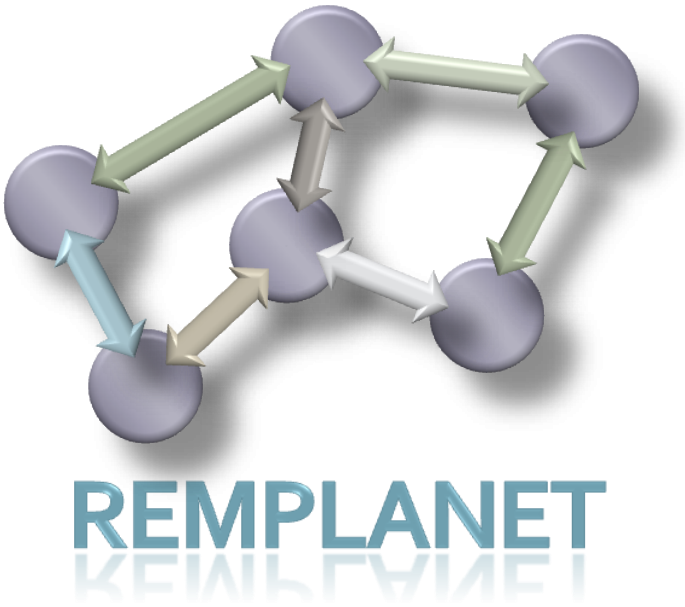

PROJECT FINAL REPORT

Grant Agreement number: 229333

Project acronym: REMPLANET

Project title: Resilient Multi-Plant Networks

Funding Scheme: Collaborative project / Small or medium-scale focused research projects (FP7-NMP-2008-SMALL-2)

Date of latest version of Annex I against which the assessment will be made:

Period covered: from 01/05/2009 to 30/04/2012

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1. Final publishable summary report

1.1. Executive summary

General Information

Project Name	Resilient Multi-Plant Networks (REMPLANET)
Project Reference	EU FP7 PROJECT 229333
Contract Type	Collaborative Project under the NMP-2008-SMALL-2
Duration	May 2009 – April 2012 (36 months)
Project Budget	3,85 M€
Web	www.remplanet.eu
Contact	Raul Poler – rpoler@cigip.upv.es

Background

The main concept of this project is the development of methods, guidelines and tools for the implementation of the **Resilient Multi-Plant Networks Model** in **non-hierarchical manufacturing networks**, characterized by **non-centralized decision making**.

Project Activities

In order to achieve the project objectives, the REMPLANET activities were structured into the following WorkPackages:

Type	WP No	Workpackage title
MGT	**WP0**	**Project Management**
RTD	**WP1**	**Strategic REMPLANET Model**
RTD	**WP2**	**Operational REMPLANET Model**
RTD	**WP3**	**Integrated REMPLANET Framework**
RTD	**WP4**	**REMPLANET Simulation and Optimization Decision Support System**
RTD	**WP5**	**REMPLANET SOP4BPM Implementation**
DEM	**WP6**	**Pilots Scenarios**
OTHER	**WP7**	**Dissemination**
OTHER	**WP8**	**Exploitation**

REMPLANET Participants

The REMPLANET Consortium was composed of research groups from different universities and an industrial mass that involves SMEs as well as large enterprises from Germany, United Kingdom, Switzerland, Italy and Spain.

UNIVERSIDAD POLITECNICA DE VALENCIA	SPAIN
IKERLAN S.COOP.	SPAIN
RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	GERMANY
THE UNIVERSITY OF LIVERPOOL	UNITED KINGDOM
SCUOLA UNIVERSITARIA PROFESSIONALE DELLA SVIZZERA ITALIANA	SWITZERLAND
BIMATEC-SORALUCE FRÄSTECHNOLOGIE	GERMANY
FESTO AG & CO KG	GERMANY
VL IDRODINAMICA SRL	ITALY
GHEPI SRL	ITALY
KING AND FOWLER LTD	UNITED KINGDOM
NEWTON INDUSTRIAL GROUP	UNITED KINGDOM
INSTITUTO TECNOLOGICO DE INFORMATICA	SPAIN
CENTRO DI RICERCA E INNOVAZIONE TECNOLOGICA SRL	ITALY

Project Results

Idea Management Process (IMP): The IMP targets the integration of customer ideas and innovations into the new product development process of a company. It is supposed to be an efficient and functional process, with which it is possible to evaluate a customer's idea in every facet and from different points of view that is important for the customer and for the company.

Mass Customization Knowledge Network (MCKN): MCKN is an online portal for collaboration of stakeholders in the field of Mass Customization. The platform offers an easy introduction into the topic of mass customization / customer co-creation. Furthermore, the portal has a broad repository of knowledge and e-learning offers; it connects different stakeholders from different fields and it fosters knowledge exchange between practitioners (www.mckn.eu).

Operational REMPLANET Model (ORM): The ORM aims to represent and integrate the main concepts and relationships to be considered in the strategic design of supply networks when they have to deal with demands of personalized products. The ORM includes a conceptual model, toolbox, and guidelines, for facilitating the alignment between products'-processes'-supply networks' configurations in order to respond to customized market demands at the lowest possible cost and time.

REMPLANET Workbook (RW): The workbook provides a practical approach to apply the REMPLANET Integrated framework. The workbook can be used to support manufacturing companies in establishing which customisation scenario they are operating in using the diagnostic tool and model answers. Moreover, it allows companies to establish where their current practices could potentially be improved and enables a company and its network to move from one scenario to another.

REMPLANET Simulation and Optimization Decision Support System (DSS): The DSS has been developed to re-design and innovate a multi-plant network architectural and managerial design, by conducting realistic what-if simulations/optimizations of the alignment between the triad products'-processes'-global supply networks' configurations, with regard to the characteristics of product orders, evaluate alternative flexible multi-plant network dynamic structures, strategies and policies, and optimize the response to customized market demands at the lowest possible cost and time.

ColNet: ColNet platform is aimed at providing a web-based environment where collaborative networks may be created and deployed onto a truly operational environment supported by a Business Process Management System (BPMS) for process execution. The platform has been designed mainly for operational purposes, supporting: a) the process of configuring a suitable network for managing orders coming from outside the network and, b) the coordination of the different participants involved in the production process of each accepted order.

Impact and Exploitation

REMPLANET project enables manufacturing enterprise networks to be more competitive in an ever increasing globalised economy, through shorter times for innovation, decision taking and manufacturing processes. Society in general could benefit from having more efficient and effective manufacturing enterprises, which reduce time and resource waste.

1.2. Summary description of project context and objectives

The project has general and particular objectives. The first ones are related to the broad-spectrum of the REMPLANET scope, whereas the particular ones are related to specific goals of each WP.

The general objectives have a strategic nature while the particular ones are more operational. For this reason, the first ones are long-term goals and they coincide with the finalization of the development of some WPs. In the first Review of REMPLANET Project at month M18, two WPs had already finished its research tasks, and they were WP1 and WP2.

WP3 finished its research at month M30 (the initial end of this WP was planned at month M24), however an extension of 6 months (from month M24 to month M30) was given for the completion of the REMPLANET Integrated Framework. The extension was used to enhance the existing level of integration between WP2 and WP5. In addition, the extension provided an opportunity to undertake a series of cases to validate the completed framework.

Finally, WP4 and WP5 are scheduled to finish in month M36 in parallel with the development of this deliverable.

On the other hand, demonstration activities (WP6) focused on implementing the results generated within the RTD WPs have finished with the testing of methods, guidelines and tools developed in the previous WPs in pilots' sites. The implementation of REMPLANET results among the industrial partners of the consortium has lead to improve and make more adherent to reality the results generated within the project. Moreover, the companies of the consortium have benefit from the implementation of methods, guidelines and tools that improve their processes and increase their competiveness.

Dissemination activities (WP7) are on-going activities that do not finish with the life cycle of REMPLANET Project as and they will be also performed beyond it in order to give visibility of the REMPLANET results achieved recently to the widest possible community.

Exploitation activities (WP8) will be also performed beyond the end of the REMPLANET project in order to give support to the REMPLANET consortium in Intellectual Property Rights issues and exploitation claims.

The general objectives (defined in the Annex I – Description of Work) of all the WPs are the following ones. Moreover, it is explained the achievements of such objectives.

Objective 1 - Strategic REMPLANET Model development:

The central objective addresses the strategic aspects implementing and setting up a resilient innovation and production system. This objective has a long-term perspective helping companies to prepare and finally make major decisions in setting up their internal capabilities to meet the requirements of the REMPLANET framework. In particular, this objective strives for the development of tools, methods, and guidelines to enable enterprises to profit from **open innovation** along the entire **multi-plant value network.**

Within WP1 an operating model, as well as a respective business model, for a web-based platform for open process innovation was developed. For this purpose, a survey was also conducted, which

delivered more insights for the concept of the previous result. Based on these learnings, a managerial procedure to help mass customizing companies to make a fair and transparent evaluation of customer ideas and a checklist to support companies (or networks of companies) in the process of realizing their platform concept was developed.

Objective 2 - Operational REMPLANET Model development:

The development of an **Operational Resilient Supply Network Model**, as well as its tools, methods, and guidelines to help globalised manufacturing organisations to decide where to buy-manufacture-assembly, and how to deliver, the different customized products demanded from different markets, as cheaply and as quickly as possible.

Based on different demand scenarios and manufacturing network conditions, alternative supply network configurations and management strategies will be developed to optimize production resources, including production planning and capacity management to enable global supply networks to respond robustly on customized market demand scenarios, within required restrictions.

The development of the PF-P&O-SN alignment conceptual model, the PF-P&O-SN decoupling point identification toolbox and set of guidelines and the Operational Resilient Supply Network Model and Toolbox (ORM) supported through a web navigation tool are the main WP2 results that corroborate the achievement of the REMPLANET **Objective 2.**

Objective 3 - Integrated REMPLANET Framework development:

Integrate the **operational and strategic resilience** views of the global supply networks to provide a framework for establishing clear linkages between organisational strategies for shaping the vision for a collaborative network of users and customers to adjust to constant change and manage renewal with the operational capabilities and mechanisms for managing the pattern of decisions for achieving this vision across a co-operative, dynamically responsive network. This will be achieved, and the REMPLANET integrated framework will be delivered, through the development and prototyping of conceptual strategic alignment models and from the explicit integration of the strategic and operational resilience models.

The REMPLANET Integrated model aims to establish relationships between network type, strategy, operations, collaborative initiatives and relevant KPI measures. The model is based on a set of ten network types adapted from a classification system of customisation networks. Strategic and operational points have then been mapped onto these networks and important collaborative initiatives and KPI measurements will be identified. Such an approach allows for strategic concerns to be closely linked to operational considerations which in turn can be aligned with collaborative initiatives and relevant KPIs.

Objective 4 - REMPLANET Simulation and Optimization Decision Support System:

Develop a Simulation and Optimization Decision-Support System (DSS) to computationally implement and validate the Integrated REMPLANET Framework and conduct, for a multitude of **operational resilience** scenarios and **strategic resilience** scenarios, systematic and systemic testing of the consequences of multi-plant network dynamic re-configurability (**dynamic networks**), as well

as about its collaborative design&manufacture dynamics over performance, behavioural patterns and properties (**network dynamics**).

Simulation and Optimization DSS prototype with the database and its main functionalities have been developed. The Simulation and Optimization DSS prototype has been calibrated and validated through pilots data. To do so, 5 sectorial simulation scenarios have been designed and analysis with the data obtained from the simulation runs has been performed. This has been used to develop the guidelines that include the Conclusions from the previous analysis in the form of sectorial general guidelines or best practices.

Objective 5 – REMPLANET SOP4BPM Implementation:

Implementation of a **Service-Oriented Platform** (SOP) for **Extended Business Process Management** (EBPM). A Service Oriented Architecture (SOA) is expected to provide greater business and Information Technology (IT) flexibility by decoupling business process logic from IT implementations. REMPLANET SOA4EBPM Platform will provide such expected business and IT alignment for EBPM while, at the same time, Enterprise Processes are also connected by re-usable service-based specifications.

The EBPM approach combined with the service-orientation paradigm will enable to support a fully non-centralized decision making process as is expected to be achieved in non-hierarchical manufacturing networks. Complementarily, this combined approach will enable dynamic and fast-responsive adaptation IT-based organizational mechanisms needed to fully achieve the resilience structure that REMPLANET is proposing.

The ColNet platform (formerly SOP^{4}EBPM) has reached the status of mature prototype where main WP5 objectives have been considered and validated.

Objective 6 – Pilot Scenarios:

The main objective is to connect and organise all the efforts of industrial partners in implementing **REMPLANET outputs.** In doing this, formal and common procedures will be set up, with the purpose to a) provide industrial partners with common communication and assessment procedures (Methodological framework); b) ease and consolidate feedback from pilot sites (pilots running and reviews); c) process information and transfer them to R&D partners to continuously improve REMPLANET toolset (Pilot running and REMPLANET release).

The tools developed within the REMPLANET Project have been deeply assessed by the industrial partners, who provided hints and advices to research partners on how to refine tools, so that they would better suit their needs and those of industries in general. To do so, a methodology was described and all the consortium followed this methodology to ensure the achievement of good-quality implementations and results.

Objective 7 - Dissemination:

Activities will focus on disseminating of tools, methods, and guidelines from all domains inside the REMPLANET project to the widest possible community as well as encouraging active external participation inside the project. Results will continually be revealed and communicated through a periodic e-newsletter, and the project team will further organize and participate in conferences,

workshops, and seminars in important events throughout Europe during and after the course of the project. The most relevant scientific results will be submitted for publication in international scientific journals.

Collaboration with other projects and initiatives beyond the consortium of REMPLANET partners will be encouraged to enrich the body of knowledge at the base of the project. Different dissemination actions will reach out to interested people from different countries, who will receive updated information about the of tools, methods, and guidelines results. The project will make wide use of Internet technologies to spread the knowledge including web logs, webinars, and the project website.

The results generated within the project have been and will be disseminated to the widest possible community using different channels as news in mass media, presentations in conferences and workshops, publication of scientific papers in journals, publication of chapter books. The REMPLANET Web portal has been and will be one of the most important resources to make the information related to the REMPLANET results available to the hugest audience, working also as a central gathering repository of REMPLANET dissemination actions. Moreover, REMPLANET Project has been part of the iNet-IMS initiative, encouraging the research and benefiting from the synergies of other FP7 NMP Projects.

Objective 8 - Exploitation:

The central objective of the exploitation stage is to establish and maintain continuous exploitation activities to make sure that, at any time during the project, the full commercial potential of the results can be realised and are available to project participants and other European SMEs.

The Project will ensure that appropriate knowledge sharing tools and reference documents are available to allow partners to carry out the required exploitation activities. In addition, it will ensure that the REMPLANET procedures are correctly used to identify and describe the intended use of results as they become available. REMPLANET strives to deliver a harmonised description of all project results within the consortium to reduce the "learning curve" of the machinery and equipment enterprises wishing to exploit project results.

A list of Exploitable Results (ERs) was created and the IPR and exploitation claims were defined. The different REMPLANET Consortium members specified their interest for exploitation and their commitment about future work prior exploitation with regard to the ERs list. Checklists were prepared for describing the various ERs, their potential applications and the required competences. WP8 work focused on the development of methodological tools for the assessment of future user feedbacks and the gathering of information about general perception of potential customers, both considering the importance of the issues that REMPLANET exploitation results contribute to solve and the nature of the developed methodologies/tools. Preliminary information about customer requirements that the ERs have to fulfil have been gathered, with a specific focus about the importance of customisation and the way of implementing it as well as the role of ICT solution for supporting efficient mass customisation deployment. Finally, a "promotional" video, quickly and easily explaining to companies and to the more general audience the benefits of the ERs was developed.

1.3. Description of the main S&T results/foregrounds

Various exploitable results have been developed in the context of the REMPLANET research project. The main goal of these tools is to support and ensure the success of resilient collaborative multi-plant manufacturing networks in current complex markets, caused by the growing globalization that implies higher competition and higher context volatility.

These solutions allow resilient multi-plant networks to succeed through the capacity to adapt rapidly and correctly to so complex and ever-changing scenarios. This is achieved by understanding the customers' wishes as well as developing and nurturing the specific supply networks allowing to effectively and efficiently deliver value to customers, through an adequate and customized bundle of physical products and services. The REMPLANET results are summarized below.

1.3.1 Summary of the Exploitable Results of REMPLANET Project

Methodological Tools

Mass Customization Knowledge Network (MCKN)

MCKN is an online portal for collaboration of stakeholders in the field of Mass Customization. The platform offers an easy introduction into the topic of mass customization / customer co-creation. Furthermore, the portal has a broad repository of knowledge and e-learning offers. Moreover, the portal connects different stakeholders from different fields. Academia, manufacturers of individualized products and providers of enabling services for mass customization are brought together to form a community that will communicate and exchange information through the platform. Finally, it fosters knowledge exchange between practitioners. Problems on implementing or executing mass customization can be posted for open discussion with the help of forums or mailing lists; other stakeholders can then answer these "questions" and share their experiences. The MCKN has four main objectives:

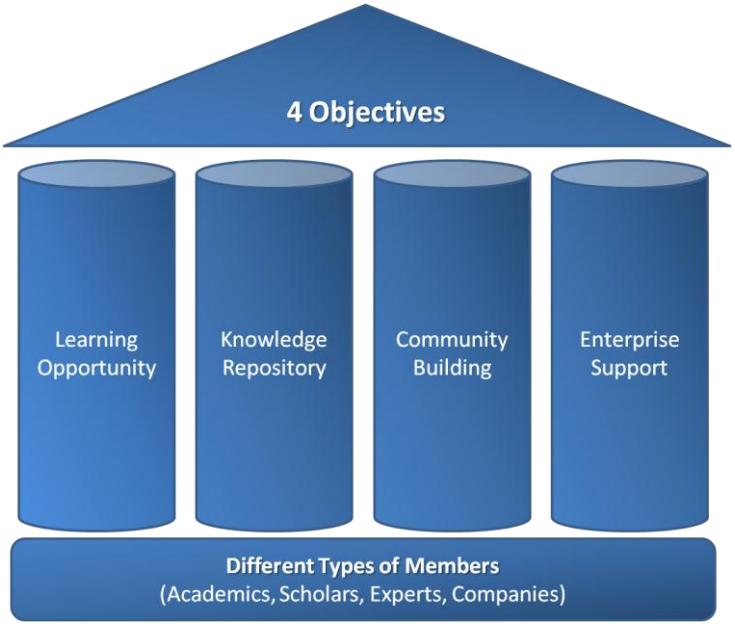

Figure 1: Framework of the MCKN

Objective 1 – Learning opportunity: the online platform provides learning opportunities for mass customization and customer co-creation. Interested visitors can use the platform to learn about

mass customization and find out how mass customization could relate to their business. Such learning opportunities have been provided with the help of a wiki.

Figure 2: MCKN Wiki

Objective 2 – Knowledge repository: the core mission of the MCKN platform is to provide a broad knowledge repository in the field of mass customization. As this mass customization knowledge may be documented in highly diverse forms, different ways of accessing the knowledge database have been provided: Academic Papers, Case Studies, Presentations, Trade Journal Articles and Videos.

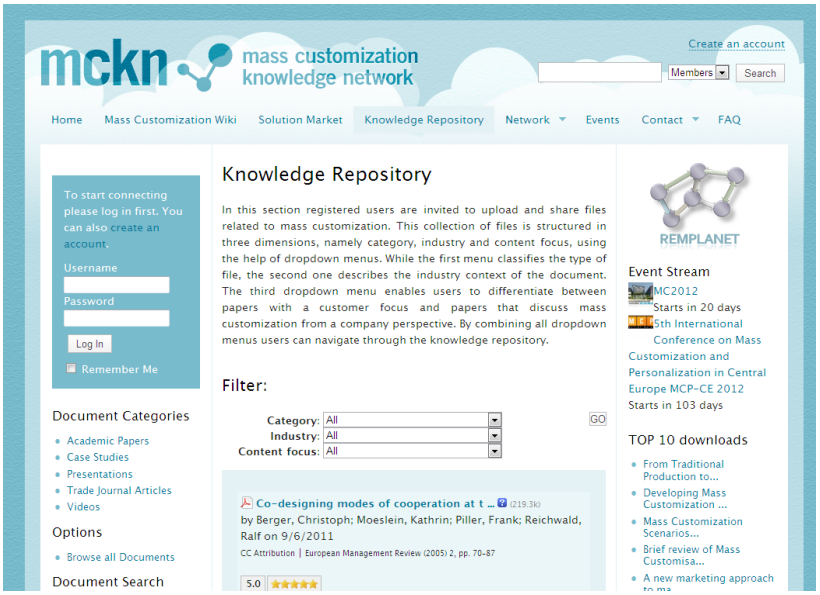

Figure 3: MCKN Knowledge Repository

Objective 3 – Community building: another highly important aspect of the MCKN is building the community. The community keeps a platform alive and needs to be given maximum support. Thus, the platform has a social network character. Users can get in touch with one another. A profile, which contains basic information about a user and a profile picture, are required. Moreover, it is possible for platform members to get in touch by sending friendly requests and writing private

messages. To support the scientific aspect of a mass customization community, a discussion forum has been included to enable members to exchange their experiences with like-minded people.

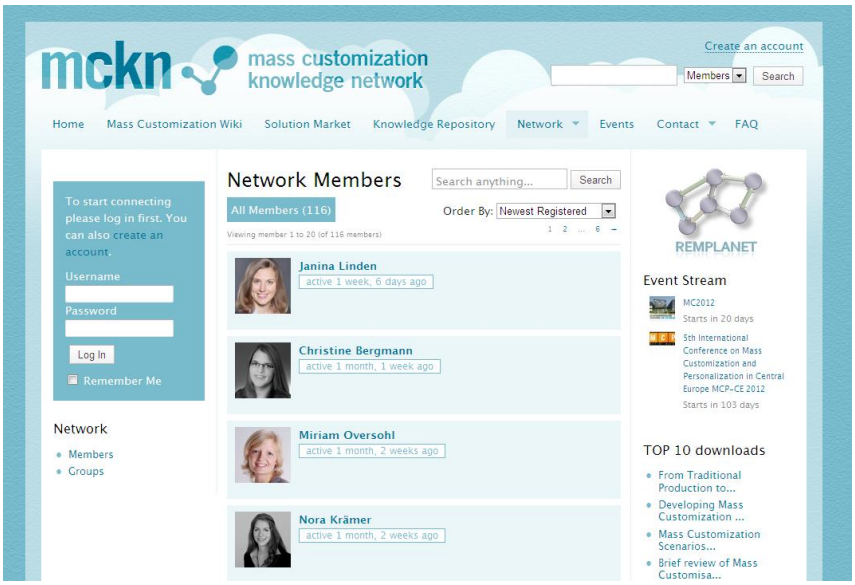

Figure 4: MCKN Network Community

Objective 4 – Enterprise support: one of the foremost goals of the REMPLANET project is to support mass customization companies. The MCKN platform offers enterprise support to interested companies. This is achieved with a collection of worst or best practices, a database of potential service providers, or an audit tool which could help companies to evaluate their own mass customization capabilities. Furthermore, the REMPLANET toolbox, which was conceptualized in WP2, will be integrated into the MCKN platform in order to support mass customization companies.

Idea Management Process (IMP)

The IMP offers the necessary link between customers and mass customizing companies. The IMP targets the integration of customer ideas and innovations into the new product development process of a company. It is supposed to be an efficient and functional process, with which it is possible to evaluate a customer's idea in every facet and from different points of view that is important for the customer and for the company. As this process has to be suitable for all kinds of customer's inputs and different industry settings, the process was designed to be as broadly and generic as possible. The IMP is divided into the phases, gates and stages of Figure 5.

Gate 1: Initial Screen

This gate allows a first estimation of the customer's idea and gives information about whether the idea is expedient or not. The first gate can be seen as a kick-off for the following process. The idea the customer brings into the workshop is a so called "blue-sky idea". Such an idea is characterized by having no barriers. Within the first gate, the idea is supposed to be defined in more detail and the participants should agree on the aim of the workshop. The initial screen decides about the direction the customer idea will take in the following. The first phase is supposed to take not more than one day.

The initial gate strongly depends on the customer's idea itself. Thus, the gate cannot be defined very clearly, because a narrow definition of tasks would spoil the generic character of the IMP. From idea to idea the workshop will have different requirements and the decisions taken in gate

one constitute the basis for the following steps. Everything that is decided along the day is based upon the key factors that are defined in this step. Therefore, it is very important that both parties totally agree to what is decided within gate one.

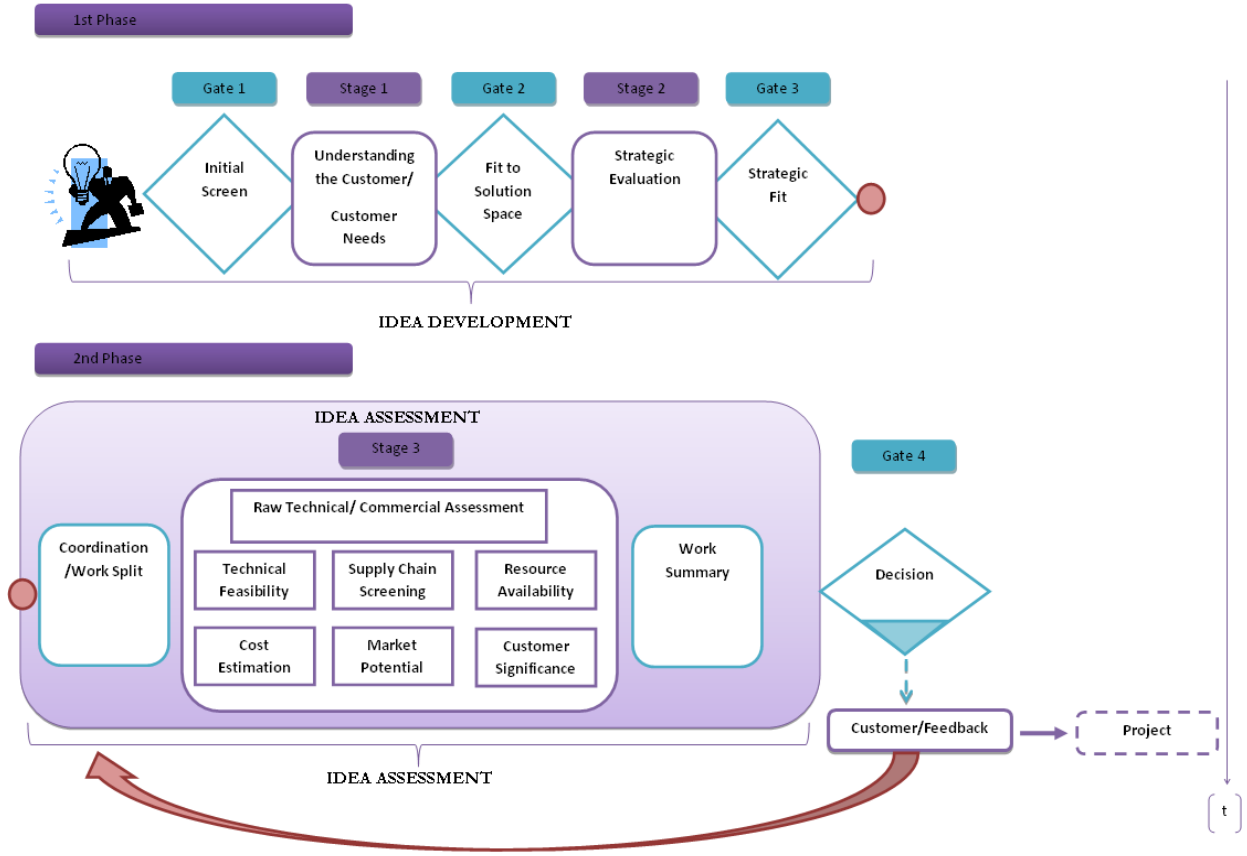

Figure 5: Idea Management Process (IMP)

Stage 1: Understanding the customer / Gate 2: Fit to solution space

In stage one an initial understanding of the customer requirements should be established. This stage focuses mainly on the correct understanding of the respective customer needs. Therefore, two main questions need to be answered: “Do we understand the underlying problem of the customer?” and “Is there already an existing solution within this solution space that could be used to address this underlying problem of the customer?

After all parties have agreed on such an initial solution concept including a translation into technical specifications, the manufacturer should compare this result to the existing solution space. It is important for a company to know if such a solution already exists or if the customer might be satisfied with a modified solution out of the company’s existing product range. At the end of this stage, the team, especially the company’s members, need to know what kind of solution the customer wants and which technical aspects might be crucial.

Recommended methods and tools: Benchmarking, Check lists, conjoint analysis, Customer evaluation methods, Kano model, Point rating systems and Quality function deployment.

Stage one is very important for the following gates, but it is settled for only one day. Having passed the first Stage the results move on to gate two that answers the question, whether the concept fits into the company’s solution space or not. It becomes apparent, that the evaluation team has to be well aware of the existing portfolio of the company. If there is a solution, the team has to discuss if

the solution can be modified to suit the customer's idea. If there is no existing solution, the evaluation process has to be continued. The team has to evaluate questions such as "Are special technologies needed for this solution?" or "Is the technology needed totally different from what our company has developed so far or is it just supplementing out technological resources?" Depending on the individual case, the customer's idea might be a suitable addition to the company's solution space or not. If the solution should be too far away from the existing portfolio, the IMP has to be stopped at this point. Depending on how the questions above were answered, the process is further evaluated or not. If the results are negative, the customer still has the option to rethink his or her requirements. If the results are positive, the process can go to the next stage, in which the strategic aspects of the customer idea are further evaluated.

Stage 2: Strategic evaluation/ Gate 3: Strategic Fit

The strategic evaluation within stage two and the decision taken within gate three can hardly be divided in two parts. The separation into stages and gates becomes a theoretical necessity at this point of time: Having evaluated the strategic implications of the customer idea at hand, the question concerning the strategic fit of a solution is simply a yes-no-decision. There are several important factors that have to be considered before taking the next step. Relevant factors could be the following: Firstly, it is important to know whether the required solution could cause unintended rivalry. Secondly, it has to be discussed whether the solution fits the company's core competencies or not. Thirdly, the solution should fit the company's business area and last, but not least, the solution should support the company's values and image.

Recommended methods and tools: Check lists, Market potential analysis, Point rating systems and SWOT-Analyse.

All of the issues above should be evaluated in this context. However, not all criteria have to be considered as knock-out criteria and would lead to an immediate abortion of the evaluation process, but the sum of all aspects will be relevant for the go/no-go-decision in this gate. Within gate three, the factors aforementioned should be weighted and summed up to see whether creating a solution would be beneficial or not. It is apparent that the decision within the gate is a yes/no decision. If the customer idea or innovation passes this gate the IMP can move on to phase two.

Stage 3: Idea Assessment

The second phase of the IMP delivers a detailed analysis of the customer idea or innovation. This second phase is limited to a maximum duration of five days, so that the whole evaluation can be completed within one week. The evaluation within phase 2 is an internal process and can be completed without customer interaction. However, after the final decision in gate 4 extensive feedback should be given to the customer.

Phase two mainly consist of stage three, which is a rather important stage that consists of multiple parts. It is the aim of this stage to come to a clear, transparent and fair decision whether the customer idea will be implemented or not. This is especially important for the customer, so he/she can understand the company's decision. The idea assessment consists of a technical and a commercial assessment; both parts can be divided into three sub-categories again:

- Technical assessment: (i) Technical feasibility, (ii) Supply chain screening, (iii) Resource availability

- Commercial assessment: (i) Cost estimation, (ii) Market potential, (iii) Customer significance

The six assessment phases are interdependent. For this reason it is not possible to define a fixed order for their analysis. The order of analysis always depends on the customer's requirements. If a customer requires a very cost sensitive solution, the commercial assessment would play a major role within stage 3. If the customer requires the use of a specific material, the assessment of the technological aspects will be of more importance. Subsequently, the customer requirements have to be evaluated at the beginning of stage 3 in order to determine in which order the individual phases of stage 3 will be handled.

Due to the interdependency of the individual assessment phases, it is not possible to implement fixed gates within stage 3. However, there are some aspects within the assessment of stage 3 that are of major importance and these aspects should be implemented as knock-out-criteria. This could be done in the form of mini-gates. Mini-Gates are gates that are not clearly defined within the process, but they can be set to simplify the process of evaluation. Whenever a mini-gate leads to a negative evaluation, the IMP comes to an immediate no-go-decision. For example, the assessment of the technical feasibility could lead to the conclusion that neither the manufacturer, nor any supplier has the technical competences to fulfill the customer requirements. At this point, the process could be stopped immediately, because further evaluation would not make any sense. In this case, feedback would be given to the customer and both parties could try to generate alternatives or agree to not pursue the idea any further.

Recommended methods and tools: Check lists, Point rating systems and Target costing.

Gate 4: Project decision

Gate 4 is the final gate of the idea management process. The six phases of the idea assessment deliver the necessary information for the decision that has to be made at this gate. All assessment results need to be summarized before a final decision can be made. The final go/no-go-decision could be made based on the individual characteristics of the customer idea and its evaluation process. However, this would be a very subjective approach and would not fulfil the requirements of the IMP that were stated above: the process was developed to allow a fair and transparent evaluation process. Therefore, it would be more useful to apply an evaluation method that treats each customer idea identically. Ideally this system would award points for certain characteristics of an innovative idea and these points just need to be summed up in the end. If the sum of points exceeds a certain pre-defined limit the project idea should be accepted; if the project does not score enough points the project idea has to be rejected.

Recommended methods and tools: Check lists and Point rating systems.

Customer feedback

Before the project starts or is rejected, the customer has to receive feedback, so that the assessment team can explain the evaluation results to the respective customer. As it is the most important goal of the IMP to guarantee a fair and transparent evaluation, this customer feedback is a very important aspect of the whole process. The customer should be able to comprehend every single step in the company's evaluation. The customer should feel treated fairly by the company and needs to be satisfied with the valuation process. If this was not the case, the customer would be discouraged to submit more ideas.

Operational REMPLANET Model (ORM)

The Operational REMPLANET Model (ORM) aims to represent and integrate the main concepts and relationships to be considered in the strategic design of supply networks when they have to deal

with demands of personalized products. The strategic character of this kind of decisions is closely linked to the corporate strategy. Involved decisions guide supply network policies from a design perspective and are made typically over a longer time horizon. This is the reason why the model provides approximate solutions for the supply network configuration.

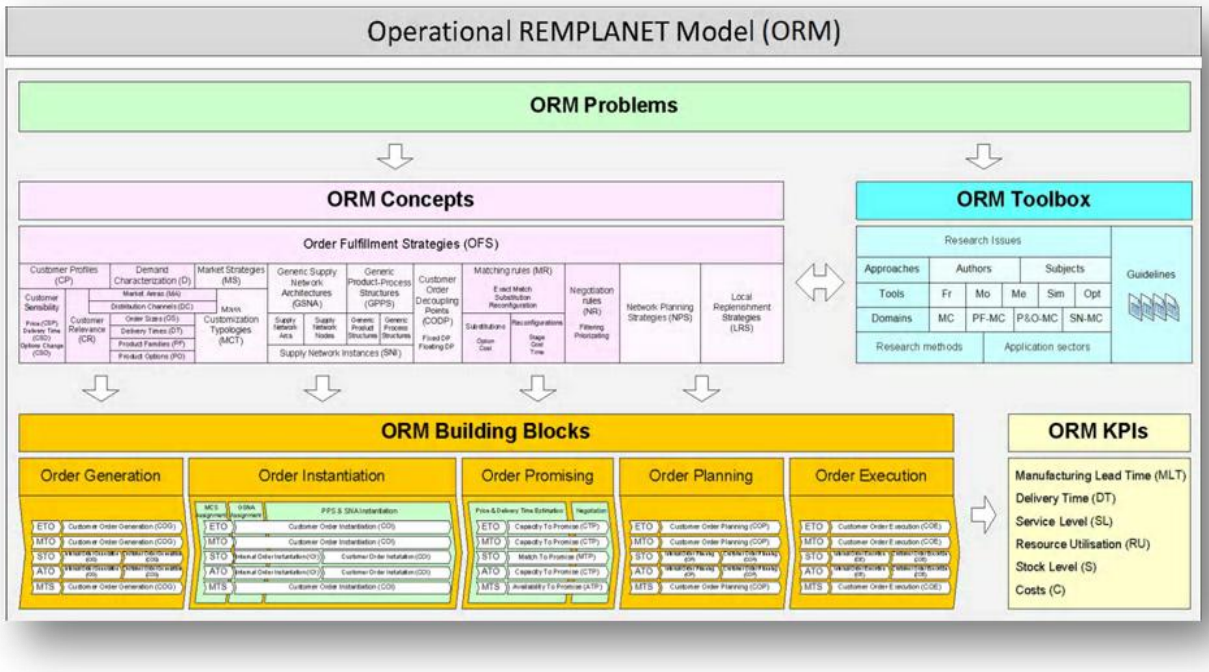

Figure 6: Operational REMPLANET Model (ORM)

The ORM includes a conceptual model, toolbox, and guidelines, for facilitating the alignment between products'-processes'-supply networks' configurations in order to respond to customized market demands at the lowest possible cost and time.

The ORM consists of five main components:

- *ORM Problems*

  Nine ORM Problems related to strategic decisions that directly affect to supply networks' design have been defined. This list of problems is the result of aggregating the twenty-seven research problems identified as a result of work done in REMPLANET Project. Two objectives were pursued with the preparation of this list:

  (i) to reduce the large number of existing research problems for their easier addressing within the ORM and,

  (ii) to provide industrial organizations with a structured and clear overview of problems from a more realistic viewpoint.

- *ORM Concepts*

  Twenty-three ORM Concepts have been defined. Concepts defined in the *PF-P&O-SN alignment model* such as customer profiles, demand characterization, market strategies, mass

customization typologies, generic product and process structures, supply network structures, matching and negotiation rules or network planning strategies constitute the main contents of this ORM component. Order fulfilment strategies and decoupling points are the two new concepts incorporated as a result of the research work performed in task T2.2.

- *ORM Building Blocks*

  Five ORM Building Blocks make up the backbone of the Operational REMPLANET Model being ordered following the sequence of stages included in the order fulfilment process, that is: Order generation -> Order Instantiation -> Order Promising -> Order Planning -> Order Execution. ORM Concepts are sequentially incorporated through their corresponding ORM building block as the order advance through the process. Information of every order is used and evaluated by each concept joining new information until the process finishes. Depending on the characteristics of each ORM problem to consider, participation of ORM Building Blocks and ORM Concepts is variable.

- *ORM Toolbox*

  Eight key major issues (Toolbox Research Issues –TRI) have been established based on a literature research. Through them, companies can get in a structured way up to *fifty-five references* to the literature with relevant information to address the ORM Problems. Additionally, a guideline with a set of relevant factors, application rules and recommendation practices for identifying the right order fulfilment strategy and the type and position of customer order decoupling point (CODP) within a supply network is available. *Sixteen business scenarios* are considered.

- *ORM KPIs*

  Six ORM KPIs: (i) Manufacturing Lead Time, (ii) Delivery Time, (iii) Service Level, (iv) Resource Utilisation, (v) Stock level and (vi) Costs, have been introduced to measure the performance of the supply network as a result of the execution of the fulfilment process.

Moreover, a web-based tool has been developed to provide a proof of concept in order to check its validity and facilitate its comprehension and access by potential users. Therefore, this tool serves to navigate the proposed model, accessing its different items in a friendly way, allowing users to go from one concept to each other it has a relationship with.

The ORM web tool follows a qualitative approach that can be extended, and complemented, with a quantitative tool such as the DSS. The DSS allows simulating-optimizing the proposed solutions coming from the analysis over different key performance indicators of the company.

REMPLANET Workbook (RW)

The aim of the workbook is to support users with decision-making in collaborative supply chain networks by demonstrating how the effective execution of appropriate sales, production and supply chain policies within and between network partners can be used to support the efficiency of the processes associated with the management of product variety.

The workbook provides a diagnostic tool based on product behaviour, operations and strategic characteristics, and collaborative working practices, in order to classify users as one of eleven network types. These eleven networks were based on the network classification set developed and provide an extension to the 8 network types in Poulin et al's., (2006) personalisation framework. Each network type in this guide has an associated template providing pertinent information on:

- Network design.
- Operational considerations.
- Key information flows.
- Collaborative initiatives.
- Customisation / variety enablers.
- Key performance indicators.

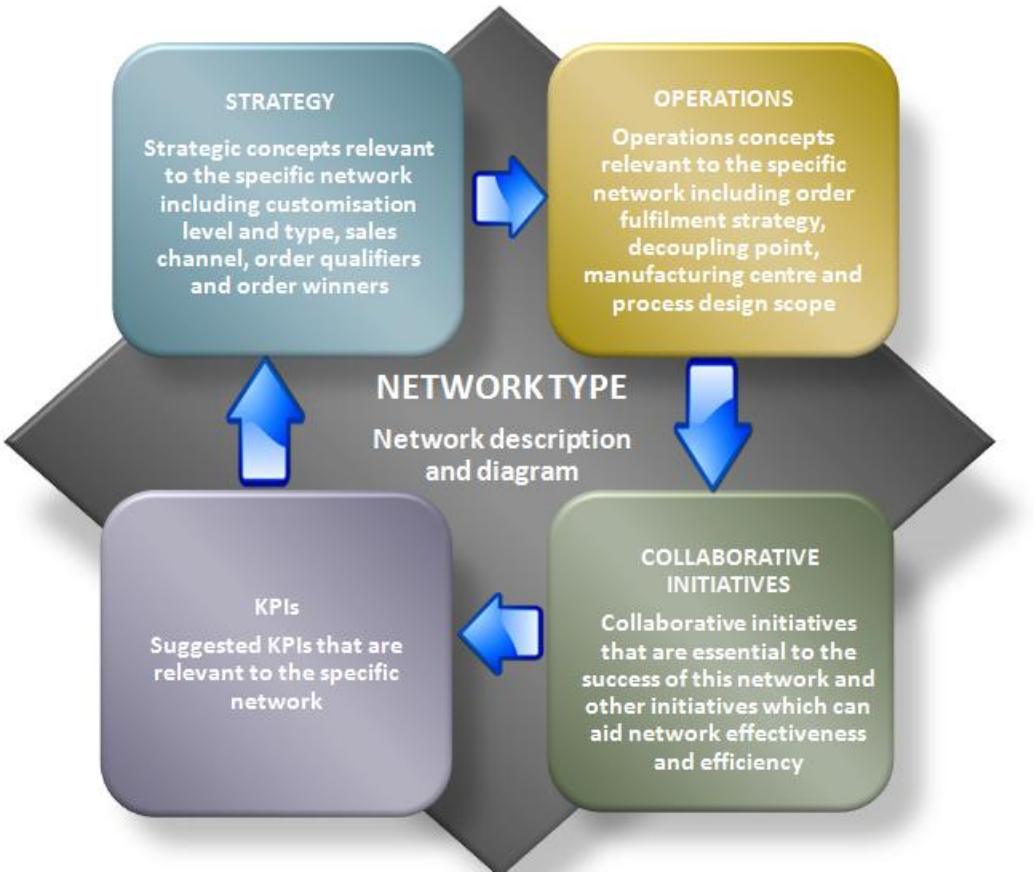

Figure 7: Basis of the REMPLANET Workbook (RW)

The template acts as a reference architecture which can be used to demonstrate how the characteristics and attributes of that particular network can be used in order to manage its commitment to the provision of product variety and customisation.

In addition, explanations are provided on how transitions can be made from one network type to another, and a series of cases demonstrates how the workbook has been used by a number of different manufacturing companies doing business in a range of different networks.

Software Tools

REMPLANET Simulation and Optimization Decision Support System (DSS

Introducing the DSS

Due to the high level of interdependence between the supply network constituent elements, their inherent material-information feedback loop flows, non-linearities, and delays, supply networks have been recognized not only as systems but also as a complex adaptive system. It is difficult to understand complex systems and make changes to globally improve their performance without a model of the system, therefore, in order to make informed decisions, decision makers must have a holistic view of all the elements that affect the planning, design, production and delivery of their product. They must be able to understand, estimate, and project their business supply network performance.

The use of a modelling approach gives insights into both the behaviour of a supply network and the implications of product and process design changes. This can be used as an aid for managers as the basis of improved decision making. Along a literature research performed it was shown that simulation modelling provides the flexibility to model processes and events to the desired level of complexity, in a risk free, dynamic and stochastic environment. It provides the essential level of realism and utility required to model supply chain environments accurately. Therefore, simulation has been proved as a versatile and powerful tool for approaching the study of supply networks' configurations, dynamic behaviour, and performance, in different conditions and environments.

DSS main agents and collaboration schema

The DSS is an agent based simulation-optimization tool, being its main agents the following ones:

- The SUPPLYCHAIN agent is the main agent that contains all the other network agents. These agents collaborate to enable the Supply Chain to execute the process from receipt of a customer order until the customized product is delivered to the customer. The SUPPLY CHAIN agent creates the network of agents and registers the response indicators in a KPI structure. The most significant KPIs are the response time and the sum of fixed and operating costs.
- The MARKET agent contains the market operating rules for market areas, customer types and sales percentages according to product requirements. This agent characterises the type of order.
- The SALES POINT agent is the point at which the product orders are created in accordance with the rules defined in the MARKET.
- The COORDINATOR agent decides when and how a Customer order will be responded to. It also supervises order execution from receipt of the order to customer delivery and updates the strategy indicators defined in the KPI-s structure (Customer service strategies used, etc.)
- The CUSTOMER ORDER agent is an internal agent of the COORDINATOR which executes the order in accordance with the network instance selected by the coordinator and, finally, supervises the customer order evolution.
- The set of PLANT NODES agents make up the production nodes (suppliers, fitters, manufacturers, warehouses) that produce the customized product for each customer order. The

Coordinator is the agent that decides which Plant NODES will be involved in each customer order (selected network instance).

- The set of ITEMS agents simulate the functioning of the materials making up the product with regard to replenishment strategies.

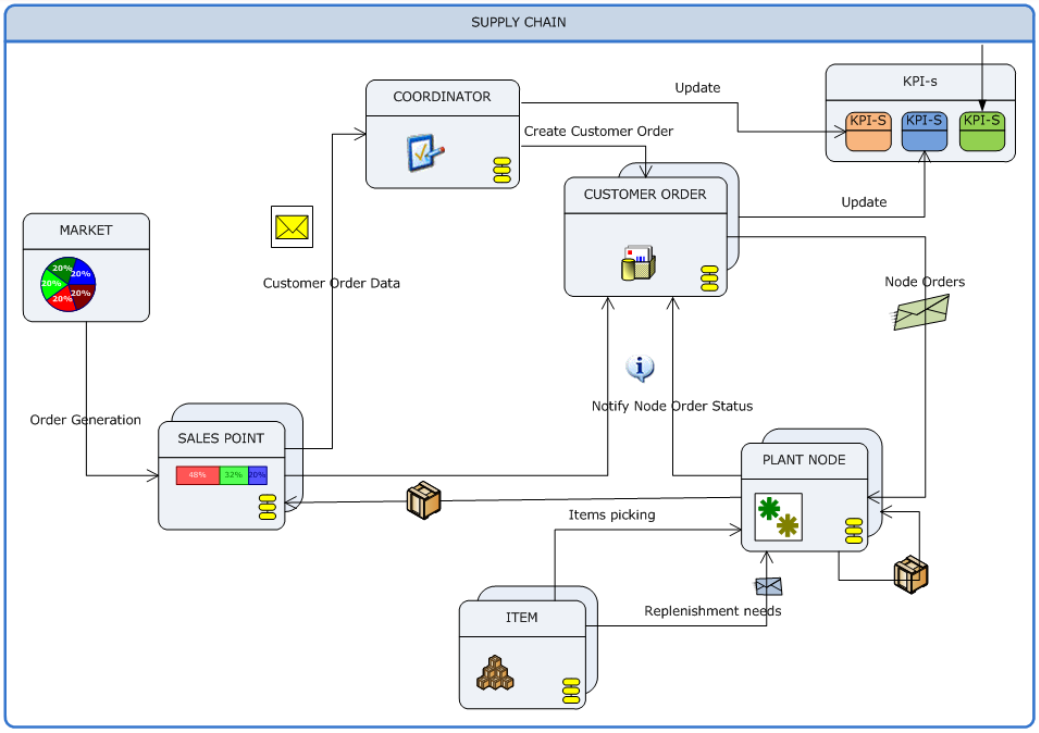

Figure 8: DSS Agents Collaboration Schema

Their dynamic collaboration schema can be briefly summarized in the following six steps:

1. The MARKET agent uses its market knowledge to suggest the customer orders to be created with a particular characterisation: market area, customer type and requirements of the desired product. The MARKET agent can work with order generation rules or sets of historical orders. On the basis of this data, the MARKET agent commands the SALES POINT agent to generate a customer order with the characteristics of the proposed order.
2. The SALES POINT agent generates the order from the data received from the MARKET agent and the SALES POINT's own data, sets a response time and a target price and, lastly, sends the customer order to the network's COORDINATOR agent.
3. The COORDINATOR agent determines when and how (supply network instance) the customer order will be responded to, on the basis of a list of pre-defined customer service strategies or by calling the Optimizer. When the network instance (Plant Nodes agents) that will produce this product has been decided, it calculates the launch date (according to the delivery date and the current network load) and, lastly, it places it in the launch queue. When it is time for it to be launched, it creates the CUSTOMER ORDER so that it can execute and follow up the customer order. The COORDINATOR agent will perform the overall follow-up on the basis of the data obtained from each CUSTOMER ORDER agent.
4. The CUSTOMER ORDER agent generates the sub-orders for each of the PLANT NODES involved in executing a customer order and sends these sub-orders to each of the nodes (suppliers, manufacturers, fitters, warehouses, etc.). The sub-Orders (Node Orders) contain data for the

reference to produced by each plant node, and the destination Plant node that is to receive the product produced. The CUSTOMER ORDER agent also performs regular follow-up of the customer order execution on the basis of the data sent by each of the Plant Nodes ("Notify Node Order Status").

5. The NODES PLANT agents produce and customize the customer's end product and the last NODES PLANT sends the end product to the SALES POINT agent. Each of the NODES PLANTS, on completing their task, and the SALES POINT agent, on receiving the end product, inform the CUSTOMER ORDER agent of the execution status, indicating the completion date for each task.
6. On completion of the customer order, the CUSTOMER ORDER agent updates the KPIS-s associated with the customer order (delivery time and direct costs for a customer order). The COORDINATOR agent also receives the information on customer order evolution and updates the global KPIS-s in the network.

DSS management purpose

REMPLANET's Simulation and Optimization Decision Support System, the DSS, is a tool to re-design and innovate a multi-plant network architectural and managerial design. This is done by conducting realistic what-if simulations/optimizations of the alignment between the triad products'-processes'-global supply networks' configurations, with regard to the characteristics of product orders.

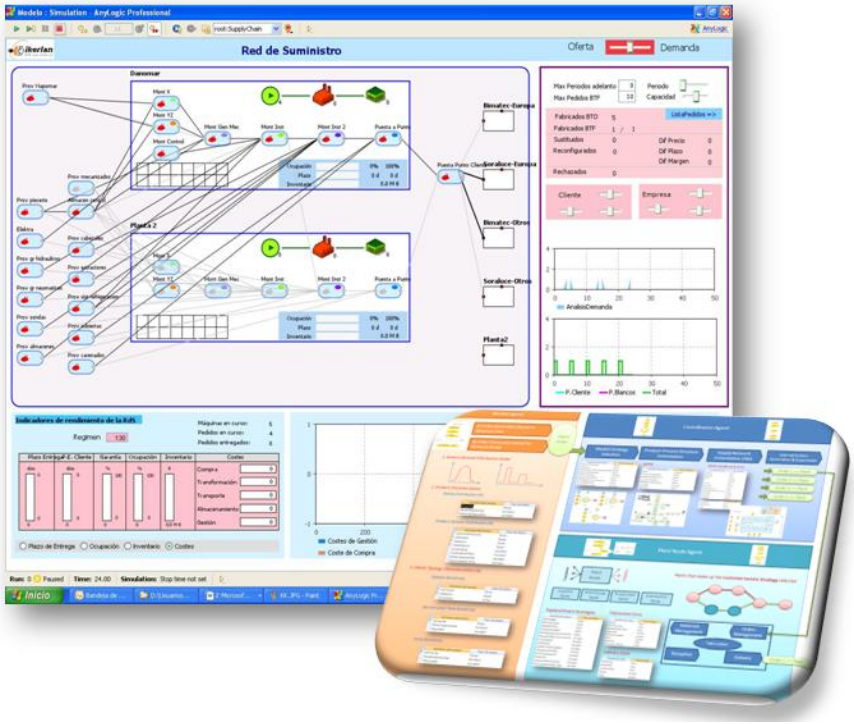

Figure 9: REMPLANET Simulation and Optimization Decision Support System (DSS)

For instance, based on different network conditions (e.g. capacity constraints, suppliers lead times, internal processes lead times, inventory levels, means of transport, supplier location, manufacturing units, distribution centres...) and customised demand scenarios, alternative and optimal global multi-plant network configurations, strategies and policies, can be identified in terms of response performance (cost and time).

The DSS is designed to deal in a quantitative manner with the following nine strategic and tactical interrelated issues:

1. Appraising demand scenarios for the current supply network.
2. Designing and configuring supply networks to provide customised products.
3. Evaluating alternatives for a new site location.
4. Setting strategies to deal with different customer behaviours resulting from market changes.
5. Setting criteria to balance the supply network capacity to meet demand variations.
6. Establishing inventories' position and replenishment policies in the supply network.
7. Defining the planning period and number of planning points of the supply network.
8. Setting order fulfilment strategies for each family product.
9. Identifying and positioning the type of customer order decoupling point (CODP) in the supply network.

"The DSS tool helps us very much to identify optimal customer service strategies, i.e. alternative configurations of the supply network to supply each product family based on market specific requirements associated with each one. In the past we have managed this problem in an intuitive form, whereas with the DSS tool we can quantitatively understand the consequences of allocating each component of the product-process structure between the different elements of the supply network… giving sense to our decisions regards what suppliers should be selected to supply which product components, where to manufacture and assemble each product component and where to store finish products in the distribution centres"

- BIMATEC-SORALUCE

ColNet

Introducing ColNet

Companies being part of Resilient Networks require gaining access to reliable, secure and timely information, to share a minimal set of data to their partners and to properly react to external events raised by others network members. In achieving those goals, inter-organizational systems interoperability and integration becomes a critical issue. In this context, the ColNet Service Oriented Platform was implemented inside the REMPLANET Project.

Figure 10: Logo of ColNet.

ColNet combines service orientation and business process management capabilities in order to support operational requirements of Resilient Networks. In doing it so, **ColNet** is taking advantage of complementary developments carried out inside other REMPLANET workpackages.

The platform was designed mainly for operational purposes, supporting: a) the process of configuring a suitable network for managing orders coming from outside the network and, b) the coordination of the different participants involved in the production process of each accepted order.

Therefore, in this context, **ColNet** supports the operational model defined in WP2. This model, was in fact, an alignment model for the triad PF-P&O-SN (product families' structure - processes and operations management strategies - supply network structure) with regard to the characteristics of product orders, i.e. volume, number of variants, uncertainty in demand, product life cycle length, lead-time accepted, etc, from a mass customization perspective. One of its main purposes was to address the characterization and analysis of companies and networks that decide to be involved in Mass Customization scenarios.

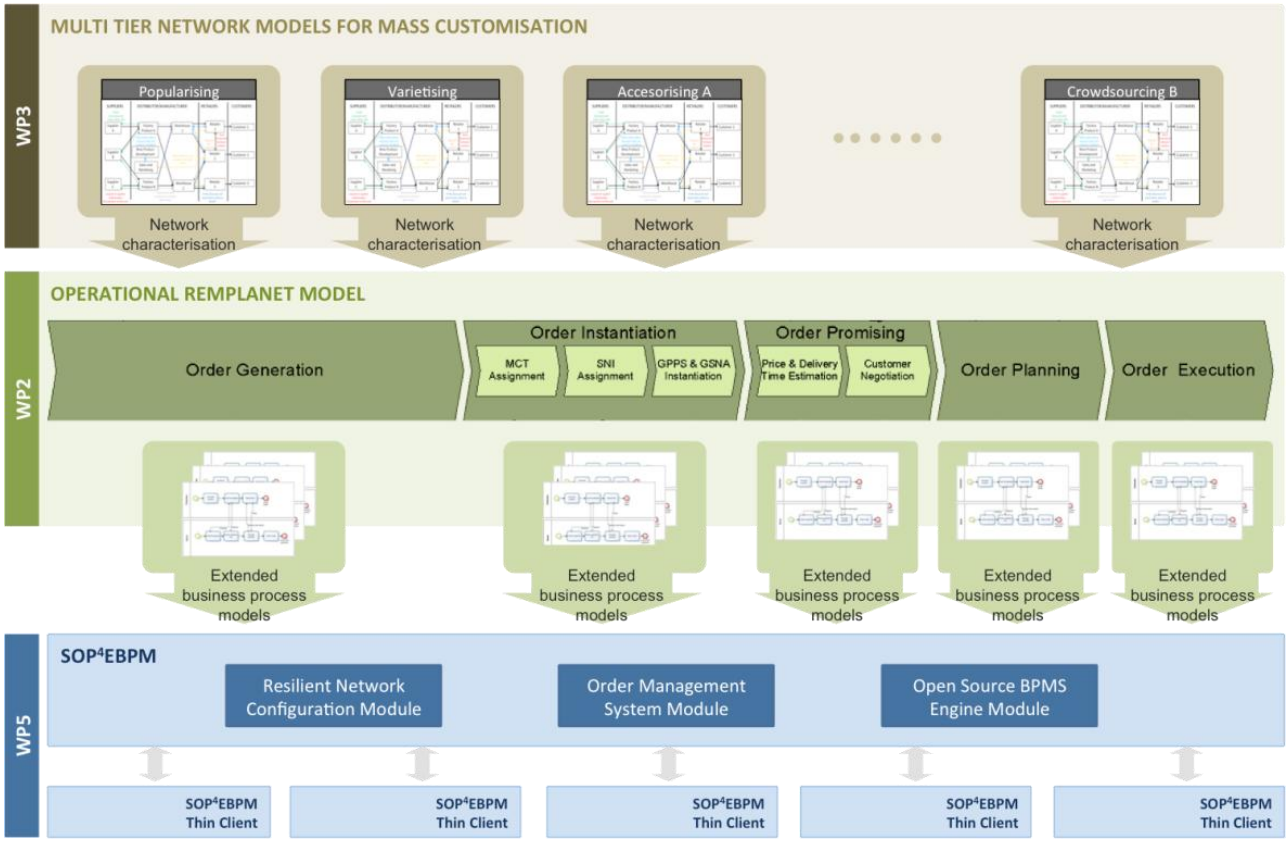

Figure 11: ColNet context.

Moreover, this network configuration process was also based on the results of WP3, where an integrated framework of Strategic and Operational REMPLANET models was proposed. Then, **ColNet** enables configuring the most relevant network topologies used in Mass Customisation Scenarios defined in WP3.

ColNet Overview

ColNet is a service-oriented and business process management-based platform that supports a fully non-centralized decision making process, as is expected to be achieved in non-hierarchical manufacturing network. Complementary, this platform will enable dynamic and fast-responsive adaptation of IT-based organizational mechanisms needed to fully achieve the resilience structure that REMPLANET is proposing.

This platform will based on open standard tools and international standards will put a special emphasis in the collaborative business process modeling for Resilient Multi-Plant Networks of the manufacturing sector, and their corresponding translation to executable representations.

Moreover, it will take advantage of interoperable services as a way of facilitating collaboration and coordination in the whole network context.

The main functional components of the ColNet platform are depicted in the following figure:

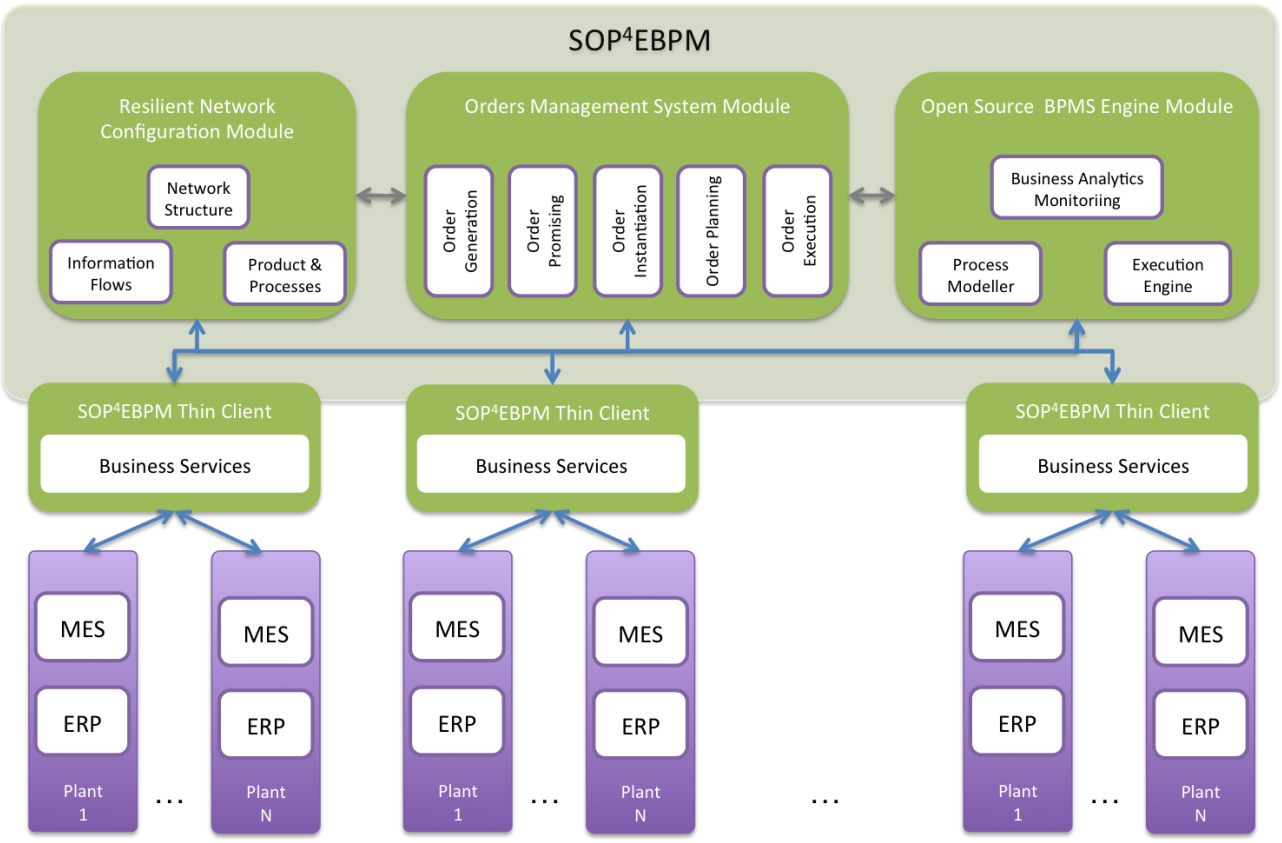

Figure 12: ColNet modules

ColNet will be composed by four main modules, which are:

- **Resilient Network Configuration Module** – This module supports the definition of networks, introducing network members and their related information about products, infrastructures and capacities which is necessary for establishing possible relationships among them.

- **Order Management System Module** – This system allows network members to handle and manage orders received from external clients, deciding which is the suitable configuration network for serving it.

- **Open Source BPMS Engine Module** – Through the BPMS, network members can coordinate their efforts working collaboratively at network process level. The processes here defined and deployed will serve for allowing members to work collaboratively in different production configurations.

- **ColNet Thin Client** – This client will be deployed on each enterprise and will allow network members to interact with the different services provided by the ColNet.

This architecture will enable networks of enterprises to react in a coordinated way when facing varying market needs, by adapting itself in the most suitable way for different production conditions.

1.3.2. REMPLANET Combination of Exploitable Results

These solutions can be used in a standalone way by network companies solving specific problems. But besides this possibility, these solutions have been designed and implemented with the aim to be complementary, in order to obtain significant synergies from their combined use providing to the manufacturing industries networks better user experiences and higher returns of investment.

Many different possible result combinations arise; some of them can be already implemented while others require further developments and the definition of specific new business models. Depending on the typology of tools a different degree of integration is required. The existence of a common glossary and of a comprehensive integrated strategy ensures the combined use of the methodological tools. On the other hand, the combined use of the software tools requires a stronger level of integration, for this reason a strong information exchange took place among the various software development teams in order to ensure their compatibility. Nevertheless, a full integration is beyond the scope of the REMPLANET project and will be achieved, if required only after the project end thanks to further development efforts. Whether a full integration will be reached depends on the identified exploitation strategies and in any case requires that both tools reach a higher maturity level.

Below some of the potential combined uses are highlighted, they have been selected thinking about the typical problems that companies being part of collaborative networks have to solve.

IMP + MCKN

The objective here is to understand Mass Customisation and applying its principles, exploiting the knowledge and expertise provided by the MCKN platform, in the definition of the product solution space also thanks to a stronger involvement of customers, achieved using the IMP. This combination based on the IMP and MCKN tools will lead to products and process designs that will better fit client requirements and will allow enterprises to be wholly aligned with the Mass Customisation paradigm.

The customers are integrated in a structured and transparent way into the enterprise innovation management process through IMP tool. During the product development phase both the manufacturing company and its customers can take inspiration from the knowledge made available by the MCKN in order to fully profit of Mass Customisation advantages. Moreover, the use of the MCKN platform ensures that the manufacturer and the customers share the same MC glossary and are aware about MC best practices. Thus, customers' requirements can be considered from the very beginning in the innovation process while aligning the innovative process with mass customization approaches. Therefore, the resulting products can meet individual customer's needs while precious hints are also gathered about the associated manufacturing processes required for achieving near mass production efficiency.

ORM + RW

The RW support manufacturing network managers to take strategic decisions, such as to identify the most suitable type of MC and the relative reference network structure to be deployed. The knowledge and best practices of the RW, dealing with strategic decisions, are fully complementary with those of the ORM, which deals with operational aspects. The combined use of these tools allows to simultaneously tackle all management decision levels (strategic, tactical, operational) defining which is the best strategy to adopt and the associated network configuration for satisfying the requirements of customized markets as well as identifying which internal processes better support the selected strategy and better fit the current network configuration. This allows to qualitatively design resilient and efficient manufacturing networks.

IMP + MCKN + ORM + RW

The combination of all methodological and knowledge based tools of REMPLANET project will provide experts and manufacturing network managers with: a) knowledge to develop capacities for defining coherent strategies derived from reference models, b) methodologies for involving customers in the innovation process while considering their need from the very beginning, c) the alignment of its innovation and design process with mass customization approaches d) guidelines for configuring the manufacturing network in the most suitable way for better supporting the selected levels of product variety and product customisation when defining the network strategy and designing products.

This combination of the methodological and knowledge based REMPLANET tools allows the alignment of the strategy and the configuration of the manufacturing supply network taking into account the specificities of the MC product solution space, designed in collaboration with the customers using the open innovation processes provided by the IMP. Therefore, the resulting network strategy and configuration will better support the selected policies of product variety and product customisation obtained in the collaborative innovation process where also the customers are involved.

ORM + RW + DSS

The combined use of ORM and RW allows to define suitable manufacturing network structures and management rules as well as MC strategies. However, these suggestions are mainly qualitative and do not take explicitly into account the effects of variability and uncertainties. A step further in the design and validation of a suitable manufacturing network configuration can be achieved if it is also applied the DSS tool. The knowledge gathered by ORM and RW tools is used for modelling potential network configurations and describing the market scenarios in which they have to operate. The performance achieved by the various configurations is assessed analysing these quantitative models thanks to the DSS simulation and optimization tool. The use of ORM and RW for supporting the definition of MC strategies and manufacturing network configurations ensure the probability that only useful models are analysed using the DSS. Therefore, for network managers this becomes a really interesting combination for improving the quality of their

simulations and optimizations for enhancing at last the overall process of decision taking. The DSS tool is particularly suitable for analysing non-hierarchical manufacturing networks, because it has been developed taking into account the specificities of such types of networks, both in terms of modelling framework and templates and of performance measurement.

Moreover, this combination of tools has two fold objectives. Academics can use the DSS to validate and refine their conclusions with regard to: a) decide which network configurations better support different policies of product variety and customisation, and b) determine the accuracy of the reference model and its proposed strategies for supporting mass customisation. Thanks to DSS industry can check the suitability of their possible strategies and network configurations before deploying them in their network allowing them to improve their decision-taking process.

ORM + RW + ColNet

ColNet solution incorporates concepts and approaches developed in the context of the ORM and RW results, supporting their deployment in real industrial applications. Therefore, network managers can apply and use the expertise obtained through the ORM and RW tools when configuring networks of enterprises and defining the associated extended business processes in ColNet. For this reason, a straightforward synergy arises among them.

ORM can be used by network managers for developing coherent strategies derived from reference models based on products'-processes'-supply networks' alignment that can later be implemented through the ColNet tool in order to respond to customized market demands at the lowest possible cost and time. Later, these strategies can be refined with the diagnostic RW tool which can help network managers to identify the network type in which they are currently operating and its suitability with regard to two factors: product variety and product customisation. Additionally, RW will aid network managers in the process of configuring their network, strategy and operations to better support the desired level of product variety and customisation.

Once strategic and operational decisions are identified applying ORM and RW, ColNet tool become a winning enabler for defining the network strategies and support them through the ColNet solution. This implies the creation of the network (involving various real companies), the assignment of roles, the definition of the management rules and the implementation of message/information exchange mechanism.

DSS + ColNet

These two ICT tools can work together in several ways in order to provide better approaches to configure and handle networks of enterprises. In fact, this collaboration can work in a bidirectional way:

- the DSS can provide information to the ColNet platform about the more suitable network configurations for each network of enterprises, using later this configuration for defining their internal business processes,
- and the ColNet platform can provide actual and updated information about process execution statistics to the DSS in order to improve the quality of the data used to perform its

simulations and optimizations.

As it can be seen, these tools are very complementary, and the outputs of each one are very useful as inputs for the other tool.

In the former case, as aforementioned, the DSS can provide two different types of inputs to ColNet. On one hand, after a simulation and optimization process, it can provide some proposals of default network configuration to be used in ColNet when configuring a network of enterprises. The idea in this case is to configure the network in the most suitable way for standard conditions, default configuration, allowing the network to work in the most fruitful way and having some alternatives for special products. On the other hand, providing proposals of network configurations for manufacturing specific incoming orders to be served by the network. This approach should be used when the incoming orders present high deviations among them resulting in very different network configurations without the possibility of assuming the existing of a default configuration. Later, these network proposals can trigger a process of network instantiation in a per order basis. This instantiation process enables enterprises to decide in a descendent order of configuration suitability which is the first feasible network process configuration to adopt for serving the order.

In the second case, ColNet process execution, based on a defined network configuration, will generate data that can be used in order to monitor the quality of the established processes, perform process re-engineering and improve the accuracy of the data used in DSS simulation and optimization processes. Then DSS will be able to generate better network configuration proposals as long as the data inputs will come from real executions.

Thus, as it can be seen the cocktail based on DSS and ColNet is a powerful combination to improve the efficiency and efficacy of the manufacturing network.

Combination of all the REMPLANET Results

The combination of all REMPLANET tools is a very strong recipe for success as long as it covers all the edges required for supporting resilient multi-plant networks design and management. This covers from the innovation process which is opened to customer participation, aligning it with mass customisation approaches, going through the establishment of the network strategy and configuration arriving to the support for the associated manufacturing processes. In parallel, all decisions with regard to network configuration and processes can be simulated and optimized through DSS for ensuring that the best decisions are taken. Finally, these network configurations can be deployed in ColNet, which will later allow the execution of their processes guiding network members through the whole process. The REMPLANET integrated solution implies can be applied by companies thinking about radical modifications of their strategy that imply MC introduction. In this sense, these companies start from scratch, and thus need to:

- collect general information about MC (using the MCKN platform)
- involve their customers in the definition of the new product solution space (IMP)
- define their MC strategy (RW) and operational rules (ORM)
- identify suitable network configurations (DSS)
- create the network and managing it (ColNet)

1.4. Potential impact

In the previous section, the different exploitable results developed within REMPLANET Project have been described. These exploitable results were implemented in different industrial partners, members of the REMPLANET consortium in order to test the results obtained and with the objective to improve or redefine them. Moreover, the industrial partners analyzed the impact of the implementation of the different results.

Two different analyses were performed with regard the REMPLANET exploitable results:

- Qualitative analysis. The different industrial partners were interviewed and they expressed their impressions about the implementation of the REMPLANET Exploitable Results. With their contribution, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was performed in order to asses the potential impact of each REMPLANET Project output.

- Quantitative analysis. Three factors to be analyzed were defined: costs, quality and time. Depending on the exploitable result assessed, different metrics of the previous three factors were measured.

The results obtained through the qualitative analysis are shown in the following per exploitable result (more information in deliverable D8.3, REMPLANET-WP8-D8.3, 2012):

MCKN

MCKN makes easier for companies to understand MC principles and to implement MC structures. The result is important because it answers the company's needs and it is seldom used. The tool answered the company needs.

Table 1: SWOT Analysis of MCKN

Strength	**Weakness**
• A database is implemented on the platform, containing the latest articles, studies and best practices around MC topics. • A communication platform is provided to experts from a research environment and from industry to go into open exchange.	
Opportunity	**Threat**
• Create new networks for the company. • Find strong partners regarding research and business activities.	• The open character might be seen as a threat for companies who share their knowledge on the platform. Competitors may take advantages of this source.

IMP

The tool described is not a software. The Idea Management Process (IMP) is an evaluation toolkit embedded to a process.

Table 2: SWOT Analysis of IMP

Strength	Weakness
• Standardized evaluation of ideas coming from customers. • Standardized documentation of ideas, which are available in a database for later use.	• Strong standardization (checklists, idea database,…) may block creativity in idea development process. • Strongly formalistic approach may lead to rejection of ideas with high potentials.
Opportunity	**Threat**
• Close contact with the customer and the latest innovative topics on the specific market. • Reduction of failed projects.	• Accidentally presenting much company internal knowledge to the outside.

ORM

ORM is a guided path to evaluate company's network.

Table 3: SWOT Analysis of ORM

Strength	Weakness
• It is very attractive as tool of consulting for the resolution of the different problems that appear in the company. • Detailed description of both daily and strategic scenarios. • It contains a lot of information on numerous topics that are of interest. • It shows approaches that are relevant to particular problems.	• A basic knowledge of mass customization concepts is needed. • Academic language and approaches are sometimes difficult for companies to understand. • Can take some time to find relevant information.
Opportunity	**Threat**
• The utilization of these concepts and tools is not easy to copy for Asian competitors. • Identification of potential and innovative situations to face and to meet customers' needs. • To find answers to problems facing the company.	• Too theoretical approach.

RW

RW is a methodological book with some questionnaires that evaluates the results from a technological point of view.

Table 4: SWOT Analysis of RW

Strength	Weakness
• Easy to understand and implement with limited help. • It explains a lot of the academic terms. • Improved customer service. • Lower stock holdings. • Improved product quality.	• When the industrial partners were looking at the guide, there was a lack of case studies; however their use of it became one of the case studies. • More difficult production operation.
Opportunity	**Threat**
• It suggests ways companies can improve their operations and the way they work with partners. • It shows how to monitor the performance of their network • It expands product varieties without changing production processes or increasing stock levels.	

DSS

The result is important because it helps to change production scheduling and planning, but also design and production of some products. The competitiveness can be improved by the result because it reinforces the delivery dates reliability and order fulfilment.

Table 5: SWOT Analysis of DSS

Strength	Weakness
• Possibility of simulating different scenarios and variables in a short time for strategic and tactical decisions. • Very important to optimize production process and reduce costs.	• It is necessary a previous work of supply information to the system that it is very laborious and complex. • Not fully integrated with company MES. •
Opportunity	**Threat**
• The utilization of this tool is not possible for the Asian competitors • It ensures dialogue with company Manufacturing Execution Systems (MES). • It ensures optimization to all company processes.	• It is not possible to use the tool for companies alone. They need the help of an expert (research partner). • It needs to train operator. • It needs to take into account several processes to ensure overall optimisation.

ColNet

The result is important because it helps to change purchasing, suppliers' selection, and comprehensive communication inside the supply network. The competitiveness can be improved by improving process efficiency.
With a daily use, ColNet answers the industrial needs.

Table 6: SWOT Analysis of ColNet

Strength	**Weakness**
• A new way to trace technical information and offers, it makes the process, more efficient and effective. • Faster Order Management Process, modern procedures.	• Suppliers must be taught to use it, and most of the suppliers of one of the industrial partners are in China. • Alignment with the existing Information Systems (IS).
Opportunity	**Threat**
• Higher transparency and comparability in suppliers offers. • Real time communication between nodes of the supply chain, computerized phases instead of circulation of sheets of paper.	• If it needs to be adapted/updated this requires the help of a SW developer as partner. • Unavailability of some users (ex. customers).

In order to study the benefits of the REMPLANET Exploitable results in a more detailed way, a complete study was performed comparing the impact indicators initially defined in REMPLANET Annex I –Dow (2009) with the values obtained after the implementation of the REMPLANET results. This analysis is thoughtfully described in the Pilots' Implementation deliverables:

- REMPLANET-WP6-D6.8, (2012).
- REMPLANET-WP6-D6.9, (2012).
- REMPLANET-WP6-D6.10, (2012).
- REMPLANET-WP6-D6.11, (2012).
- REMPLANET-WP6-D6.12, (2012).
- REMPLANET-WP6-D6.13, (2012).

The following sections show an overview of the evolution of the quantitative impact indicators before and after the implementation of the REMPLANET Results:

FESTO Implementation (MCKN + IMP)

The following table summarizes the progress beyond the impact indicators after the use of the MCKN and the implementation of IMP in FESTO:

Table 7: FESTO Impact Analysis

	Cost	**Quality**		**Time**
Target	*Cost of failure due to many iterations in solution definition (trial-and-error)*	*Number of orders not fulfilled (change of provider by customer) due to missing options in solution space*	*Customer satisfaction (multi-dimensional measurement scale in place, including loyalty, retention, WTP, referral potential)*	*Reduction in contract preparation and execution time*
	Reduction by 25%	*Reduction of 10%*	*Increase by 25%*	*NA*
March 2012	-25%	-10%	+25%	-20%

The Idea Management Process (IMP) has contributed to reduce the cost of failure due to the IMP evaluates every customers' idea in the same way, so that the idea evaluation becomes fair and transparent for customers.

From a quality point of view the IMP reduces the number of orders not fulfilled since it supports practitioners in matching the respective process steps of the IMP with suitable methods and tools and moreover both results IMP and MCKN contribute to increase the customer satisfaction. The MCKN provides a collection of worst or best practices, a database of potential service providers, and an audit tool which will be very useful for the daily operation of the enterprises. MCKN provides added value because it increases the perceived satisfaction by the customers.

Finally, the time is also reduced since IMP is a very well defined methodology to integrate customer ideas and innovations into the business process and the MCKN provides an excellent way to support mass customization companies.

VL Idrodinamica Implementation (ORM + ColNet)

The following table summarizes the situation of the impact indicators after the implementation of ORM and ColNet in VL Idrodinamica:

Table 8: VL Impact Analysis

	Cost **Effective management of increased products codes**	**Quality** **Evolution of back office activity**	**Time** **Time efficiency in orders fulfilment**
Target	*No. of new production lines (+30%)* *No. of new product patterns (+30%)*	*Introduction of Supply chain management.* *Cash flow management.* *Management of foreign suppliers.*	*Improvement* *Time reduction in orders fulfilment (- 20%)*
March 2012	10 production lines 53 patterns of finished products	Advanced tools allow efficient performances in the back office activities to support the production, the supply and the communication with external actors	Integration of advanced tools with the existing ones allow the faster and automatic procedures: - 2,6 days/order

With regards to costs, the expected result, related both to new supply management competences developed through ORM and the use of a more advanced tool for order management (ColNet), is achieved through a higher capacity to manage a complex production scenario, with different options, production lines and finished products.

From a quality viewpoint, the evolution towards a process where communication with external actors and with the production lines is managed in a more efficient, automated way, has been accomplished. This is related basically to the implementation of the ColNet platform, and it is expected to represent the starting point of a progression that will involve the highest possible numbers of clients and partners in VL's network.

Finally, with regard to time, effective, quicker and smoother order management procedures lead to shorter lead time. This is well explained in the improved figures with regard to lead time in order fulfilment, which decreased from 3,6 to 2,6 average days/order.

BIMATEC Implementation (ORM + DSS)

The following summarizes the situation of the impact indicators after the implementation of ORM and DSS in BIMATEC:

Table 9: Expected and achieved BIMATEC impacts within REMPLANET

	Cost			**Quality**		**Time**	
Target	*Reduction*			*Improvement*		*Reduction*	
Value	**Stocks level**	**Logistics costs**	**Total supply network cost**	**Delivery reliability**	**Customer service level**	**Production lead-time**	**Delivery time**
Units	Stock turnover	% Logistic costs / Turnover	2009 Cost = 100%	Customer survey	Customer survey	Days	Days
March 2009	Ra= 4	2,56%	100%	69%	62%	210	119
March 2012	Ra=3,5	2,44%	101%	75%	73%	189	84
Achievement	-12,5%	-0,11%	+1%	+6%	+11%	-10%	-29%

With regard to costs, both stock level and logistics costs decreased, as it was expected, also thanks to the improvements brought by the ORM web tool and the DSS tool. The modularity strategy implemented by BIMATEC, on the other hand, determined the need for a higher stock, thus partially reducing this benefit. From the total supply network cost viewpoint, an increase has been recorded, which, while being of minor entity, is somehow going against the expected project impact. The main reason for this effect has to be found in the Consumer Price Index (CPI) rise by 6,2% in the last 3 years, an increase which seemingly compensated the reduction generated by a better management of BIMATEC supply network.

Quality has been assessed by observing the results of a Customer Survey taken every year at BIMATEC, which has shown improvements as expected both with regard to Delivery Reliability (+6%) and with regard to Customer Service level (+11%).

Finally, also the time dimension has shown the expected improvements. Reduction was estimated both with regard to production lead time and delivery time, and this punctually occurred, by 10% and 29% respectively. These effects can also be attributed to the improvement in supply chain and process management (i.e. more appropriate order fulfillment strategies) brought in by the ORM web tool and the use of the DSS tool to simulate scenario and support strategic decisions.

KING & FOWLER Implementation (ORM + RW)

The following table summarizes the situation of the impact indicators after the implementation of ORM and RW in KING & FOWLER:

Table 10: Expected and achieved K&F impacts within REMPLANET

	Cost	Quality		
	Production Costs	**Throughput optimisation**	**Customers service level adherence**	**Productivity**
Target	*Reduced or maintained at their current levels while resource utilization is enhanced*	*Development of a formal, collaborative co-manufacturing strategy*	*Pass 90%*	*Superior to 3%*
March 2009		No co-manufacturing strategy in place	86% core customers	2.84
March 2012		Agreements with customers and suppliers in place	90% core	3.12
Achievement	Costs maintained at roughly the same level			

Costs have been maintained at the same level, whereas the resource utilization increased, thus ensuring a higher efficiency of K&F's processes. A co-manufacturing strategy, based on transparency, KPIs and high visibility throughout the supply network, has been put in place.

This, in turn, has helped to improve two fundamental aspects of K&F competitiveness: customers service level adherence and productivity. For a supply chain integrator as K&F, these are indeed highly valuable results, and their attainment is highly evaluated at the company level.

NEWTON Implementation (RW + MCKN)

The following table shows a summary of the progress of the impact indicators after the implementation of RW and the use of MCKN in NEWTON:

Table 11: Expected and achieved NEWTON impacts within REMPLANET

	Cost	Quality	Time
	Improving the efficiency with which upgrades and enhancements are made to those products	**Improving the customer-driven functionality of existing products**	**Innovating the creation of new products**
Target	*Mass Customization (MC) Implementation*	*Customer driven functionality introduced*	*New product development innovation*
March 2009	No MC skills	Make to Order	Innovation driven by unstructured factors
March 2012	MC Skills obtained through MCKN platform	Assembly to Order (more efficient customization)	Innovation driven by structured collaboration with RTD centres
Achievement	Yes	Yes	Yes

Firstly, MC implementation and competence building through MCKN allowed NEWTON to obtain a higher efficiency in its innovation capacity, and in the upgrades introduction to existing products.

Secondly, the process change, by speeding a smoothing customization of NEWTON solar panel, enabled the company to introduce customer driven functionality with much less effort than before.

Finally, the company innovativeness will surely be enhanced by an experience such as that of REMPLANET, where day to day work was carried out side by side with research centres. Thanks to this, NEWTON could touch by hands the benefits of university-industry collaboration, thus developing those tools which can make it more competitive and able to meet the contemporary competitive challenges.

GHEPI Implementation (DSS + ColNet)

The following table shows an overview of the evolution of the impact indicators after the implementation of DSS and ColNet in GHEPI:

Table 12: GHEPI Impact Analysis

	Cost	**Quality**		**Time**
	Implementation of strategies addressing total ownership costs.	**Increase of number of customers involved in co-design strategies.**	**Production compliances**	**Lead time**
Target	Strategy-identification and implementation	From the current 5 customers to 8	20% reduction	2 weeks reduction
March 2009	No strategy for total ownership costs	5	6.16 %	5 weeks
March 2012	Strategy defined and ready to be implemented	7	3.49 %	4 weeks

With regard to costs, the simulation and optimization work done with the DSS tool, helped GHEPI in the design of a strategy for total ownership costs that will allow the company to set the correct prices to their customers, ensuring that the actual production costs are fairly taken into account.

As for quality, GHEPI increased the number of customers involved in co-design strategies, a process which has surely been encouraged by the new tools developed in REMPLANET, in particular with regard to ColNet, where the collaboration at network level was strengthened and supported. On the other hand, production compliance decreased by almost 50%, showing that the company is greatly improving its capacity to manage complex orders and production strategies.

Finally, lead time was also reduced, and to this result certainly contributed the REMPLANET tools. In particular, the DSS tools smoothed internal procedures and supported the optimization of internal workloads, whereas the ColNet platform supported the quicker definition of order fulfilment strategies and supply chain.

After showing a very brief description of the quantitative analysis performed in each implementation of the REMPLANET Results at pilot's sites, it is appropriate to define a framework to show how each results contribute to different aspects of the three main impact factors: costs, quality and time. This is shown in Table 13. The size of the bars shows the level of impact that each result has to each aspect analyzed with regard to the three factors studied.

Table 13: Potential impact per exploitable result

		MCKN	IMP	ORM	RW	DSS	COLNET
Cost	Cost of failure due to many iterations in solution definition (trial-and-error)						
	Effective management of increased products codes						
	Reduction of the production costs						
	Reduction of stocks level						
	Reduction of the logistics costs						
	Reduction of the total supply network cost						
	Improving the efficiency with which upgrades and enhancements are made to those products						
	Implementation of strategies addressing total ownership costs						
Quality	Reduction of orders not fulfilled						
	Efficient performances in the back office activities to support the production, the supply and the communication with external actors						
	Improvement of the delivery reliability						
	Improvement of the customer service level and satisfaction						
	Improving the customer-driven functionality of existing products						
	Increase of number of customers involved in co-design strategies						
	Improvement of production compliances						
Time	Reduction in contract preparation and execution time						
	Time efficiency in orders fulfilment						
	Reduction of production lead-time						
	Reduction of delivery time						
	Improvement of the quality throughput optimisation						
	Improvement of the customers service level adherence						
	Improvement of the productivity						
	Innovating the creation of new products						

In conclusion, the REMPLANET Exploitable results, in a standalone way or combined, impact directly in the performance of the enterprises reducing in general the total supply network cost, improving different quality customers drivers such as consistence with commitments, customization of products… and reducing the delivery lead times, as it has been shown through the qualitative and quantitative analysis.

Moreover, it is important to highlight that the REMPLANET Project has a public website with different interesting information. The address of the project website is: www.remplanet.eu

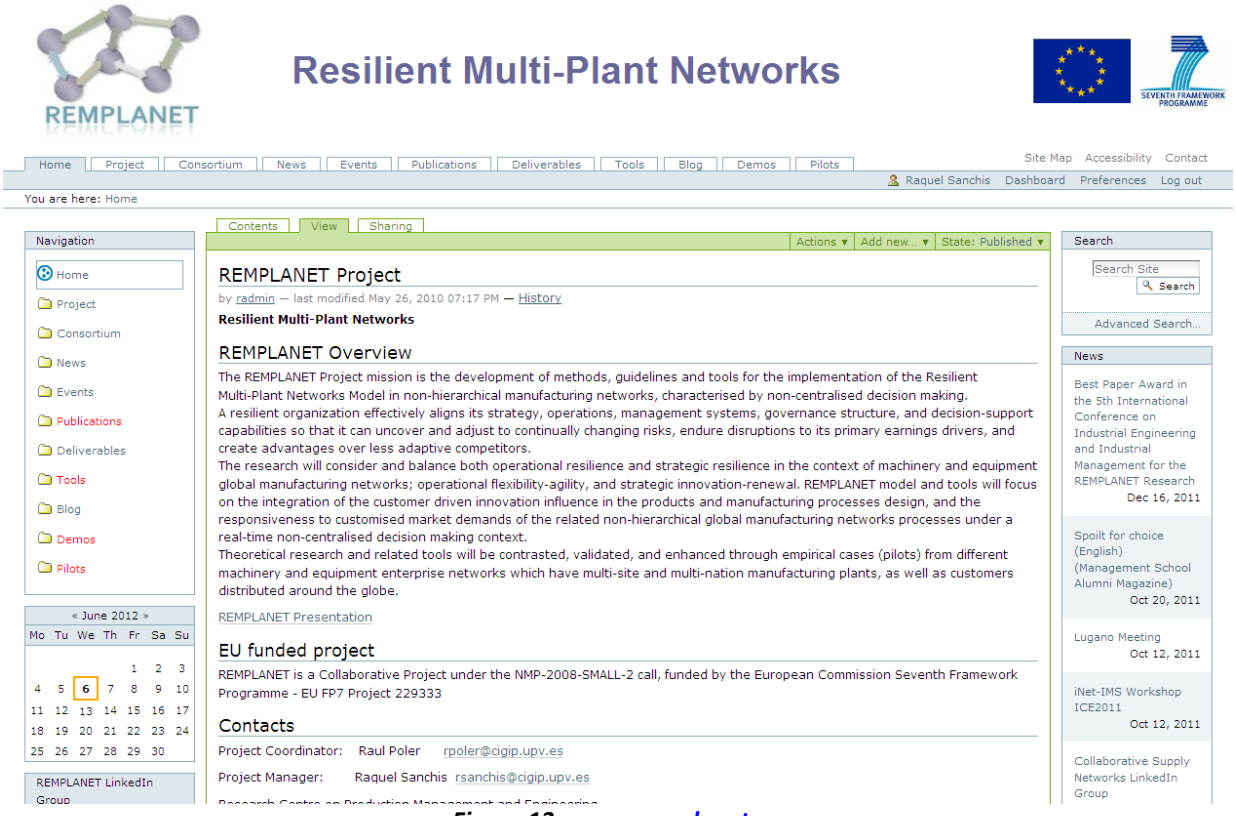

Figure 13: www.remplanet.eu

The website will be maintained after the project finishes, offering the public deliverables, demonstrators, etc. The REMPLANET Website shows information related to the results generated within the project and moreover, it offers up-to-date information about events, project publications, etc. related to topics addressed in REMPLANET project. For this reason, if any party is interested in the REMPLANET Project results could contact the consortium via the REMPLANET website or through the following email address: info@remplanet.eu

In Annex I of this Final Report, a list of all beneficiaries with the corresponding contact information is attached.

More information related to the REMPLANET website can be found in the deliverable D7.4: Project Website and Portal (REMPLANET-WP7-D7.4_M30, 2011).

Moreover, a video has been developed and will be disseminated via Youtube. In the video, a fictitious but realistic context of use is described, where an automotive producer of new electric car prototype (UNO) decides to apply the Mass Customization approach and asks to its machine provider (MECHTECH) to provide new machineries for new flexible production. Also MECHTECH needs to analyse its network and production to reach an adaptive, resilient and flexible approach to the production.

This video assures to reach larger audience and to clearly explain, also to not experienced potential users, the concepts and results generated within the REMPLANET project. This video will be attached to this Final Report. Currently, a new version of the video is being developed in order to add some interviews with the industrial partners of the project showing the benefits they have obtained through the implementation of the REMPLANET Results. Moreover, interviews with the WPLeaders explaining the exploitable results of the REMPLANET project are also available on the REMPLANET website.

Figure 14: Video explaining the REMPLANET Results.

2. Use and dissemination of foreground

There are different documents developed within the frame of REMPLANET Project that are related to the use and dissemination of foreground. These deliverables are the following ones:

- **D0.3: Rolling Plan, including Budget and Resource Planning, Controlling, Quality Assurance and Risk Management (REMPLANET-WP0-D0.3_M36, 2012).**

  At this point of time, the end of the project, in which all the tasks defined in the Annex I – description of Work have been already developed and the REMPLANET objectives achieved, the deliverable D0.3 is focused on the actions that will be developed beyond the project, as additional work that was not included in the Annex I – Description of Work. The actions beyond the project are mainly related to the exploitation plan of the results generated within the project.

- **D7.3: REMPLANET Dissemination Results (REMPLANET-WP7-D7.3_M36, 2012).**

  This document presents the dissemination results of the REMPLANET project funded by the 7th Programme Framework of the EU. The contents of this document serve for summarizing the results of the adopted strategy and the proposed plan for implementing it.

- **D7.5: Dissemination materials (brochures, banners, posters and booth) (REMPLANET-WP7-D7.5_M24, 2011).**

  This deliverable describes the dissemination materials (brochures, banners, posters and booth) created for being distributed and used at REMPLANET and other events to provide the project results widespread visibility.

- **D8.3: Exploitation supporting toolkit (REMPLANET-WP8-D8.3_M36, 2012).**

  This document is organized in three main chapters. In the first one, the Intellectual Property Rights (IPR) identified for each result are described.

  The second part of the deliverable is a rationale reading of the data from questionnaires based on the evaluation of the results. Project industrial partners evaluated the results they tested during the validation phase of the pilot cases. A Strengths Weaknesses, Opportunities, and Threats (SWOT) Analysis further complement the description of the various results with a list of strong and weak aspects. This is important for further improvements of a result that currently it is in its prototype shape.

  The third part is about marketing plan and strategy. A theoretical explanation about marketing aspects is supported by a more specific vision of REMPLANET future foreseen actions assuring a suitable market approach.

The summary of the main dissemination actions performed during the development of the REMPLANET Project, including scientific publications relating to foreground are shown in table A1 and A2:

Section A: Dissemination (public)

Table A1: List of scientific (peer reviewed) publications (ordered by the publication date).

No	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers	Open access
1	SOP4EBPM: Generating Executable Business Services from Business Models	Rubén de Juan-Marín, Rubén Darío Franco	Enterprise Interoperability	Vol. 38 (Biennial)	Springer Berlin Heidelberg	Valencia, Spain	13/10/2009	107-112	ISSN: 1865-1348	No
2	An Ontology Proposal for Resilient Multi-Plant Networks	Rubén Darío Franco, Guillermo Prats and Rubén de Juan-Marín	Enterprise Interoperability IV: Making the Internet of the Future for the Future of Enterprise	Biennial	Springer	Coventry, United Kingdom	12/04/2010	168-178	ISBN: 1849962561	No
3	Estrategias de Gestión de los Procesos y Operaciones en Escenarios de Personalización en Masa (ES)	Raquel Sanchis and Raúl Poler	Industrial Engineering as University Third Mission agent	Yearly	Publicaciones – Escuela Técnica Superior de Ingeniería	Bilbao, Spain	08/09/2010	1248 - 1257	ISBN: 978-84-95809-7	No
4	Production operational strategies for high-value-added manufacturing companies. A literature review.	Eduardo Castellano and Javier Dolado	Industrial Engineering as University Third Mission agent	Yearly	Publicaciones – Escuela Técnica Superior de Ingeniería	Bilbao, Spain	08/09/2010	1309-1319	ISBN: 978-84-95809-7	No
5	Product-processes-supply chain structures alignment for mass customization scenarios. A literature r	Eduardo Castellano and Javier Dolado	Industrial Engineering as University Third Mission agent	Yearly	Publicaciones – Escuela Técnica Superior de Ingeniería	Bilbao, Spain	08/09/2010	1805-1818	ISBN: 978-84-95809-7	No
6	Mathematical Modelling for Supply Chain Configuration	Josefa Mula, Julien Maheut and Jose P. Garcia-Sabater	Mathematical Modelling		Nova Science Publishers, Inc.	NY, USA	01/04/2011	209-226	ISBN 978-1-61209-651-3	No
7	Integrated Framework for Variety and Customisation Management	Lucy Everington, Andrew Lyons, Dong Li	Proceedings of the 2011 17th International Conference on Concurrent Enterprising (ICE 2011)	Yearly	IEEEXplore	Aachen, Germany	20/06/2011	1-8	ISBN: 978–3–943024–05–0	No
8	Open Innovation Accelerators analysis: applicability in the Mass Customisation context	Luca Canetta, Alina Florinita Pitu	Proceedings of the 2011 17th International Conference on Concurrent Enterprising (ICE 2011)	Yearly	IEEEXplore	Aachen, Germany	20/06/2011	1-11	ISBN: 978–3–943024–05–0	No
9	Conceptualising the Mass Customisation Decision-Making Process in Collaborative Supply Chains	Jorge E. Hernández, Andrew C. Lyons, Dong Li and Lucy Everington	Proceedings of the EWG-DSS London-2011 Workshop on Decision Systems.	Yearly	IRIT Research: IRIT/RR—FR (IRIT, EWG-DSS, EURO)	London, UK	23/06/2011	29	IRIT Research Report : IRIT / RR–2011-13—FR, June 2011	Yes

No	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers	Open access
10	Medición de la Resiliencia Empresarial ante Eventos Disruptivos. Una Revisión del Estado del Arte	Raquel Sanchis, Raúl Poler	Ingeniería Industrial: Redes Innovadoras. Libro de Actas del XV Congreso de Ingeniería de Organización	Yearly	Grupo de Ingenieria de Organización. Universidad Politécnica de Cartagena	Cartagena, Spain	07/09/2011	104-113	ISBN: 978-84-694-7125-8	No
11	Supply Chain Network Design Optimization	Josefa Mula, Julien Maheut and Jose P. Garcia-Sabater	Journal of Marketing and Operations Management Research	Quaterly	Nova Science Publishers, Inc.	NY, USA	13/12/2011	189-205	ISNN: 1949-4912	No
12	Estrategias de Cumplimentación de Pedidos en el Sector de Fabricación de Bienes de Equipo. Un Estudio EmpíricoOrder fulfilment strategies in the manufacturing capital goods sector. An empirical study	Raquel Sanchis, Eduardo Saiz, Eduardo Castellano, Raul Poler	Revista Dirección y Organización	Four-monthly	CEPADE - Universidad Politécnica de Madrid	Madrid, Spain	30/12/2011	84-90	ISSN (On line): 2171-6323 - ISSN (Print): 1132-175X	Yes
13	La Matriz de Operaciones y Materiales y la Matriz de Operaciones y Recursos, un nuevo enfoque para resolver el problema GMOP basado en el concepto del Stroke	Julien Maheut, José P. García-Sabater	Revista Dirección y Organización	Four-monthly	CEPADE - Universidad Politécnica de Madrid	Madrid, Spain	30/12/2011	46-57	ISSN (On line): 2171-6323 - ISSN (Print): 1132-175X	Yes
14	Customer-driven supply chains: from glass pipelines to open innovation networks	Andrew Lyons, Adrian Coronado-Mondragon, Frank Piller, Raul Poler	Decision Engineering Series	NA	Springer	London, UK	05/01/2012	1-195	ISBN: 978-1-84628-875-3	No
15	Order Fulfilment Strategies in the Capital Goods Sector. An Empirical Research	Raquel Sanchis, Eduardo Saiz, Eduardo Castellano and Raul Poler	Industrial Engineering: Innovative Networks 2012, Part 5	Yearly	Springer	London, UK	28/02/2012	257-264	ISBN 978-1-4471-2320-0	No
16	A Supply Chain Operations Lot-Sizing and Scheduling Model with Alternative Operations	Julien Maheut, José Pedro Garcia-Sabater and Josefa Mula	Industrial Engineering: Innovative Networks 2012, Part 5	Yearly	Springer	London, UK	28/02/2012	309-316	ISBN 978-1-4471-2320-0	No
17	ColNet Platform: Resilient Collaborative Networks through Interoperability	Rubén Darío Franco, Rubén De Juan-Marín, Carlos Rodríguez-Merino and Jose Luis Martínez	Enterprise Interoperability V: Shaping Enterprise Interoperability in the Future Internet	Yearly	Springer	London, UK	22/03/2012	295-304	ISBN 978-1-4471-2818-2	No
18	Decision Support System Prototype for Supply Network Configuration Planning and Operations Scheduling in the Machine Tool Industry: a case study	Julien Maheut, Juan Manuel Besga, Jone Uribetxeberria	Liverpool 2012 EWG-DSS Workshop– Book of Abstracts	Yearly	University of Liverpool Management School, EWG-DSS, EURO	Liverpool, UK	12/04/2012	1-6	ISBN: 978-0-9561122-4-8	Yes

No	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers	Open access
19	Identificación de criterios para la asignación de estrategias de cumplimentación de pedidos en el sector de bienes de equipo. Aplicación a un fabricante de máquina-herramienta	Eduardo Saiz, Eduardo Castellano, Jone Uribetxebarria and Juan Manuel Besga	DYNA Ingeniería e Industria	Bimonthly	Federación de Asociaciones de Ingenieros Industriales de España	Bilbao, Spain	01/05/2012	316 - 325	ISSN: 0012-7361	No
20	The application of a knowledge-based reference framework to support the provision of requisite variety and customization across collaborative networks	Andrew Lyons, Lucy Everington, Jorge Hernandez, Dong Li, Roula Michaelides, Juneho Um	International Journal of Production Research	Monthly	Taylor & Francis		Expected: July, 2012		Accepted for publication	No
21	Digital Ecosystems Vision for Manufacturing Enterprise Interoperability	Rubén de Juan-Marín, V. Matoses and Rubén Darío Franco	Workshops Proceedings of the 6th International Conference on Interoperability for Enterprise Systems and Applications	Yearly			Expected: July, 2012		Accepted for publication	
22	Measuring Enterprise Resilience	Raquel Sanchis and Raul Poler	Workshops Proceedings of the 6th International Conference on Interoperability for Enterprise Systems and Applications	Yearly			Expected: July, 2012		Accepted for publication	
23	Identification and analysis of Disruptions: the first step to understand and measure Enterprise Resilience	Raquel Sanchis and Raul Poler	Proceedings of the 6th International Conference on Industrial Engineering and Industrial Management.	Yearly			Expected: July, 2012		Accepted for publication	
24	Leagility in Enterprise Networks Configuration of Capital Goods Sector	Raquel Sanchis, Eduardo Saiz, Eduardo Castellano, Raul Poler	Proceedings of the 6th International Conference on Industrial Engineering and Industrial Management.	Yearly			Expected: July, 2012		Accepted for publication	
25	Algorithm for complete enumeration based on a stroke graph to solve the supply network configuration and operations scheduling problem in a mass customization company: a case study	Julien Maheut and José Pedro Garcia-Sabater	Proceedings of the 6th International Conference on Industrial Engineering and Industrial Management.	Yearly			Expected: July, 2012		Accepted for publication	
26	Exchange Rates and Trade Tariffs Assessment for Strategic Decisions in Supply Networks Configuration	Eduardo Saiz and Jone Uribetxebarria	Proceedings of the 2012 Winter Simulation Conference (WSC), Berlin.	Yearly			Expected: December, 2012		Under review	

Table A2: List of dissemination activities

Nº	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
1	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	La Politécnica coordina un proyecto para mejorar la competitividad de las Redes de Empresas	06/05/2009	http://www.ruvid.org/	Scientific community (higher education, Research) - Medias	9000	Spain
2	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	UPV coordina proyecto mejorar competitividad de Redes Empresas Multiplanta	08/05/2009	http://www.adn.es	Scientific community (higher education, Research) - Industry - Medias	5000	Spain
3	Press releases	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	Kick-Off Meeting for the REMPLANET project in Valencia	11/05/2009	http://blog.tim.rwth-aachen.de/	Scientific community (higher education, Research) - Industry	5000	EU
4	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	Un proyecto europeo mejorará la competitividad y capacidad de adaptación al mercado de las empresas	15/05/2009	http://www.agenciasinc.es/	Scientific community (higher education, Research)	9000	Spain
5	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	Un proyecto europeo mejorará la competitividad y capacidad de adaptación al mercado de las empresas	19/05/2009	http://creainnova.bligoo.com/	Scientific community (higher education, Research) - Industry - Medias	9000	Spain
6	Articles published in the popular press	IKERLAN S.COOP.	Ikerlan-IK4 impulsa una investigación para optimizar las redes globales de suministro	01/07/2009	http://www.estrategia.net/	Industry	5000	Spain
7	Press releases	IKERLAN S.COOP.	Ikerlan-IK4 promueve una investigación para optimizar las redes de suministro globales	04/07/2009	http://www.europapress.es/	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	9000	Spain
8	Presentations	IKERLAN S.COOP.	Bimatec-Soraluce REMPLANET Pilot: Integration of a new product catalogue process generation and resilient supply network configurations for several customised demand scenarios	12/10/2009	Helsinki, Finland	Scientific community (higher education, Research) - Industry	450	EU
9	Presentations	UNIVERSIDAD POLITECNICA DE VALENCIA	REMPLANET: Resilient Multi-Plant Networks	12/10/2009	Helsinki, Finland	Scientific community (higher education, Research) - Industry	450	EU

Nº	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
10	Presentations	FESTO AG & CO KG	Managing customer interaction in innovation processes with value creation networks	12/10/2009	Helsinki, Finland	Scientific community (higher education, Research) - Industry	450	EU
11	Presentations	IKERLAN S.COOP.	Customised Order Fulfillment in a Machine Tool Supply Network	12/10/2009	Helsinki, Finland	Scientific community (higher education, Research) - Industry	450	EU
12	Flyers	INSTITUTO TECNOLOGICO DE INFORMATICA	Resilient Multi-Plant Networks: REMPLANET Project	31/10/2009	http://www.remplanet.eu/web/project/REMPLANET_Leaflet.pdf/view	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	9000	EU
13	Press releases	IKERLAN S.COOP.	Un proyecto europeo estratégico reúne a expertos de primer nivel	22/01/2010	http://www.diariovasco.com/	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	9000	Spain
14	Articles published in the popular press	IKERLAN S.COOP.	EXPERTOS DE PRIMER NIVEL SE REÚNEN EN IKERLAN-IK4 PARA AVANZAR EN UN PROYECTO EUROPEO ESTRATÉGICO	01/02/2010	http://www.ikerlan.es/	Scientific community (higher education, Research) - Industry	3000	Spain
15	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	La UPV coordina el proyecto europeo Remplanet	15/02/2010	http://www.diariocriticocv.com/	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	3000	Spain
16	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	El Campus de Alcoy de la UPV coordina el proyecto europeo Remplanet	16/02/2010	http://www.pagina66.com/	Civil society	1000	Spain
17	Publication	IKERLAN S.COOP.	IKERLAN-IK4 logra un proyecto europeo para innovar y optimizar el rendimiento de redes de suministro	01/03/2010	http://www.mondragon-corporation.com/	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	5000	Spain

Nº	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
18	Presentations	IKERLAN S.COOP.	Toolkits for developing adapt-to-order strategies in mass customization scenarios	21/06/2010	Lugano, Switzerland	Scientific community (higher education, Research) - Industry - Civil society - Policy makers	350	EU
19	Presentations	THE UNIVERSITY OF LIVERPOOL	Strategic planning of collaborative supply network in the context of mass customization	21/06/2010	Lugano, Switzerland	Scientific community (higher education, Research) - Industry - Civil society - Policy makers	350	EU
20	Press releases	Centro di Ricerca e Innovazione tecnologica srl	Mass Customisation e Reti di Impresa: la promozione del CRIT	29/09/2010	http://blog.crit-research.it/	Industry	3000	Italy
21	Press releases	Centro di Ricerca e Innovazione tecnologica srl	Ceramiche fotovoltaiche e sistemi gestionali avanzati	03/11/2010	http://www.technologyreview.it/	Industry	3000	Italy
22	Press releases	INSTITUTO TECNOLOGICO DE INFORMATICA	ITI acoge el quinto Workshop del Proyecto Europeo REMPLANET	26/01/2011	https://observatorio.iti.upv.es/ and	Industry	3000	Spain
23	Flyers	INSTITUTO TECNOLOGICO DE INFORMATICA	Resilient Multi-Plant Networks: REMPLANET Project	29/03/2011	http://www.remplanet.eu/web/project/REMPLANET_Leaflet-2011.pdf/view	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	9000	EU
24	Presentations	UNIVERSIDAD POLITECNICA DE VALENCIA	Resilient Multi-Plant Networks: REMPLANET	29/03/2011	Bilbao, Spain	Scientific community (higher education, Research) - Industry	150	EU
25	Presentations	UNIVERSIDAD POLITECNICA DE VALENCIA	A mathematical programming model for Supply Chain Operations Scheduling in distributed plants	29/03/2011	Bilbao, Spain	Scientific community (higher education, Research) - Industry	150	EU
26	Workshops	THE UNIVERSITY OF LIVERPOOL	Conceptualising the Mass Customisation Decision-Making Process in Collaborative Supply Chains	23/06/2011	London, UK	Scientific community (higher education, Research) - Industry	100	EU
27	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	Reconocidos dos investigadores de la Politécnica	26/09/2011	http://www.ruvid.org; http://www.presspeople.com and http://www.pagina66.com	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	5000	Spain

Nº	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
28	Press releases	UNIVERSIDAD POLITECNICA DE VALENCIA	Investigadores del Campus de Alcoy de la UPV, galardonados por sus investigaciones sobre la capacida	26/09/2011	http://riunet.upv.es/	Scientific community (higher education, Research)	2000	Spain
29	Articles published in the popular press	THE UNIVERSITY OF LIVERPOOL	Spoilt for choice	20/10/2011	http://www.liv.ac.uk/	Scientific community (higher education, Research) - Industry - Civil society - Policy makers - Medias	5000	EU

Section B (Public)
Part B1

Currently some applications for registering some of the exploitable results of the REMPLANET Project are being studied. However, there is not still a final decision about this issue.

B1: List of applications for patents, trademarks, registered designs, etc.					
Type of IP Rights:	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
It is still being studied and analized.					

B2: List of REMPLANET exploitable foreground

Type of exploitable foreground	Exploitable Foreground (description)	Confi-dential	Foreseen embargo date	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable for commercial use or any other use	Patents or other IPR exploitation (licenses)	Owner & Other Beneficiary(s) involved
Commercial exploitation of R&D results	Mass Customization Knowledge Network (MCKN): MCKN is an online portal for collaboration of stakeholders in the field of Mass Customization. The platform offers an easy introduction into the topic of mass customization / customer co-creation. Furthermore, the portal has a broad repository of knowledge and e-learning offers.	No		Two options: Commercial Exploitation: Sustainable revenue streams have to be generated with the help of new functionalities. A commercial exploitation requires a larger, active community. More investments in marketing and social media channel integration are needed. Not Commercial Exploitation: In this case, the aspect of building an active community around the MCKN platform is most important.	Companies belonging to any sector interested in the field of mass customization / customer co-creation	Date of result achievement: 04/2012. Time to market: 04/2012.	NA	IKERLAN: B F UO; RWTH: B F MULO; SUPSI: F UO; BIMATEC: U; FESTO: B F MULO; ITI: U; CRIT: B U
General advance-ment of knowledge	The Idea Management Process is a management procedure that aims at supporting MC companies in integrating customer ideas and innovations into the business process. For this purpose, a generic stage gate process was designed and a demonstrator was provided, which supports practitioners in matching the respective process steps of the Idea Management Process with suitable methods and tools. The IMP is supposed to evaluate every customer's idea in the same way, so that the idea evaluation becomes fair and transparent for customers.	No		This result could be exploited via consulting services, as the generic process has to be adapted to the specific company context before it can be implemented. Thus, each company, which plans to implement the IMP, needs to be analysed and supported during the implementation process.	Mass customizing enterprises	Date of result achievement: 04/2012. Time to market: 04/2012. Some improvements will be needed before the IMP can be exploited. Furthermore, the process is designed as a generic management tool. Subsequently, the process needs to be adapted for the implementation in a specific company's context.	NA	IKERLAN: B F U; RWTH: B F MULO; BIMATEC: U; FESTO: F MULO; ITI: U

Type of exploitable foreground	Exploitable Foreground (description)	Confi-dential	Foreseen embargo date	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable for commercial use or any other use	Patents or other IPR exploitation (licenses)	Owner & Other Beneficiary(s) involved
General advancement of knowledge	The Operational REMPLANET Model (ORM) aims to represent and integrate the main concepts and relationships to be considered in the strategic design of supply networks when they have to deal with demands of personalized products. The strategic character of this kind of decisions is closely linked to the corporate strategy. Involved decisions guide supply network policies from a design perspective and are made typically over a longer time horizon. This is the reason why the model provides approximate solutions for the supply network configuration.	No		The main exploitation vehicle is the consultancy service. Different consultants could be certified as auditors after completing a training curriculum (beginners-intermediary-advanced levels). Ordinary training services like online courses and videos, webinars, workshops, etc, will be priced according to market standards.	Manufactures of machinery and equipment	Date of result achievement: 04/2012. Time to market: 08/2012.	NA	UPVLC: B F UO; IKERLAN: B F MUO; RWTH: F UO; ULIV: B; BIMATEC : U; VL-idrodinamica : B U; ITI: U; CRIT: U
General advancement of knowledge	The workbook provides a practical approach to apply the REMPLANET Integrated framework. The approach considers the level of product variety and customisation of a manufacturer and how its network, strategy and operations can best be configured to support this level of product variety and customisation. The workbook can be used to support manufacturing companies in establishing which customisation scenario they are operating in using the diagnostic tool and model answers. Moreover, it allows companies to establish where their current practices could potentially be improved and enables a company and its network to move from one scenario to another.	No		The IRF will be used as a consultancy tool by members of the REMPLANET consortium. ULIV already has plans in place to undertake this type of consultancy as part of a new project they are undertaking called Collaborate to Innovate.	Any manufacturing company in establishing which customisation scenario they are operating in.	Date of result achievement: 01/2012. Time to market: 12/2012.	NA	IKERLAN: F U; RWTH: F UO; ULIV: B F MLO; SUPSI: U; BIMATEC: U; KING & FOWLER: U; ITI: U; CRIT: U
Commercial exploitation of R&D results	The Simulation and Optimization computational decision support tool has been developed to re-design and innovate a multi-plant network architectural and managerial design, by conducting realistic what-if simulations/optimizations of the alignment between the triad products'-processes'-global supply networks' configurations, with regard to the characteristics of product orders. The DSS allows to evaluate alternative flexible multi-plant network dynamic structures, strategies and policies, and to optimize the response to customized market demands at the lowest possible cost and time.	No		Professional consulting service tool: The DSS as a technological support mean for assessing enterprises with regard to the nine products'-processes'-global supply networks' configurations strategic and tactical interrelated issues.	Machinery and equipment manufacturing industry	Date of result achievement: 04/2012. Time to market: 08/2012 as a fully functional prototype; 04/2013 as a commercial tool.	NA	UPVLC: B F UO; IKERLAN: B F MULO; SUPSI: O; BIMATEC: F U; GHEPI: F U; CRIT: U

Type of exploitable foreground	Exploitable Foreground (description)	Confi-dential	Foreseen embargo date	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable for commercial use or any other use	Patents or other IPR exploitation (licenses)	Owner & Other Beneficiary(s) involved
Commercial exploitation of R&D results	ColNet platform is aimed at providing a web-based environment where collaborative networks may be created and deployed onto a truly operational environment supported by a Business Process Management System (BPMS) for process execution. ColNet combines service orientation and business process management capabilities in order to support operational requirements of Resilient Networks. The platform has been designed mainly for operational purposes, supporting: a) the process of configuring a suitable network for managing orders coming from outside the network and, b) the coordination of the different participants involved in the production process of each accepted order. One of its main purposes is to address the characterization and analysis of companies and networks that decide to be involved in Mass Customization scenarios.	No		ColNet will be commercialised in two complementary ways. A license fee for network managers and a freemium model for nodes, giving them a basic functionality for free and advanced features by a monthly fee.	Any company interested in an ICT Platform for Collaborative Business Processes	Date of result achievement: 3/2012. Time to market: 12/2012.	NA	UPVLC: B F MULO; VL-idrodinamica: F U; GHEPI: F U; ITI: B F MULO; CRIT: MUO

2.1. MCKN

Purpose

MCKN is an online portal for collaboration of stakeholders in the field of Mass Customization. The platform offers an easy introduction into the topic of mass customization / customer co-creation. Furthermore, the portal has a broad repository of knowledge and e-learning offers.

Figure 15: MCKN Logo

Moreover, the portal connects different stakeholders from different fields. Academia, manufacturers of individualized products and providers of enabling services for mass customization are brought together to form a community that will communicate and exchange information through the platform.

Finally, it fosters knowledge exchange between practitioners. Problems on implementing or executing mass customization can be posted for open discussion with the help of forums or mailing lists; other stakeholders can then answer these "questions" and share their experiences.

How the foreground might be exploited, when and by whom

Two proposals have been suggested to exploit such a result:

Exploitation strategy: Commercial Exploitation

When considering a commercial exploitation of the platform, sustainable revenue streams have to be generated. The D1.2 surveys have shown that users will not be willing to pay a membership or download fee. Therefore, revenues could only be realized with the help of new functionalities (premium membership, yellow pages, sponsoring, advertising, etc.). However, this approach bears the danger of hindering the community building process. At the same time, a commercial exploitation absolutely requires a larger, active community. Therefore, more investments in marketing and social media channel integration have to be made.

Exploitation strategy: Not commercial use

In this case, the aspect of building an active community around the MCKN platform is most important. Subsequently, it would not be necessary to invest in new functionalities that generate revenues at this point of time. Possible new investments would focus on the integration of social media channels (Facebook, LinkedIn, Twitter) in order to increase the platform's availability.

Date of result achievement: 04/2012.

Time to market: 04/2012.

Depending on the two strategies suggested, there are two types of IPR & exploitation claims considering different partners involved and interested in such a result:

Table 14: Commercial Exploitation Strategy for MCKN (who).

Partners	IPR & exploitation claims	Partner contribution (importance of B and F)	Partner Commitment (participation to costs)	Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)
IKERLAN	**B F UO**	**N/A**	N/A	N/A
RWTH	**B F MULO**	**B (Very High)** **F (Very High)**	Cost % according to activity sharing (EU project dissemination)	Editing, content management, administration
SUPSI	**F UO**	**F (Medium)**	Cost % according to activity sharing (EU project dissemination)	User and developer if MCKN used as entry point of MC projects
BIMATEC	**U**	**N/A**	N/A	User
FESTO	**B F MULO**	**N/A**	N/A	N/A
ITI	**U**	**N/A**	N/A	Use the platform in order to obtain information. Moreover, also possible collaboration with RWTH for further MCKN developments.
CRIT	**B U**	**B (Low)**	2 man months	Information on the platform could be used in future technical assistance projects in favour of CRIT clients who want to implement MC

Table 15: Not Commercial Exploitation Strategy for MCKN (who).

Partners	IPR & exploitation claims	Partner contribution (importance of B and F)	Partner Commitment (participation to costs)	Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)
IKERLAN	**B F UO**	**B (Medium)** **F (Medium)**	None	MCKN platform as an user (free or premium); upload documents and promote Ikerlan's MC products&services
RWTH	**B F MULO**	**B (Very High)** **F (Very High)**	Cost % according to activity sharing (EU project dissemination)	Editing, content management, administration.
SUPSI	**F UO**	**F (Medium)**	Cost % according to activity sharing (EU project dissemination)	User and developer if MCKN used as entry point of MC projects.
BIMATEC	**U**	**N/A**	N/A	User
FESTO	**B F MULO**	**N/A**	N/A	N/A
ITI	**U**	**N/A**	N/A	User
CRIT	**B U**	**B (Low)**	2 man months	Information on the platform could be used for internal training purposes.

IPR exploitable measures taken or intended

Market size and trends are: there is no accurate estimation of market size, but the following indicators can be provided:

- Conferences such as the bi-annual MCPC conference have app. 250 – 500 attendees from academia.
- There are several databases on MC configurators. One of the biggest databases lists more than 500 companies that offer MC products.
- Previous experiences in the field of MC allow to identify and contact around 100 providers of secondary services (consultants, software providers, etc.).

From these estimates, the following worst and best cases are considered:

Worst case: 1 registered person from 5 % of the companies → 50 active members.

Best case: 3 registered persons from 50% of the companies → 1500 active members.

Ranking against competing products in terms of price / performance is: there is currently no comparable website available.

Competitors are: there is no comparable website available, there are no competitors at this point.

Eventual protection of the result: the software features used are mostly Open Source components. Thus, the value of the platform results solely from the uploaded contents and the interaction of registered users. Whenever users upload content to the platform, they will be asked to determine a licensing model according to the "creative commons licences" for their content. Therefore, it is not necessary / possible to protect this value from our side.

Furthermore, the longer the platform will be in use, the more it will build up market entry barriers. This development is due to network effects.

Approximate price range:

Membership fee: it should not be raised in order to reach the needed, critical number of active members

- Fee for being listed as provider of secondary services: To Be Determined.
- Commission for intermediation: depends on individual case.
- Possible revenues from advertisement: depends on individual case.

Further research necessary, if any

The further steps related to the Commercial Exploitation strategy of the MCKN are detailed as follows from a costs viewpoint:

Costs

- ***Investments:*** 30€/h*40h
    - Marketing: To be determined according to the targeted markets
- ***Use:***
    - Editor / Community Manager: 15.000€/year (researcher, 19h/week) - 50.000€/year (full time professional)
    - Administration: 5.000€/year (student assistant 10h/week) (probably a second administrator will be needed)
    - Hosting: 1.000€/year

Whereas the further steps related to the Not Commercial strategy of the MCKN from a costs point of view is the following one:

Costs

- ***Investments:***
    - New features: 1.200€/each (30€/h*40h)
- ***Use:***
    - Administration: 5.000€/year (student assistant 10h/week) (probably a second administrator/editor will be needed)
    - Hosting: 1.000€/year

<u>Potential/expected impact (quantify where possible)</u>

Innovations of this result are:

- This exploitable result is not using any new technology.
- The innovation results from the support to collaboration and collection of contents on the platform.
- The platform will provide a dynamic knowledge repository in the field of mass customization, which will be available at the end of the project.

Benefits to the customers: Three different benefit groups can be identified:

- Providers of content could benefit from feedback, ratings and comments of other users.
- Consumers of content benefit from the platform because it enables them to access information and respective experts.

- Providers of secondary services could be consultants or service providers who are specialized in supporting mass customization operations with their offerings (e.g. Programming of a configurator). These users could have an interest in the REMPLANET platform in order to get in touch with potential customers.

2.2. IMP

Purpose

The Idea Management Process is a management procedure that aims at supporting MC companies in integrating customer ideas and innovations into the business process. For this purpose, a generic stage gate process was designed and a demonstrator was provided, which supports practitioners in matching the respective process steps of the Idea Management Process with suitable methods and tools. The IMP is supposed to evaluate every customer's idea in the same way, so that the idea evaluation becomes fair and transparent for customers.

This result could be exploited via consulting services, as the generic process has to be adapted to the specific company context before it can be implemented. Thus, each company, which plans to implement the IMP, needs to be analysed and supported during the implementation process.

The IMP offers the necessary link between customers and mass customizing companies. The IMP targets the integration of customer ideas and innovations into the new product development process of a company. It is supposed to be an efficient and functional process, with which it is possible to evaluate a customer's idea in every facet and from different points of view that is important for the customer and for the company. As this process has to be suitable for all kinds of customer's inputs and different industry settings, the process was designed to be as broad and generic as possible.

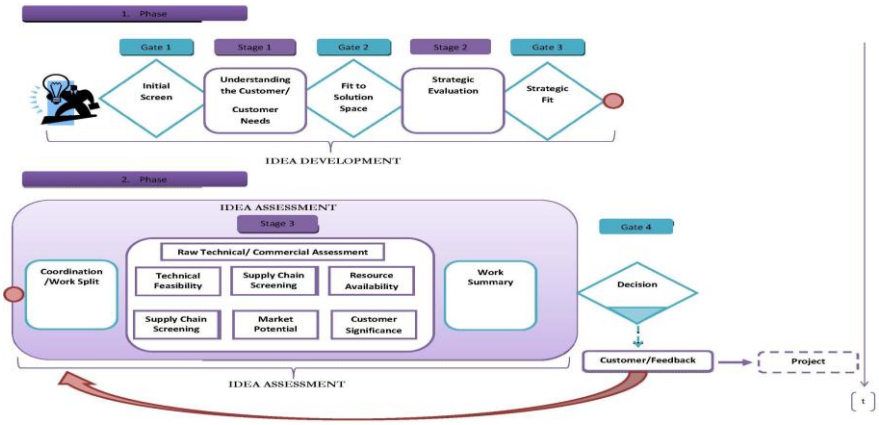

Figure 16: IMP

How the foreground might be exploited, when and by whom

This result could be exploited via consulting services, as the generic process has to be adapted to the specific company context before it can be implemented. Thus, each

company, which plans to implement the IMP, needs to be analysed and supported during the implementation process.

Date of result achievement: 04/2012. The generic process and a list of management tools and methods are already available as a result of WP1. With the end of the project, the piloting of the process will be completed and potential improvements could be integrated.

Time to market: 04/2012. Some improvements will be needed before the IMP can be exploited. Furthermore, the process is designed as a generic management tool. Subsequently, the process needs to be adapted for the implementation in a specific company's context.

Table 16 shows the IPR & exploitation claims of the different parties involved and interested in the exploitation of such a result:

Table 16: MC consulting services for IMP (who).

Partners	IPR & exploitation claims	Partner contribution (importance of B and F)	Partner Commitment (participation to costs)	Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)
IKERLAN	**B F U**	**B(M) F(M)**	None	User
RWTH	**B F MULO**	**Very High**	No additional commitment beyond the planned effort within the project	It will be used for consulting tasks in order to support MC businesses in becoming more open for customer input, especially in terms of new product development.
BIMATEC	**U**		None	As a user
FESTO	**F MULO**	**Medium**	Not necessary	Not necessary
ITI	**U**	**--**	**None**	**User**

IPR exploitable measures taken or intended

Market size and trends are:

The most likely business model for this result is the use in consulting mass customizing enterprises.

As estimated above, there are more than 500 existing MC enterprises.

Ranking against competing products in terms of price / performance is: this result will be applicable as one aspect of a consulting service for MC businesses only. Therefore it is rather difficult to identify "competing products".

Competitors are: existing MC consultancies.

Further research necessary, if any

Possible costs for improvement / refinement before use (app. 3 MM)

Potential/expected impact (quantify where possible)

Innovations of this result are: within the methodologies and procedures.

- The result is a generic managerial procedure that helps mass customizing companies to make a fair and transparent evaluation of customer ideas and innovations.

- The innovation content of the result lies within the formal description of a process and the matching of existing management tools and methods with the respective process steps.

Customers of the result:

- Validation has been achieved through a FESTO-internal pilot.

- As soon as the result reaches a mature state, it could be offered to all mass customizing companies.

Benefits to the customers:

- Fair and transparent procedure for the integration of customer ideas and innovations.

- The process could act as a decision aid and help to identify the “right” customer ideas.

2.3. ORM

Purpose

The Operational REMPLANET Model (ORM) aims to represent and integrate the main concepts and relationships to be considered in the strategic design of supply networks when they have to deal with demands of personalized products. The strategic character of this kind of decisions is closely linked to the corporate strategy. Involved decisions guide supply network policies from a design perspective and are made typically over a longer time horizon. This is the reason why the model provides approximate solutions for the supply network configuration.

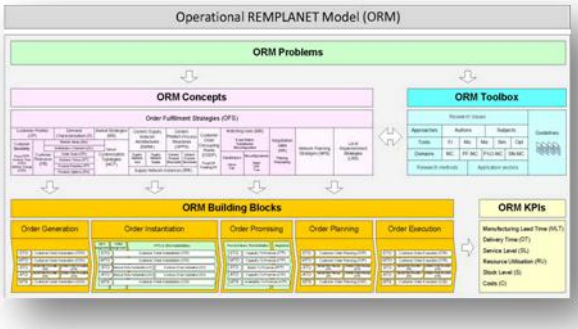

Figure 17: ORM

The ORM includes a conceptual model, toolbox, and guidelines, for facilitating the alignment between products'-processes'-supply networks' configurations in order to respond to customized market demands at the lowest possible cost and time.

How the foreground might be exploited, when and by whom

The main exploitation vehicle is the consultancy service. The fee for the consulting service will vary according to each consulting firm, e.g. 100€/hour/consultant. An ordinary consulting service could imply 5 sessions of two consultants = around 10.000€/service.

Different consultants could be certified as auditors after completing a training curriculum (beginners-intermediary-advanced levels). For each level, an estimated fee for a 2 day course could be around 2.500€ per person.

Ordinary training services like online courses and videos, webinars, workshops, etc, will be priced according to market standards.

Date of result achievement: 04/2012.

Time to market: 08/2012.

Table 17 shows the IPR & exploitation claims of the different parties involved and interested in the exploitation of such a result:

Table 17: Technical consulting & training services for ORM (who).

Partners	**IPR & exploitation claims**	**Partner contribution (importance of B and F)**	**Partner Commitment (participation to costs)**	**Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)**
UPVLC	**B F UO**	**B (Medium)** **F (Medium)**	UPVLC is committed to invest 2MM after the project in order to launch the exploitation of ORM	UPVLC is interested in using ORM: - to connect it with the ColNet tool. - to provide in house training to companies - to provide consultancy to companies.
IKERLAN	**B F MUO**	**B (Very High)** **F (Very High)**	IKERLAN is committed. 6 MM (i.e. private funding)	IKERLAN claims a leading role in the ORM exploitation since it is a result of previous and future research efforts. IKERLAN will be responsible of main decisions taken concerning ORM's exploitation strategy, licensing policies, and functional capabilities.
RWTH	**F UO**	**Medium**	None	Result could be used in the context of consulting services, but not as a stand-alone product.
ULIV	**B**	**Medium**	N/A	N/A
BIMATEC	**U**		None	As a user

VL-idrodinamica	**B U**	**B (High)**	5,8 man/month	VL Idrodinamica has a background role in the ORM web Tool exploitation strategy. The SME contributed in the improvement of the tool in terms of evaluation and suggestions for the main parts/blocks organization.
ITI	**U***	F (Medium)	N/A	Use.
CRIT	**U**	Coordinated and reported industrial partners validation		Use in company consulting.

IPR exploitable measures taken or intended

Approximate price range: As stated above, the main exploitation vehicle is the consultancy services. The fee for the consulting service will vary according to each consulting firm, e.g. 100€/hour/consultant. An ordinary consulting service could imply 5 sessions of two consultants = around 10.000€/service. Also, different consultants could be certified as auditors after completing a training curriculum (beginners-intermediary-advanced levels). For each level, an estimated fee for a 2 day course could be around 2.500€ per person. Ordinary training services like online courses and videos, webinars, workshops, etc, will be priced according to market standards.

Market size and trends are: as stated in section B3-Impact of REMPLANET Annex I (REMPLANET-Annex I, 2009), manufacture of machinery and equipment was the main activity of 162.256 enterprises in the EU-25 in 2001. The largest contributor to EU-25 value added in the machinery and equipment manufacturing industry was Germany (37'4%). Italy's sector followed with a share of about half as much (16'9%). Share in the UK was around 10'1% and 4'8% in the case of Spain. Together the sectors in these 4 Member States accounted for 70% of total EU-25 value added in 2002. Enterprises with this as their main activity generated a turnover of 502 billion Euros.

Ranking against competing products in terms of price / performance is: in terms of performance, it will rank in the top positions. In terms of price, as the main exploitation vehicle already considered is the consultancy one, it will depend on the service fee applied.

Competitors are: Currently no management consulting firm is offering such kind of service.

Eventual protection of the result: The result would be protected through COPYRIGHT before its launch to the market and afterwards it could also be protected in some particular cases through LICENCE AGREEMENTS.

Further research necessary, if any

Cost for further development of the product: The amount of work required after the end of the project to ensure the exploitation has been estimated in 6MM = 60.000€.

- **Investments:** Professional final layout design plus COPYRIGHT/LICENCE AGREEMENTS issues = 3MM or about 30.000€

- **Use:** Training curriculum (beginners-intermediary-advanced levels) design, marketing and launch = 3MM or about 30.000€

Potential/expected impact (quantify where possible)

Innovations of this result are:

- New knowledge, models and procedures to deal with the unsolved existing problem: analysis in an integrated way of product family structures - processes and operations management strategies and supply network configuration with regard to the characteristics of product orders in mass customisation scenarios. Structured content in the form of a Toolbox and guidelines that support the development stages of the ORM.

- Consulting service based on the ORM (problems to be solved, concepts involved in the solution, model's building blocks and data involved in the solution, support tools guidelines from the toolbox) to provide guidance on future courses of action of the companies.

Customers of the result: enterprises that belong to sectors with medium/high degree of customized orders; metal production, machinery and equipment, machinery and computers, medical precision and optical instruments, motor vehicles, trailers and semi-trailers and transport equipment. Specially, enterprises formed by global multi-plant networks.

Benefits to the customers: reference model to structure their Mass Customization (MC) problems and a list of tools that can be used to solve a specific problem and/or technical research issues.

2.4. RW

Purpose

The workbook provides a practical approach to apply the REMPLANET Integrated framework. The approach considers the level of product variety and customisation of a manufacturer and how its network, strategy and operations can best be configured to support this level of product variety and customisation.

The workbook can be used to support manufacturing companies in establishing which customisation scenario they are operating in using the diagnostic tool and model answers. Moreover, it allows companies to establish where their current practices could potentially be improved and enables a company and its network to move from one scenario to another.

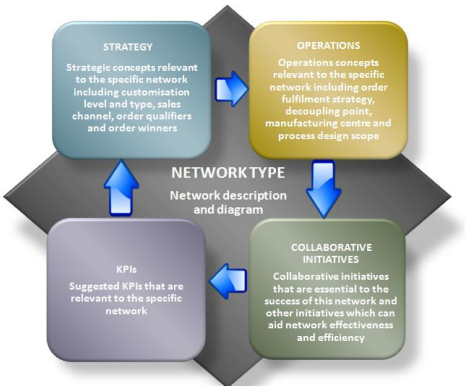

Figure 18: RW

How the foreground might be exploited, when and by whom

The RW will be used as a consultancy tool by members of the REMPLANET consortium. Using the diagnostic provided in the workbook it will be possible to advise SMEs, offering a high variety of products and/or customised products, which of the network types they fall into. Having established this, it will be possible to compare their network, strategy and operations to the 'ideal network'. After this, it will be possible for the consulting partner to identify potential improvements that could be made including the implementation of collaborative initiatives that could improve the performance of the network. The consulting partner will also be able to suggest KPIs that can be used to monitor the performance of the network.

ULIV already has plans in place to undertake this type of consultancy as part of a new project they are undertaking called Collaborate to Innovate.

Date of result achievement: 01/2012.

Time to market: 12/2012.

Table 18 shows the IPR & exploitation claims of the different parties involved and interested in the exploitation of such a result:

Table 18: Technical consulting & training services for RW (who).

Partners	IPR & exploitation claims	Partner contribution (importance of B and F)	Partner Commitment (participation to costs)	Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)
IKERLAN	F U	F (Medium)	None	User
RWTH	F UO	F (Low)	None	It is conceivable that the workbook could be used in the context of consulting tasks.
ULIV	B F MLO	B (Very High) F (Very High)	ULIV is committed to covering the cost of printing the guides for its usage by ULIV as a consultancy tool	ULIV will be responsible of main decisions taken concerning the IRF exploitation strategy. This will take the form of usage of the workbook associated with this framework as a consultancy tool.
SUPSI	U		none	As a user, mainly for theoretical applications.
BIMATEC	U		none	As a user.

KING & FOWLER	U		N/A	King and Fowler may have the opportunity to encourage other companies in their sector/ that they work with to make use of the consultancy service provided around this result.
ITI	U	--	N/A	As a user.
CRIT	U	Supported industrial partners in validation		Use in private consulting.

IPR exploitable measures taken or intended

Approximate price range: Cost of work book plus potential consultancy fee to the University or the consultant for guidance.

Market size and trends are: the market size is potentially high, since this workbook could be applied to any manufacturing company in establishing which customisation scenario they are operating in, as well as considering the willingness of various consortium members to use it. In order to fully exploit the RW it is highly recommendable the support of the University of Liverpool, to guide enterprises in its use and/or to train consultants interested to using it in their activities. In the framework of the "Collaborate to Innovate" (C2I) project (£910k, May 2012 – April 2015), University of Liverpool and Agile Business Solutions will use the RW as a guide for the introduction of appropriate product and process innovations in order to help 64 high-growth SMEs in a minimum of 8 networks.

Further research necessary, if any

At the end of the project, this workbook will be complete and the only costs would be printing and binding costs of around £5 (6€) per workbook.

Potential/expected impact (quantify where possible)

Innovations of this result are: a workbook to help companies with high variety products and customised products to align and optimise their strategy, operations and networks. This workbook is based on and extends existing knowledge on manufacturing strategy, operations, network structure, collaborative initiatives and KPIs. The workbook allows companies to link network structure, operations and strategy. It helps companies to implement collaborative initiatives essential/useful to make their network structure, strategy and operations more efficient.

The workbook guides companies to identify their network/strategy/operations and consider how these should fit together and how changes to these could align and improve their business. It then guides the user to identify KPI's that are most appropriate for measuring performance for this network, strategy and operations.

Workbooks considering linking operations and strategy are already in existence. The innovation content of this result is the extension of this to focus on manufacturers where customisation and high variety play an important part in their business and the extension of the model to consider network type, collaborative initiatives and KPI's.

Customers of the result: primarily Small and Medium-sized Enterprises (SMEs) working in manufacturing networks looking to take advantage of collaborative alliances in order to more effectively manage the process of product customisation and variety management.

Benefits to the customers: This tool allows the customer to better align strategy and operations so it has a very wide potential remit for changing processes and activities. The main benefit is the identification of relevant collaborative initiatives which once implemented can allow the company to improve: partnerships within the supply chain, efficiency in their own processes and the interactions within the supply chain, all of which can then help them improve the efficiency with which they deal with high variety/ customisation of their products.

2.5. DSS

Purpose

The Simulation and Optimization computational decision support tool has been developed to re-design and innovate a multi-plant network architectural and managerial design, by conducting realistic what-if simulations/optimizations of the alignment between the triad products'-processes'-global supply networks' configurations, with regard to the characteristics of product orders. The DSS allows to evaluate alternative flexible multi-plant network dynamic structures, strategies and policies, and to optimize the response to customized market demands at the lowest possible cost and time.

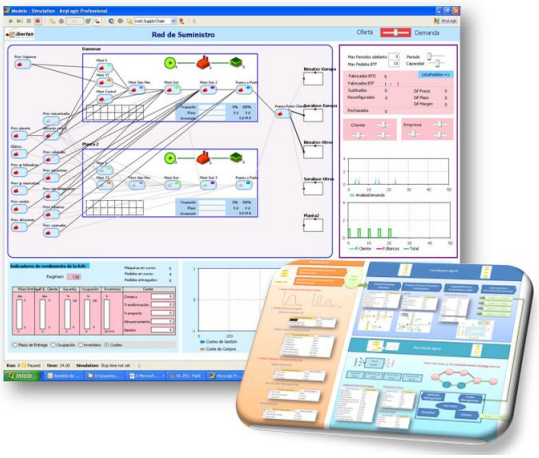

Figure 19: DSS

How the foreground might be exploited, when and by whom

Professional consulting service support tool: The DSS as a technological support mean for assessing enterprises with regard to the nine products'-processes'-global supply networks' configurations strategic and tactical interrelated issues. The consulting service fee for each of the nine problems-issues stated is about 60.000€/consulting service (i.e. about 50 days project for two consultants - 100€/hour/consultant).

Date of result achievement: 04/2012.

Time to market: 08/2012 as a fully functional prototype; 04/2013 as a commercial tool.

Table 19 shows the IPR & exploitation claims of the different parties involved and interested in the exploitation of such a result:

Table 19: Technical consulting & training services for DSS (who).

Partners	**IPR & exploitation claims**	**Partner contribution (importance of B and F)**	**Partner Commitment (participation to costs)**	**Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)**
UPVLC	**B F UO**	**B (Very High)** **F (High)**	UPVLC is committed to invest 4MM in order to launch the exploitation of DSS	UPVLC is interested in using DSS : - to provide in house training to companies. - to provide consultancy to companies.
IKERLAN	**B F MULO**	**B (Very High)** **F (Very High)**	IKERLAN is fully committed. 12MM (i.e. institutional and private funding)	IKERLAN claims a leading role in the DSS exploitation since it is a result of previous and future research efforts. IKERLAN will be responsible of main decisions taken concerning DSS's exploitation strategy, licensing policies, and functional capabilities.
RWTH	-	N/A	N/A	N/A
SUPSI	**O**		none	As a user. Moreover, SUPSI is available to support IKERLAN in the exploitation of the DSS if there are interested companies that cannot be directly reached by IKERLAN.
BIMATEC	**F U**	**F (High)**	none	As a user
GHEPI	**F U**	**F (High)**	none	As a user
CRIT	**U**	Supported validation by industrial partners		Difficult to use in consulting as we have no direct competence in CRIT – possible involvement of SUPSI/IKERLAN in projects with companies interested.

IPR exploitable measures taken or intended

Approximate price range: As stated above, the DSS exploitation vehicle is as a professional consulting service support tool. The consulting service fee for each of the nine problems-issues that the DSS deals with is about 60.000€/consulting service (i.e. about 50 days project for two consultants - 100€/hour/consultant).

Market size and trends are: Manufacture of machinery and equipment was the main activity of 162.256 enterprises in the EU-25 in 2001. The largest contributor to EU-25 value added in the machinery and equipment manufacturing industry was Germany (37,4%). Italy's sector

followed with a share of about half as much (16,9%). Share in the UK was around 10,1% and 4,8% in the case of Spain. Together the sectors in these 4 Member States accounted for 70% of total EU-25 value added in 2002. Enterprises with this as their main activity generated a turnover of 502 billion Euros.

Competitors are: Management & IT consultancy firms. The competitive advantage (expertise) we begin with could be significantly reduced in about 5 years.

Eventual protection of the result: The result would be protected through COPYRIGHT before its launch to the market.

Further research necessary, if any

DSS commercial tool: Professional final layout design (i.e. user experience designer, graphic designers, software designer) plus COPYRIGHT issues = 10MM or about 100.000€; Marketing actions = 2MM or about 20.000€

Potential/expected impact (quantify where possible)

Innovations of this result are: The DSS is designed to deal in a quantitative manner with the following nine strategic and tactical interrelated issues:

1. Appraising demand scenarios for the current supply network

2. Designing and configuring supply networks to provide customized products

3. Evaluating alternatives for a new site location

4. Setting strategies to deal with different customer behaviours resulting from market changes

5. Setting criteria to balance the supply network capacity to meet demand variations

6. Establishing inventories' position and replenishment policies in the supply network

7. Defining the planning period and number of planning points of the supply network

8. Setting order fulfilment strategies for each family product

9. Identifying and positioning the type of customer order decoupling point (CODP) in the supply network

Customers of the result: Global multi-plant network companies and SMEs that belong to sectors with medium/high degree of customized orders, e.g. metal production, machinery and equipment, machinery and computers, medical precision and optical instruments, motor vehicles, trailers and semi-trailers and transport equipment, that need to optimize the response to customized market demands at the lowest possible cost and time.

Benefits to the customers: The DSS allows conducting several what-if simulation / optimization scenarios. For instance, based on different network conditions (e.g. capacity constraints, suppliers lead times, internal processes lead times, inventory levels, means of transport, supplier location, manufacturing units, distribution centres...), and customised

demand scenarios, alternative/optimal global multi-plant network configurations, strategies and policies, can be analyzed/identified in terms of response performance (cost and time).

2.6. ColNet

Purpose

ColNet platform is aimed at providing a web-based environment where collaborative networks may be created and deployed onto a truly operational environment supported by a Business Process Management System (BPMS) for process execution.

ColNet combines service orientation and business process management capabilities in order to support operational requirements of Resilient Networks. The platform has been designed mainly for operational purposes, supporting: a) the process of configuring a suitable network for managing orders coming from outside the network and, b) the coordination of the different participants involved in the production process of each accepted order. One of its main purposes is to address the characterization and analysis of companies and networks that decide to be involved in Mass Customization scenarios.

Figure 20: ColNet

How the foreground might be exploited, when and by whom

Licensing & usage

ColNet will be offered in two different licensing modalities that will be analysed in more detail when preparing the business plan.

First model is aimed at supporting collaborative networks already operating but lacking of a centralised ICT platform in co-ordinating its distributed activities. In this case, the platform can be offered to the network co-ordinator that, in turn, will promote its usage and adoption to other nodes belonging to the network.

In this case, ColNet will be sold in two different kinds of licenses: server (network manager) and nodes (other organizations). Different prices can be applied depending on each case.

Second exploitation model is aimed at independent network brokers, which may create and manage operational networks requiring critical mass of users to succeed in their business goals.

For this specific case ColNet may be licensed in a freemium base. A server license sold to the co-ordinator and free licensed to the nodes (limited functionality). Each scenario will be carefully analysed.

Technical consulting & training services

The above described exploitation scenarios may require both technical consulting and training services. Consulting services will be required when supporting the current network manager activities. They may include: to assist the identification, modelling and deployment of extended business processes to be considered in that network; extended processes reengineering; functional analysis and technical requirements definition, among others.

Licensed companies may also offer consulting services for performing the technical integration between ColNet services and internal systems of companies being connected to the platform.

Training services may also be offered for both technical vendors and end users, depending on each licensing model.

Date of result achievement: 3/2012.

Time to market: 12/2012.

Table 20 shows the IPR & exploitation claims of the different parties involved and interested in the exploitation of such a result:

Table 20: Exploitation Strategies for ColNe (who).

Partners	**IPR & exploitation claims**	**Partner contribution (importance of B and F)**	**Partner Commitment (participation to costs)**	**Partner exploitation strategy description (markets, exclusivity, external suppliers, etc.)**
UPVLC	**B F MULO**	**B (Very High)** **F (Very High)**	UPVLC is fully committed. More 50 man/month	UPVLC claims a leading role in the ColNet exploitation since it is a result of previous and future research efforts. UPVLC will be responsible of main decisions taken concerning ColNet's exploitation strategy, licensing policies, platform architecture and functional capabilities.
RWTH	-	N/A	N/A	N/A
VL-idrodinamica	**F U**	**F (Very High)**	4,7 man/month	VL Idrodinamica has a basic role in the exploitation strategy of the ColNet Platform. The SME is one of the testing ground for the first configuration of the tool, so its results represent the basis for the development and the multiplier effect of the tool after the end of the project.
GHEPI	**F U**	**F (Very High)**	5,8 man/month	Ghepi would like to use the platform

				to manage its network and its process, studying and developing adaptation and new features if possible.
ITI	**B F MULO**	**B (Medium)** **F (Very High)**	ITI is fully committed. More 30 man/month	ITI claims to be consulted in the decision processes related to the ColNet exploitation. Moreover, ITI weight in the decision process should increase if its participation increases.
CRIT	**MUO**		High commitment supporting definition (at least 10 man-month)	Available to support the spread and promotion of ColNet to big companies and SMEs in the Emilia-Romagna context.

IPR exploitable measures taken or intended

Approximate price range: ColNet will be commercialised in two complementary ways. A license fee for network managers and a freemium model for nodes, giving them a basic functionality for free and advanced features by a monthly fee.

Server: 30-50K€ (estimated)

Additional node: 3-6K€ (estimated annual fee)

Competitors are: Next generation of ERP systems.

Further research necessary, if any

The cost has been estimated in 1,2 M€. Moreover and relates to its use there will be expenses for server acquisition and maintenance, software maintenance, etc.

Potential/expected impact (quantify where possible)

Innovations of this result are:

ColNet is a fully web-based development. Additionally, in supporting their process execution, network managers can internally deploy an Open BPMS.

Traditionally, business process management is conceived as 'internal' companies' projects. Few implementations consider extended business processes as a real issue to be managed along the whole suppliers' network.

Most of currently used tools supporting these processes are based on Enterprise Resource Planning (ERP) systems or internally deployed Business Process Management Systems. Poor BP integration mechanisms are provided and interoperability barriers are high.

The ICT Platform for Collaborative Business Processes is based on three main pillars:

- Modelling and execution of extended business processes for industrial applications.

- Open Source (OS) BPMS as a core component of extended BPM.

- Service-oriented architecture approach when lowering interoperability barriers for newcomers is needed.

These three components are combined into a single solution intended to support mass-customization scenarios.

ColNet combines three different approaches in an integrated way:

- Digital Ecosystem Management: by allowing the definition of common reference processes, abstract service interfaces, generic nodes' profiling, actual nodes instances registration, reference business documents and messages.

- Collaborative Networks (CN) Management: ColNet supports the creation and deployment of collaborative networks at both structural and functional level. Once CN configuration is completed, processes can be easily deployed in a BPMS solution in order to provide also process and service orchestration.

- Single organizations: each single organization willing to be involved in CN, first must get registered into the ecosystem. ColNet provides single organizations with a Web-based Thin Client supporting their interactions/transactions with the networks it belongs to.

Customers of the result: ColNet is a suitable option for companies or persons in charge of managing open networks of either other companies or persons that their work needs to be co-ordinated in a centralised way. Companies being able of managing their whole supply chain. As many partners are involved, more profitable may be this solution.

Benefits to the customers:

- Global view of their business processes.

- Single application for extended business process management.

- A service oriented architecture enabling seamless integration and interoperability with partners.

- Open source-supported solution. The platform runs on top of an OS BPMS.

- ColNet customers may get some benefits when deploying it:

    - ColNet is an open web space, intended to host as many nodes as possible, giving all of them the same opportunities in quotation or bargain processes.

    - ColNet Manager is able to design a fully interoperable business network within which, both Business and IT costs to get involved on it are lower than other solutions.

- Collaborative Networks operate as single entities, accepting orders, co-ordinating the internal work being carried out for each node and providing tools for order's status monitoring.

- Preferred scenarios for ColNet are those characterised by demand-driven supply or distribution chains.

3. Report on societal implications

A General Information *(completed automatically when **Grant Agreement number** is entered.*	
Grant Agreement Number:	**229333**
Title of Project:	**Resilient Multi-Plant Networks**
Name and Title of Coordinator:	**Prof. Raul Poler**

B Ethics	
1. Did your project undergo an Ethics Review (and/or Screening)? • If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 *'Work Progress and Achievements'*	***No***
2. Please indicate whether your project involved any of the following issues (tick box):	***NO***
RESEARCH ON HUMANS	
• Did the project involve children?	No
• Did the project involve patients?	No
• Did the project involve persons not able to give consent?	No
• Did the project involve adult healthy volunteers?	No
• Did the project involve Human genetic material?	No
• Did the project involve Human biological samples?	No
• Did the project involve Human data collection?	No
RESEARCH ON HUMAN EMBRYO/FOETUS	
• Did the project involve Human Embryos?	No
• Did the project involve Human Foetal Tissue / Cells?	No
• Did the project involve Human Embryonic Stem Cells (hESCs)?	No
• Did the project on human Embryonic Stem Cells involve cells in culture?	No
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	No
PRIVACY	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	No
• Did the project involve tracking the location or observation of people?	No
RESEARCH ON ANIMALS	
• Did the project involve research on animals?	No
• Were those animals transgenic small laboratory animals?	No
• Were those animals transgenic farm animals?	No
• Were those animals cloned farm animals?	No

• Were those animals non-human primates?	No
RESEARCH INVOLVING DEVELOPING COUNTRIES	
• Did the project involve the use of local resources (genetic, animal, plant etc)?	No
• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?	No
DUAL USE	
• Research having direct military use	No
• Research having the potential for terrorist abuse	No

C Workforce Statistics

3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).

Type of Position	Number of Women	Number of Men
Scientific Coordinator	0	1
Work package leaders	1	8
Experienced researchers (i.e. PhD holders)	2	16
PhD Students	4	7
Other	15	30

4. How many additional researchers (in companies and universities) were recruited specifically for this project?	
Of which, indicate the number of men: 4	6

D Gender Aspects

5. Did you carry out specific Gender Equality Actions under the project?	☑ ○	Yes No

6. Which of the following actions did you carry out and how effective were they?

		Not at all effective				Very effective
☑	Design and implement an equal opportunity policy	○	○	○	○	✓
☑	Set targets to achieve a gender balance in the workforce	○	○	○	✓	○
❑	Organise conferences and workshops on gender	○	○	○	○	○
☑	Actions to improve work-life balance	○	○	○	✓	○
○	Other:					

7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?

○ Yes- please specify

✓ No

E Synergies with Science Education

8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?

○ Yes- please specify

✓ No

9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?

✓ Yes- please specify. The project has developed different materials addressed to different type of audience:

Science education material	Resources	Audience
REMPLANET Web Page	www.remplanet.eu	Scientific community Industry Civil society
LinkedIn Group	Collaborative Supply Networks	Scientific community Industry
REMPLANET in Youtube	Video	Scientific community Industry Civil society
Press	Different press	Scientific community Industry Civil society
Publications	Scientific and technical articles	Scientific community Industry

○ No

F Interdisciplinarity

10. Which disciplines (see list below) are involved in your project?

✓	Main discipline[1]: 2.3		
○	Associated discipline[1]:	○	Associated discipline[1]:

G Engaging with Civil society and policy makers

11a	**Did your project engage with societal actors beyond the research community?** *(if 'No', go to Question 14)*	○ ✓	Yes No

11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?

- ○ No
- ○ Yes- in determining what research should be performed
- ○ Yes - in implementing the research
- ○ Yes, in communicating /disseminating / using the results of the project

11c	**In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?**	○ ○	Yes No

12. Did you engage with government / public bodies or policy makers (including international organisations)

- ○ No
- ○ Yes- in framing the research agenda
- ○ Yes - in implementing the research agenda
- ○ Yes, in communicating /disseminating / using the results of the project

13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?

- ○ Yes – as a **primary** objective (please indicate areas below- multiple answers possible)
- ○ Yes – as a **secondary** objective (please indicate areas below - multiple answer possible)
- ○ No

13b If Yes, in which fields?

Agriculture		Energy		Human rights	
Audiovisual and Media		Enlargement		Information Society	
Budget		Enterprise		Institutional affairs	
Competition		Environment		Internal Market	
Consumers		External Relations		Justice, freedom and security	
Culture		External Trade		Public Health	
Customs		Fisheries and Maritime Affairs		Regional Policy	
Development Economic and Monetary Affairs		Food Safety		Research and Innovation	
Education, Training, Youth		Foreign and Security Policy		Space	
Employment and Social Affairs		Fraud		Taxation	
		Humanitarian aid		Transport	

[1] Insert number from list below (Frascati Manual).

13c If Yes, at which level?

- ○ Local / regional levels
- ○ National level
- ○ European level
- ○ International level

H Use and dissemination

14. How many peer-reviewed articles were published/accepted for publication?	**26**
To how many of these is open access provided?	**4**
How many of these are published in open access journals?	**2**
How many of these are published in open repositories?	**2**
To how many of these is open access not provided?	**22**
Please check all applicable reasons for not providing open access:	
✓ publisher's licensing agreement would not permit publishing in a repository ❑ no suitable repository available ✓ no suitable open access journal available ❑ no funds available to publish in an open access journal ❑ lack of time and resources ❑ lack of information on open access ❑ other[2]: ……	

15. How many new patent applications ('priority filings') have been made? *("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).*		**0*** **Currently, the possibility to patent a REMPLANET exploitable result is being studied.*
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	Trademark	**0**
	Registered design	**1*** **Currently, this is also being analyzed in order to find out the steps for the registration.*
	Other	**5**
17. How many spin-off companies were created / are planned as a direct result of the project?		**0**
Indicate the approximate number of additional jobs in these companies:		**0**

18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:

✓	Increase in employment, or	✓	In small & medium-sized enterprises

[2] For instance: classification for security project.

❑	Safeguard employment, or	❑	In large companies
❑	Decrease in employment,	✓	None of the above / not relevant to the project
❑	Difficult to estimate / not possible to quantify		

19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (*FTE = one person working fulltime for a year*) jobs:	*Indicate figure:* Total FTE = 7.00 additional researchers during all the project Yearly FTE = 2.33 additional researchers per year

I Media and Communication to the general public

20. As part of the project, were any of the beneficiaries professionals in communication or media relations?

○ Yes ✓ No

21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?

✓ Yes ○ No

22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?

☑	Press Release	☑	Coverage in specialist press
☑	Media briefing	☑	Coverage in general (non-specialist) press
☑	TV coverage / report	☑	Coverage in national press
☑	Radio coverage / report	☑	Coverage in international press
☑	Brochures /posters / flyers	☑	Website for the general public / internet
☑	DVD /Film /Multimedia	☑	Event targeting general public (festival, conference, exhibition, science café)

23 In which languages are the information products for the general public produced?

☑	Language of the coordinator	☑	English
☑	Other language(s)		

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TABLES

FIGURES

Annex I: REMPLANET Beneficiaries Contact Information

Partner	Name	Function	Email
Project Coordination and Management			
UPVLC	Raul Poler	Project Coordinator	rpoler@cigip.upv.es
UPVLC	Raquel Sanchis	Project Manager / WP0 Leader	rsanchis@cigip.upv.es
Project Research			
RWTH	Frank Steiner/ Frank Piller	WP1 Leader	steiner@tim.rwth-aachen.de piller@tim.rwth-aachen.de
IKERLAN	Eduardo Saiz	WP2 Leader	ESaiz@ikerlan.es
ULIV	Andrew Lyons	WP3 Leader	A.C.Lyons@liverpool.ac.uk
IKERLAN	Eduardo Castellano	WP4 Leader	ecastellano@ikerlan.es
UPVLC	Dario Franco	WP5 Leader	dfranco@cigip.upv.es
CRIT	Enrico Callegati	WP6 Leader	callegati.e@crit-research.it
ITI	Ruben de Juan-Marín	WP7 Leader	rjuan@iti.upv.es
SUPSI	Luca Canetta	WP8 Leader	luca.canetta@icimsi.ch
Industrial			
BIMATEC	Thilo Borbonus		Thilo.Borbonus@Bimatec.de
BIMATEC-Soraluce	Eduardo Ansola		eansola@soraluce.com
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