marcel Huschebeck 1,56MM, Philipp Lenz 2,08 MM, Werner Heid 0,09MM
	<b>Subcontracting 1</b>		
<b>WP1</b>	<b>Other costs</b>	3.855,98 €	<b>Travel costs:</b> 22-23.10.2012 Brussels (Huschebeck, Lenz) 1.280,27€ 14-15.03.2013 Valencia (Huschebeck, Lenz) 497,68€ 16-17.01.2014 Graz (Huschebeck, Lenz) 2.078,03€
<b>WP7</b>	<b>Other costs</b>	16.410,25 €	<b>Travel costs:</b> 16.04.2013 Roosendaal (Huschebeck) 150,75€ 22.04.2012 Berlin (Lenz) 270,23€ 04.06.2013 Munich (Huschebeck) 35,39€ 12-14.06.2013 Rome (Huschebeck, Lenz) 1.766,14€ 21.10.2013 Zaragoza (Huschebeck) 766,29€ 3-4.12.2013 Brussels (Huschebeck) 696,09€ 21.01.2014 Rome (Huschebeck) 1.128,92€ 24.02.2014 Rome (Huschebeck) 740,26€ 07.03.2014 Brussels (Huschebeck, Lenz) 1.669,84€  <b>Travel Reimbursements:</b> 4.407,84€ <b>Other Costs:</b> 4.778,50€





Partner 3		ARMINES	
	<b>Indirect costs</b>	50.215,49 €	
	<b>TOTAL COSTS</b>	161.456,65 €	
work package (WP1-8)	Item description	Amount in €	explanations
WP2	<b>Personnel direct costs</b>	78.186,73 €	
WP3	<b>Personnel direct costs</b>	9.187,85 €	
WP5	<b>Personnel direct costs</b>	5.945,55 €	
WP6	<b>Personnel direct costs</b>	8.164,46 €	
WP2	<b>Travel and other costs</b>	9.756,57 €	Participation of E.Ballot + SL.Pan to the Kick-off meeting in Brussels 22-23/10/2012 Participation of E.Ballot + SL.Pan to the General Assembly in Karlsruhe 16-18/12/2012 Participation of E.Ballot + SL.Pan to the General Assembly in Valence 13-15/03/2013 Participation of E.Ballot to the progress meeting in Roosendaal 15-16/04/2013 Participation of E.Ballot + SL.Pan to the progress meeting in Berlin 21-24/04/2013 Participation of E.Ballot to the progress meeting in Brussels 15/05/2013 Participation of E.Ballot to the progress meeting in Munich 4-5/06/2013 Participation of E.Ballot + SL.Pan to the progress meeting in Rome 12-15/06/2013 Participation of E.Ballot to the progress meeting in Graz 16-17/09/2013 Participation of E.Ballot to the progress meeting in Genève 14/10/2013 Participation of E.Ballot to the progress meeting in Brussels 4-5/12/2013 Workshop organized in Mines-paristech for the contortium 27-28/02/2013



Partner 5	Budget PLAN					Budget SPENT				
ULav										
	Type of Activity					Type of Activity				
	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D
Personnel costs	119.750,00	0,00	0,00	0,00	119.750,00	37.097,90	0,00	0,00	0,00	37.097,90
Subcontracting	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other direct costs	7.500,00	0,00	0,00	0,00	7.500,00	17.892,30	0,00	0,00	0,00	17.892,30
Indirect costs	25.450,00	0,00	0,00	0,00	25.450,00	10.998,04	0,00	0,00	0,00	10.998,04
Total costs	152.700,00	0,00	0,00	0,00	152.700,00	65.988,24	0,00	0,00	0,00	65.988,24
Requested EU contribution	114.525,00	0,00	0,00	0,00	114.525,00	49.491,18	0,00	0,00	0,00	49.491,18
	MM PLAN	MM spent								
WP1	0,0									
WP2	9,0	5,00								
WP3	2,0	1,00								
WP4	0,0									
WP5	0,0									
WP6	2,0	1,00								
WP7	0,0									
WP8	0,0									
Total	13,0	7,00								

Partner 5	ULav		
	Indirect costs (20%)	6.982,94 €	
	TOTAL COSTS	62.024,93 €	
work package (WP1-8)	Item description	Amount in €	explanations
	Personnel direct costs	37.097,90 €	Salary of Benoit Montreuil + Ph.D. student working part-time on project, both University Laval employees; WP2 = 5MM; WP3 = 1MM; WP6 = 1MM
	Subcontracting 1		
	Travel costs	17.944,09 €	Project meetings in Brussels (10/12) 1.527,98€, Karlsruhe (12/12) 1.317,70€, Valencia (03/13) 1.514,55€, Work session in Belleville with P&G (04/13) 1.598,52€, Rome (06/13) 2.676,75€, Zaragoza (10/13) 4.277,23€, Graz (01/14) 2.406,52€



<b>Partner 7</b>	<b>Budget PLAN</b>					<b>Budget SPENT</b>				
<b>KGS</b>										
	<b>Type of Activity</b>					<b>Type of Activity</b>				
	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D
<b>Personnel costs</b>	165.950,00	0,00	0,00	0,00	<b>165.950,00</b>	103.736,53	0,00	0,00	0,00	<b>103.736,53</b>
<b>Subcontracting</b>	0,00	0,00	0,00	0,00	<b>0,00</b>	0,00	0,00	0,00	0,00	<b>0,00</b>
<b>Other direct costs</b>	14.500,00	0,00	0,00	0,00	<b>14.500,00</b>	4.773,31	0,00	0,00	0,00	<b>4.773,31</b>
<b>Indirect costs (60,00%)</b>	108.270,00	0,00	0,00	0,00	<b>108.270,00</b>	65.105,90	0,00	0,00	0,00	<b>65.105,90</b>
<b>Total costs</b>	<b>288.720,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>288.720,00</b>	<b>173.615,74</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>173.615,74</b>
<b>Requested EU contribution</b>	<b>216.540,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>216.540,00</b>	<b>130.211,81</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>130.211,81</b>
Actual number of MM higher but personnel cost are lower										
	<b>MM PLAN</b>	<b>MM spent</b>								
WP1	0,0									
WP2	0,0									
WP3	2,0	3,8								
WP4	16,0	18,6								
WP5	0,0									
WP6	4,0	0,4								
WP7	0,0									
WP8	0,0									
<b>Total</b>	<b>22,0</b>	<b>22,8</b>								

Partner 7	KGS		
	<b>Indirect costs (59,67%%)</b>	64.747,82 €	
	<b>TOTAL COSTS</b>	173.257,66 €	
work package (WP1-8)	Item description	Amount in €	explanations
WP3	<b>Personnel direct costs</b>	103.736,53 €	Preparation for workpackages, development of concepts, development of two types of smart sensor devices for M-Box Level 0 and M-Box Level 1  Arnfried Nagel, 1,2 MM Christian Bogatu, 1,0 MM Manuela Muster, 1,1 MM Tim, 0,5 MM
WP4	<b>Personnel direct costs</b>		Development of two types of smart sensor devices according to the requirements as part of the track and trace system development for modular logistics units (M-Box Level 0 and M-Box Level 1).  Integration of the Modulushca requirements into already existing logistic systems.  Both modular units were developed: Monitoring of status of shipment and track and trace (TAT).  Development of software integration interfaces  Arnfried Nagel, 1,5 MM Christian Bogatu, 9,2 MM Manuela Muster, 4,1 MM Tim, 3,9 MM
WP6	<b>Personnel direct costs</b>		Preparation of demonstration  Arnfried Nagel, 0,3 MM Manuela Muster, 0,1 MM
	<b>Subcontracting 1</b>		
	<b>Other costs</b>	1.312,99 €	12.10.12 LCD display holder, 45,34 € 15.10.12 LG Flatron E2342 T-BN, 350,43 € 17.10.12 Sony Vaio VPC, 467,22 € 15.03.13 Consulting lawyer (Gottschewsky), 450,00 €
	<b>Travel costs</b>	3.460,32 €	Brussels 22.10. - 23.10.12 CB,AN 346,79 € Spain 14.03. - 15.03.12 AN 205,67 € Amsterdam Apr 13 AN 228,49 € Rome Jun 13 CB,AN 545,06 € Graz Sep 13 AN 806,55 € Zaragoza Okt 13 AN 552,16 € Graz Jan 14 MM 775,60 €



Partner 8	Poste Italiane		
	<b>Indirectcosts(20%)</b>	€ 17.751,49	
	<b>TOTAL COSTS</b>	106.508,93 €	
workpackage(WP1-8)	Itemdescription	Amountin€	explanatons
WP2	<b>Personneldirectcosts</b>	13.675,66 €	BEOLCHI=m/p 0,64; BIGGI=m/p 0,53; DEMASI=m/p 0,41; FANTASIA=m/p 0,44; FORMICA=m/p 0,06; FURBATTO=m/p 0,26;RESTAINO=m/p 0,44
WP3	<b>Personneldirectcosts</b>	19.943,69 €	BEOLCHI=m/p 0,38; BIGGI=m/p 0,90; DEMASI=m/p 0,70; FANTASIA=m/p 0,75; FORMICA=m/p 0,10; FURBATTO=m/p 0,45; RESTAINO=m/p 0,75
WP4	<b>Personneldirectcosts</b>	33.619,35 €	BEOLCHI=m/p 1,02; BIGGI=m/p 1,43; DEMASI=m/p 1,12; FANTASIA=m/p 1,18; FORMICA=m/p 0,16; FURBATTO=m/p 0,71; RESTAINO=m/p 1,19
WP5	<b>Personneldirectcosts</b>	11.027,69 €	BEOLCHI=m/p 0,21; BIGGI=m/p 0,50; DEMASI=m/p 0,39; FANTASIA=m/p 0,41; FORMICA=m/p 0,06; FURBATTO=m/p 0,25; RESTAINO=m/p 0,41
	<b>Subcontracting1</b>	0,00 €	
	<b>Travelcosts</b>	10.491,06 €	Catering expenses for meeting in Rome (June13thto14th2013); Travel costs for Biggi(Bruxelles, October22ndto23rd2012 and November14thto15th2013; Karlsruhe, December16thto19th2012; Valencia, March13thto15th2013; Saragoza, October20thto23rd2013;Graz, January16thto17th2014); DeMasi (Valencia, March13thto15th2013);Fantasia (Saragoza, October20thto23rd2013); Pagni (Bruxelles, November14thto15th2013); Restaino (Graz, January15thto17th2014).



Partner 9	CHEP		
	Indirect costs (100%)	99.666,67 €	
	TOTAL COSTS	199.875,00 €	
work package (WP1-8)	Item description	Amount in €	explanations
	Personnel direct costs	86.395,83 €	James Spanton: 7 MM (WP3) Robert Spencer: 2.7 MM (WP3), Lauren Salisbury 2MM (WP3&6) Ryan Allan 1 MM (WP 6) , Anna O 2.0MM (WP3), John Riley (.2 MM WP3), Christof Weis (.2 MM WP3) , Sanjiv Takyar (2MM) Brussels, Graz, Valencia, Brussels, Graz, Zaragoza),
	Subcontracting 1		
	Other personnel costs	5.416,67 €	<b>Development of deliverables, meetings and reviews of docs.</b>
			Zaragoza (Lauren Salisbury, Sanjiv Taykar), Belgium, Lauren Salisbury & Ryan Allan (WP6), Rome Ryan Allan (WP6), Board Meeting (John Riley & Christof Weis). Sanjiv Takyar: 22 – 23 October 2012 Brussels – 750 euros 19 November 2012 Graz – 600 euros 13-15 March 2013 Valencia – 1100 euros 3 June 2013 Brussels – 600 euros 16-17 Sept 2013 Graz – 750 euros 21-22 October 2013 Zaragoza – 750 euros Ryan Allan: Brussels, Rome, Graz ~1000euros.  James Spanton: 22 – 23 October 2012 Brussels, K/O meeting – €750 17-18 December 2012, Karlsruhe – quarterly meeting €750 14-17 January 2013, Sydney/Melbourne – leverage automotive crate expertise & design process and engage design houses - €10K 27 February 2013, London – meeting with M&S retailer 7-8 March 2013, Madrid – meeting with Mercadona retailer - €750 13-15 March 2013, Valencia – quarterly meeting - €1100 20 March 2013, Brussels – meeting with Delhaize retailer - €400 12 April 2013, Brussels – meeting with ECR - €400 22-23 April 2013, Amsterdam – HLIB CO3 Modulushca presentation - €750 29 April 2013, Brussels – meeting with Colruyt retailer - €400 4 June 2013, Munich – Advisory group meeting - €400 12-14 June 2013, Rome - quarterly meeting - €800 16-17 Sept 2013 Graz – 750 euros
	Travel costs	8.395,83 €	Rob Spencer: Brussels x 2, Valencia - £1,535

Partner 10	Budget PLAN					Budget SPENT				
Incept										
	Type of Activity					Type of Activity				
	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D
Personnel costs	122.750,00	0,00	0,00	0,00	122.750,00	99.521,00	0,00	0,00	0,00	99.521,00
Subcontracting	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other direct costs	7.500,00	0,00	0,00	0,00	7.500,00	5.138,36	0,00	0,00	0,00	5.138,36
Indirect costs (60%)	73.050,00	0,00	0,00	0,00	73.050,00	59.226,00	0,00	0,00	0,00	59.226,00
Total costs	203.300,00	0,00	0,00	0,00	203.300,00	163.885,36	0,00	0,00	0,00	163.885,36
Requested EU contribution	152.475,00	0,00	0,00	0,00	152.475,00	122.914,02	0,00	0,00	0,00	122.914,02
	MM PLAN	MM spent								
WP1	0,0									
WP2	0,0									
WP3	0,0									
WP4	0,0									
WP5	16,0	12,97								
WP6	0,0									
WP7	0,0									
WP8	0,0									
Total	16,0	13,0								

Partner 10	Incept		
	Indirect costs (60%)	59.226,00 €	Allocated by overhead per day x days per time sheet
	TOTAL COSTS	163.885,36 €	Sum of personnel, indirect and travel
work package (WP1-8)	Item description	Amount in €	explanations
	Personnel direct costs	99.521,00 €	Nick Gazzard - CEO, 4,3 MM, Project management / scenario and NVM KPI model design / analysis and report writing
	Subcontracting 1	0,00 €	Tom Loder - Director of solutions, 4,4 MM, Specific WP5 model development and NVM software modifications. NVM /KPI Model building. Attending workshops and selected project meetings
	Travel costs	5.138,36 €	Please see details below
Travel details	Location / date	Costs	Comments
Initial project kick off Exec meeting	Brussels - 22/23 Mar 2012	365,49 €	
ILIM Project setup meeting	Poznan - 18/19/20 Nov 2012	899,84 €	Three days of hotels & complex transfers etc.
Exec meeting	Karlsruhe - 16/17/18 Dec 2012	757,86 €	Three days of hotels & complex transfers etc.
Exec meeting	Valencia - 14/15 2013	484,96 €	
WP 5.2 KPI model review	Brussels - 14/15 May 2013	255,44 €	
WP 5.2 KPI ILIM model workshop	London - 15 July	289,44 €	Most of costs are meeting room hire in London
Exec meeting	Zaragoza - 21/22 Oct	165,25 €	
Presenting at Eu logistics conference	Brussels - 7/8 Nov	552,11 €	Expensive hotel due to venue + short notice = high cheapest fare on Eurostar
Exec meeting	Rome - 13/14 June 2013	622,70 €	
Exec meeting	Graz - 15/16/17 Jan 2014	471,67 €	
Exec board meeting	Brussels - 7 Mar 2014	273,60 €	
	<b>Total</b>	<b>5.138,36 €</b>	



Partner 11	ITENE		
	Indirect costs (85,51%)	55.697,97 €	
	<b>TOTAL COSTS</b>	120.834,18 €	
<b>work package (WP2)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	Personnel direct costs	7.953,93 €	Review of task 2.1 and 2.2 results to integrate them in Task 2.3. Review of WP3, WP4 and WP5 results to integrate them in Task 2.3. Development of IR 2.3: Technical obstacles and solutions on scenario level. Assistance to Modulushca meeting held in Valencia
	Indirect costs (85,51%)	6.801,41 €	
<b>work package (WP3)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	Personnel direct costs	17.791,67 €	Contributions to the Mbox design and development of the Policy and market analysis included in D3.2: Modular logistics unit design. Development of the survey on ergonomics and handling capabilities for task 3.3. Assistance to Modulushca meetings held in Brussels, Valencia, Zaragoza and Graz, and the WP3 working session in Graz.
	Indirect costs (85,51%)	16.979,32 €	
	Travel costs	2.064,86 €	Travel Manuel García and Juan Alcaraz, 21-23/10/2012 Brussels. Travel Juan Alcaraz 16-18/09/2013 Graz. Travel Juan Alcaraz, 21-23/10/2013 Zaragoza.
<b>work package (WP5)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	Personnel direct costs	9.413,77 €	Contributions to task 5.2. Review of task 5.2 results for integration in task 5.3. Assistance to Modulushca meeting held in Valencia
	Indirect costs (85,51%)	8.049,71 €	
<b>work package (WP7)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	Personnel direct costs	20.063,41 €	Development of the Dissemination strategy. Development of the dissemination materials: web, social networks 2.0, brochures, posters and newsletters. Development of the working intranet with blogging system. Assistance to Karlsruhe, Rome and Valencia meetings. organisation of the Valencia meeting.
	Indirect costs (85,51%)	23.867,53 €	
	Other costs	5.824,72 €	The Web design of the MODULUSHCA Project with the required specifications, Buying the domain moduluscha .eu and moduluscha .com, its availability for 3 years and solutions to problems of uploading archives, web update, Design of MODULUSHCA image and templates, Design of MODULUSHCA brochure, Printing of 2000 MODULUSHCA brochures, Sending catalogues to Austria 21-05-13, Sending the brochure to 15 destinations in Europe, Designing of the post for roller and printing of 2 roll up posters of MODULUSHCA Project, Design of MODULUSHCA Newsletter
	Travel costs	2.023,85 €	Travel Antonio Monsalve 17-19/12/2012 Stuttgart, Travel Antonio Monsalve Roma 12-14/06/2013. Travel Juan Alcaraz, 15-17/01/2014 Graz. Travel Juan Alcaraz 6-8/03/2013, Brussels

<b>Partner 12</b>	<b>Budget PLAN</b>					<b>Budget SPENT</b>				
<b>ILIM</b>										
	<b>Type of Activity</b>					<b>Type of Activity</b>				
	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D	(A) RTD / Innovation	(B) Demonstration	(C) Management	(D) Other	Total A+B+C+D
<b>Personnel costs</b>	115.000,00	0,00	0,00	0,00	<b>115.000,00</b>	34.089,18	0,00	0,00	0,00	<b>34.089,18</b>
<b>Subcontracting</b>	0,00	0,00	0,00	0,00	<b>0,00</b>	0,00	0,00	0,00	0,00	<b>0,00</b>
<b>Other direct costs</b>	15.500,00	0,00	0,00	0,00	<b>15.500,00</b>	20.524,74	0,00	0,00	0,00	<b>20.524,74</b>
<b>Indirect costs (60%)</b>	78.300,00	0,00	0,00	0,00	<b>78.300,00</b>	32.768,35	0,00	0,00	0,00	<b>32.768,35</b>
<b>Total costs</b>	208.800,00	0,00	0,00	0,00	<b>208.800,00</b>	87.382,27	0,00	0,00	0,00	<b>87.382,27</b>
<b>Requested EU contribution</b>	<b>156.600,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>156.600,00</b>	<b>65.536,70</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>65.536,70</b>
	<b>MM PLAN</b>	<b>MM spent</b>								
WP1	0,0									
WP2	0,0									
WP3	4,0	0,6								
WP4	6,0	3,70								
WP5	18,0	10,00								
WP6	0,0									
WP7	0,0									
WP8	0,0									
<b>Total</b>	<b>28,0</b>	<b>14,3</b>								

<b>Partner 12</b>	<b>ILIM</b>		
	<b>Indirect costs (60%)</b>	32.768,35 €	
	<b>TOTAL DIRECT COSTS</b>	54.613,92 €	
<b>work package (WP 3)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	<b>Personnel direct costs</b>	1.081,95 €	Implementation of tasks within WP3
	<b>Subcontracting 1</b>	0,00 €	
	<b>Travel costs</b>	2.396,51 €	15-17/01/2014; Graz; Participation in project meeting; 2 pers.
	<b>Other direct costs</b>	0	
<b>work package (WP 4)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	<b>Personnel direct costs</b>	7.117,13 €	Implementation of tasks within WP4
	<b>Subcontracting 1</b>	0,00 €	
	<b>Travel costs</b>	0,00 €	
	<b>Other direct costs</b>	0,00 €	
<b>work package (WP 4)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	<b>Personnel direct costs</b>	25.890,11 €	Implementation of tasks within WP5
	<b>Subcontracting 1</b>	0,00 €	
	<b>Travel costs</b>	1.494,24 €	21-23/10/2012; Strombeek-Bever; Participation in project Kick-off meeting; 2 pers.
		48,27 €	11/10/2012; Gdynia; Representing the project during the debate "Development of Logistic of Trólmiasta and the needs of employers in the industry TSL"; 1 pers.
		650,53 €	16-19/12/2012; Karlsruhe; Participation in project working meeting; 1 pers.
		1.131,99 €	13-16/03/2013; Valencia; Participation in project meeting; 1 pers.
		684,34 €	15-16/04/2013; Participation in outbound session in order to collect data for WP5; 1 pers.
		1.673,53 €	14-15/05/2013; Brussels; Participation in WP5 wrking meeting; 2 pers.
		372,04 €	15/05/2013; Brussels; Project working meeting; 1 pers.
		943,14 €	3-4/06/2013; Munich; Participation in project Board of Directors; 1 pers.
		2.164,04 €	14-06/07/2013; London; Participation in WP5 workshops; 2 pers.
		2.717,81 €	11-18/10/2013; Tokyo; Participation in ITS Wowld Congress 2013; 1 pers.
		1.285,21 €	20-25/10/2013; Saragossa; Participation in project meeting and conference on ICT for Transport Logistics; 1 pers.
		1.997,81 €	22-24/01/2014; Dorking; Participation in project working meeting; 2 pers
		2.602,46 €	11-15/06/2013; Rome; Participation in project working meeting; 2 pers.
	<b>Other direct costs</b>	154,03 €	Catering during project meeting in Poznan (19/11/2012)
		208,79 €	The fee for participation in 6th European Conference on ICT for transport logistics.



<b>Partner 13</b>	<b>JDR</b>		
	<b>Indirect costs (20%)</b>	32.672,36 €	Flat rate 20%
	<b>TOTAL COSTS</b>	163.361,78 €	
<b>work package (WP1-8)</b>	<b>Item description</b>	<b>Amount in €</b>	<b>explanations</b>
	<b>Personnel direct costs</b>	157.434,34 €	Person month during this period: R.Ridderhof, R.Matthijssen,M.Bauwens, N.Meijer,D.Uitdewilligen, H.Heeren, A.Declercq, G.v.Laerhoven, J.Klecha, R.Hack, S.Wijngaards, E.J.Joosse. All persons: Status=permanent, occupation=full-time. JDR has been working on WP 3.1, 4.3,4.5,6.1,6.2 and has been using a resource from a third party (Ernst Opus V). The resource is directly used by JDR, the work is performed in its premises. The resource made available is under the full and direct control, instructions and management of JDR, who is the one carrying out the research.
	<b>Subcontracting 1</b>		
	<b>Travel costs</b>	5.927,44 €	Hotel, travel. Visits by R.Ridderhof, M.Bauwens to Brussels(B, 807), Karlsruhe(DE, 187), Valencia (S,566), Zaragoza(S, 425), Rome(I, 2330), Graz(A, 1032).These visits where per visit a 2day event, with a 1night stay in a Hotel per person. Workshops at premises Roosendaal (NL, 580).



Partner 14	MEWARE		
	<b>Indirect costs (65%)</b>	77.713,04 €	
	<b>TOTAL COSTS</b>	206.014,90 €	
work package (WP4)	Item description	Amount in €	explanations
			<b>6 persons working in WP5:</b> Imma Battaglia: 1,33 MM Giancarlo Tretola: 11,70 MM Gionata Barberi: 2,35 MM Daniela Nappo: 6,25 MM Viviana Verdino: 9,48 MM Stefania Guaragna: 0,44 MM TOTAL: 31,54 MM
	<b>Personnel direct costs</b>	117.391,30 €	
	<b>Subcontracting 1</b>	0,00 €	
			Bruxelles 22-23/10/2012, Battaglia, 635,14€ Karlsruhe 16-19/12/2012, Battaglia, 650,76€ Valencia 13-16/03/2013, Barbieri, Tretola, 1746,08€ Monaco 4-5/06/2013, Battaglia, 600,67€ Meeting 13-14/06/2013, 3738,30€ Evento 14/6/2013, 1470€ Zaragoza 21-23/10/2013, Battaglia, Tretola, 1587,52€ Graz 15-17/01/2014, Battaglia, Tretola, 2084,72€ Bruxelles 7/03/2014, Battaglia, 329,24€
	<b>Travel costs</b>	10.910,56 €	



Partner 15	TUG		
	<b>Indirect costs (60%)</b>	86.109,35	
	<b>TOTAL COSTS</b>	147.574,38 €	
work package (WP1-8)	Item description	Amount in €	explanations
	<b>Personnel direct costs</b>	133.849,15 €	Florian Ehrentraut 17,6MM, Alexander Ortner-Pichler 2,8MM, Russell D. Meller 2,3MM, Thomas Stöhr 3,5MM, Dirk Jodin 1MM, Christian Landschützer 2,7MM, Stefan Kratochwill 2MM
	<b>Subcontracting 1</b>	4.058,80 €	Bulding of prototypes: external production
	<b>Travel costs</b>	9.666,43 €	Brussels, 22-24.10.2012, 1.988,04€ (Landschützer, Ehrentraut) Karlsruhe, 17-18.12.2012, 685,27€ (Landschützer) Valencia, 13-16.3.2013, 730,02€ (Ehrentraut) Rome, 12-16.6.2013, 1.571,66€ (Landschützer, Ehrentraut) Brussels, 2-3.6.2013, 1.480,80€ (Landschützer, Ehrentraut) Zaragoza, 20-24.10.2013, 2.100,70€ (Landschützer, Ehrentraut) Graz, 16-17.1.2014, 114€ (Landschützer) Graz, 16-17.1.2014, 995,94€ (hosting)

