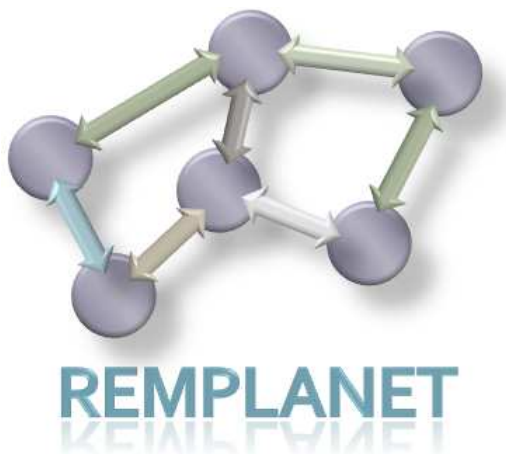


Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>



THEME NMP
NMP-2008-3.3-1 Supply chain integration and real time decision making in non hierarchical manufacturing networks
Programme Title
Collaborative project / Small or medium-scale focused research projects
Project Title
<b>Resilient Multi-Plant Networks</b>
Acronym
<b>REPLANET</b>
Project No
<b>229333</b>

## DELIVERABLE D8.1

### Exploitation Guidelines.

#### Work package 8

Leading Partner: SUPSI

Document Editor: Paolo Pedrazzoli

Dissemination Level: PU

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Version 1.9

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

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## Versioning and contribution history

Version	Description
0.1	First draft of D8.1 structure and initial proposal of subsections allocation to participants
0.11	Draft with partners contributions (mainly deliverable structure)
0.12	Draft with partners contributions (mainly contents description)
1.0	Final version with preliminary knowledge (month 6)
1.5	Updated version with additional knowledge (month 12)
1.7	Updated version after ESS (month 16)
1.9	Updated version after ESS and integrating ESS coach remarks (month 18)

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## Table of contents

<b>PART I</b> .....	<b>5</b>
<b>I.1 INTRODUCTION</b> .....	<b>5</b>
<b>I.2 METHODS TO PRODUCE THE DELIVERABLE</b> .....	<b>6</b>
<b>I.3 MAIN RESULTS</b> .....	<b>7</b>
<b>I.4 FUTURE WORK</b> .....	<b>7</b>
<b>I.5 CONCLUSIONS</b> .....	<b>8</b>
<b>PART II</b> .....	<b>9</b>
<b>II.1 INTRODUCTION</b> .....	<b>9</b>
<b>II.2 POTENTIAL EXPLOITABLE RESULTS AND THEIR RELEVANCE</b> .....	<b>9</b>
<b>II.2.1 WP1 Strategic REPLANET Model</b> .....	<b>12</b>
<b>II.2.2 WP2 Operational REPLANET Model</b> .....	<b>17</b>
<b>II.2.3 WP3 Integrated REPLANET Framework</b> .....	<b>22</b>
<b>II.2.4 WP4 REPLANET Simulation and Optimization Decision Support</b> .....	<b>25</b>
<b>II.2.5 WP5 REPLANET SOP4EBPM Implementation</b> .....	<b>29</b>
<b>II.3 EXPLOITATION STRATEGY AND IPR MANAGEMENT</b> .....	<b>31</b>
<b>II.4 CONCLUSIONS</b> .....	<b>36</b>
<b>REFERENCES</b> .....	<b>39</b>
<b>TABLES</b> .....	<b>40</b>
<b>ANNEX I</b> .....	<b>41</b>

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## **EXECUTIVE SUMMARY**

This deliverable is a report describing all the activities performed in order to provide the tools required for defining the exploitation guidelines, which will constitute the basis for all the future exploitation activities. More specifically, this document provides some checklist allowing to characterise the various exploitation results, identifying the “whats” and the “addressees”, as well as to sketch a first draft of suitable exploitation strategies, through the identification of potential “suppliers” and “means”.

The 21<sup>st</sup> of September 2010 REMPLANET consortium had the ESS (Exploitation Strategy Seminar) in Bologna (Italy). During the day the partners refined their idea of the results and their exploitation strategy. In this last reviewed version of the document the conclusions from the ESS meeting are integrated. The document presents the identified project results with a short description and the knowledge that the partners applied to the result, further step is the identification of the IPRs. Each paragraph presents the result and some indicators from the seminar beside other information already collected.

Furthermore, the second part of the deliverable proposes the checklists that allow to derive for each potential exploitation result a much more precise information about assessment of the required background and the expected foreground. This allows to go deeper in defining which can be the suitable exploitation strategies and to identify and manage from the beginning of the project eventual IPR management issues based on the ESS collected information. It is ensured the global coherence for the project and the subsequent exploitation activities as well as it is promoted the interaction and collaboration among the partners, allowing to identify any potential source of conflict and serving as a basis for relieving their effects.

Project	REPLANET - Resilient Multi-Plant Networks	Project - No	229333
Work Package	Exploitation	WP - No	WP8
Document	Deliverable D8.1	Save Date	29/10/2010

## PART I

### I.1 INTRODUCTION

“WP8 Exploitation” overall objective is to exploit (i.e.: *make the most of*) project results. The specific knowledge generated throughout REPLANET project can be consolidated and exploited in various forms:

Tools:

- decentralized co-design toolkits for user innovation
- simulation and optimization tools
- decision-support systems

Methodologies and techniques:

- choice of suitable existing modelling languages
- modelling and meta-modelling techniques
- methodology to provide support to the definition of extended processes in multi-plants networks

Organically arranged information:

- best-practices
- information on rapid-manufacturing technologies enabling users ideas concretization

Platforms and frameworks:

- service-oriented platform for business process management
- conceptual frameworks
- network models
- business strategies

In order to efficiently and effectively pursuing this goal, several (strongly interrelated) aspects have to be investigated:

**whats:** the REPLANET outcomes that satisfying the requirements of specific user groups create value and can be commercially exploited. The dimensions for characterising and describing exploitable project outcomes have to be identified and specified, also discriminating internally exploitable from externally exploitable results. A constant examination of potentially exploitable *whats* has to be carried out in order to recognise new opportunities arising during the project carry-out and to avoid devoting resources to results that turn out as un-exploitable.

**addressees:** who’s expected to benefit of *whats* mentioned above. Potentially interested groups of users and their peculiarities have to be identified for each exploitable result. The dimensions for measuring expectable benefits deriving from their involvement have to be specified.

**suppliers:** which are the partners and/or the actors external to the project consortium more suitable for approaching the *addressees*, handling the *whats*. A clear identification of these actors and proper training actions are necessary. The rules defining the activities of the

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

*suppliers* should be formulated, in order to avoid conflicts and adequately manage and protect IPR.

**means:** which are the tools, methods, platforms, medium better fitting with the other dimensions. This implies the preliminary selection of technologies supporting exploitation initiatives, characterisation of their functionalities and required improvements, definition of documents, files and other materials needed to performing exploitation actions.

Feedbacks and exploitation initiative outcomes monitoring are expected to allow a constant re-focussing of research activities and of WP8 strategies. The concrete objectives of this work-package are:

O8.1 To develop a strategy and a plan ensuring inheritance of project valuable outcomes at a commercial level.

O8.2 To steer and guide project partners to correctly and consistently exploit project outcomes.

O8.3 To identify and quantify exploitation opportunities and related stakeholders characteristics and approaching methods.

O8.4 To facilitate partners exploitation initiatives quickening “learning curve” treading.

O8.5 To promote feedbacks on project results application from users and interact as practice sensors with all other WPs.

For these reasons, in the “Exploitation Guidelines” is provided an empty framework to be used for stimulating collaboration, identifying and solving IPR protection and management issues, and to ensure that all the aspects relevant for the success of exploitation activities are carefully taken into account. The exploitation framework is a living entity, evolving consistently with project evolvments. At the beginning of the project the objective is defining exploitation methodologies, rules, responsibilities, objectives and times in accordance to the aspects mentioned above: the whats, the addressees, the suppliers and valuable exploitation means and tools.

## **I.2 METHODS TO PRODUCE THE DELIVERABLE**

A first draft of the structure of this deliverable has been provided by SUPSI on the basis of its experience and of the analysis of state of the art exploitation practices and guidelines. The structure and the contents of the deliverable have been subsequently enriched through the contributions of the consortium members. In particular, the RTD partners have been involved into the description of the exploitable results characteristics. SUPSI collaborates with CRIT in order to try to align as much as possible the checklists of D8.1 “Exploitation Guidelines” with those defining the user requirements contained in D6.0 “Methodological Framework”. The contributions of industrial and RTD partners have been really useful for concretely assessing the results during the Exploitation Strategy Seminar (ESS) in M16, in order to prepare the version 2.0 of this deliverable. During the meeting the moderator help in defining the results and the strategy was essential to focus on the information that are presented on these pages.

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

### **I.3 MAIN RESULTS**

The main objective of the version 2.0 of the deliverable “D8.1 Exploitation Guidelines”, due at the end of month 18 updating information, is presenting the definition of the project results and arriving to an agreement about the elements to be inserted into the checklists for qualifying the potential exploitable results and the relative exploitation and IPR management strategies. The “D8.1 Exploitation Guidelines” is a living document, which content will be updated all along the project carry-on and will serve as a basis for the other WP8 deliverables. Despite the difficulty experienced by various partners at the initial stage of the project to provide reliable information about some of the covered topics, an agreement was reached about the structure and the general contents of the checklist. The sections of the checklists to be further developed in version 2.0 were also identified. A tentative draft of exploitable results characterisation has been done for all the work-packages (WP1, WP2, WP3, WP4 and WP5) in the first version and in this second one it has been updated and reached a quite effective version after the ESS. Till now, these preliminary results seem corroborate the choice of developing an exploitation strategy based on the use of the exploitable results by consulting companies/institutes. These actors will help the companies involved in non-hierarchical manufacturing network creation to choose a suitable collaboration model and act as neutral coach until the level of mutual trust will rise sufficiently to ensure the effective pursue of collaboration. These consulting companies, being involved in the analysis and the set up of various non-hierarchical company networks, can rapidly master the innovative methodologies and tools provided by the project, thus better leveraging the initial efforts due to the learning effects than a single company belonging to a non-hierarchical network.

### **I.4 FUTURE WORK**

The establishment of “D8.1 Exploitation Guidelines” from the beginning of the project underlines the objective of having as soon as possible a clear understanding of the exploitable results characteristics and benefits as well as of IPR protection and management issues. However, a better understanding of the exploitable results and strategy will be achieved all along the project carry-on, thus implying the necessity to continuously updating this deliverable (especially in what concern the information collected through the proposed checklists). On the basis of this observation the consortium reaches an agreement for devoting some of the planned efforts after the undertaking of the ESS in order to capitalise upon the results of this guided brainstorming. Specifically, the RTD and the industrial partners are involved in the redaction of version 2.0, where the contents of the checklists are completed and validated and a comprehensive description is provided for each potentially exploitable result. Version 2.0 is realised in order to follow what suggested by the ESS moderator: “The characterization of the exploitable results needs further enrichment with additional information to be gathered from the competent services of the partners involved in those results”. This version of D8.1 integrates not only the information stemming from the ESS but also those obtained in the following weeks while refining the contents of the ESS synthesis report according to the ESS coach suggestions. All along the project carry-out the consortium will further investigate the results and relative exploitation.

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## **I.5 CONCLUSIONS**

This deliverable proposed the checklists as solid basis, furthermore agreed upon by all the consortium members, for describing the potential exploitable results and the strategy to be followed for obtaining the most from them. Furthermore, the checklists also allow to identify background and foreground exploitation issues in order to prevent conflicts and to identify exploitable strategy that does not interfere with the IPR management and protection of the various consortium members. The checklists have been designed in order to be compliant to the usual requirements of Plan for Using and Disseminating the Knowledge (PUDK) even if they allow to go further into details for the definition of the exploitation strategy.



Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## PART II

### II.1 INTRODUCTION

The success of the exploitation activities requires an early identification of all the potentially exploitable results. In fact, this allows to develop suitable exploitation strategies and application scenarios as well as to recognise potential IPR management issues and solve them through the establishment of the necessary rules and procedures. The “Exploitation Guidelines” are developed to support the gathering of all the information concerning the exploitation activities as well as to structure this information. The provided checklists will allow to define the exploitation methodologies, rules, responsibilities, objectives and plans. The qualitative information collected at this stage will drive the subsequent quantitative estimations and support the establishment of suitable exploitation strategies. The “Exploitation guidelines” are developed thanks to the contribution of all project beneficiaries, which will be involved into the redaction of the Exploitation deliverable all along the project carry-out. In particular, the RTD providers are mainly involved in the description of the potential exploitable results as well as in the definition of the required background and foreground. The industrial partners mainly provide information about the potential addressees. In this version of the deliverable part of the information presented is the work done for the ESS (in preparation, during the day and the follow up of the meeting). The exploitation manager and partners involved will apply the matrixes here shown to the results for further identifying the suitable exploitation strategies.

### II.2 POTENTIAL EXPLOITABLE RESULTS AND THEIR RELEVANCE

Table 1 provides a preliminary list of the exploitable results, based upon the analysis conducted during the project proposal development and the first project months. This list constitutes the starting point for the elaboration of an effective exploitation strategy. This list is absolutely not binding, the members of the consortium are invited to modify and expand it all along the project carry-out.

First of all, for each work-package the potential exploitable results have to be identified and described, with a particular emphasis on the analysis of their benefits. Table 2 provides a framework for the characterisation of the exploitable results. This is necessary in order to provide some preliminary indications about the exploitation strategy to be followed in each case. The exploitable result characterisation checklist has to be used to describe each of the potential exploitable results. In the following subsections for each work-package is provided the list of the exploitable results and their detailed description. The provided checklist can allow to better specify the characteristics of the exploitable results and/or to identify new exploitable means as well as identify new exploitation opportunities.

In this preliminary phase the information are mainly qualitative and are mostly provided by the RTD partners responsible of leading the various work-packages. A first rough characterisation of the exploitable results allows to better understand which can be the suitable exploitation strategies and how to manage the relationships among the involved

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

actors. A table similar to Table 2 is filled for each exploitable result and continuously updated to achieve inversion 1.9 (after the ESS) to the current descriptions.

**Table 1: List of exploitable results, involved partners and main RTD responsible**

EXPLOITABLE RESULTS		Involved Industrial partners (Preliminary list)	Responsible
1	Platform for open process innovation in the domain of mass customization	Festo, Newton, but also all other partners of the consortium	RWTH
2	Tool for integration of customer ideas and innovations	Festo	RWTH
3	Operational reference model and Toolbox <ul style="list-style-type: none"> <li>Self assessment web questionnaire based on WP2 ER quantitative survey. Followed by a technical consulting service based on D23 (problems, concepts, model's blocks / data, support tools from the toolbox) that provides guidance on future courses of action: e.g. <a href="https://www.improve-innovation.eu/home/improve-assessment/">https://www.improve-innovation.eu/home/improve-assessment/</a> from <a href="https://www.improve-innovation.eu/">https://www.improve-innovation.eu/</a></li> <li>Training services: (1) online courses and videos; (2) webinars; (3) workshops; (4) custom map building</li> </ul>	Bimatec, King & Fowler, VL-Idrodinamica	IKERLAN
4	Integrated strategic alignment workbook and tool	Bimatec, Newton, King & Fowler	ULIV
5	Resilient Multi-Plant Networks Computational DSS Tool <ul style="list-style-type: none"> <li>Professional consulting service tool</li> <li>Basic web DSS tool version (management flight simulator or microworlds) e.g. (1) <a href="http://www.iseesystems.com/community/downloads/NetSimModels.aspx">http://www.iseesystems.com/community/downloads/NetSimModels.aspx</a>, (2) <a href="http://www.strategydynamics.com/shop/">http://www.strategydynamics.com/shop/</a>, (3) <a href="http://forio.com/">http://forio.com/</a></li> <li>Licensed tool with training services for different profiles (developers / users): (1) online courses and videos; (2) webinars; (3) workshops; (4) technical support.</li> </ul>	Bimatec, Ghepi	IKERLAN
6	ICT platform for collaborative business processes	Ghepi, VL-Idrodinamica	UPVLC

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

The following table lists here the fields that further define the results. The checklist can be used for establishing the benefits and the limits of the results. Moreover, some details about the exploitation strategy for each one are provided.

**Table 2: Exploitable result characterisation checklist**

Deliverable	ID and Title
Benefits and their impact	List, Short Description and Relative Impact (VH: Very High H: High M: Medium L: Low VL: Very Low)
Usability/Complexity	SU: Seamless Utilisation TR: Training Required CR : Consulting Required OEE: Outsourced to External Experts NS: New skills required IS: information system improvement
Exploitation	E: External ES: Suppliers EC: Competitors EP: Partners I: Internal B: Both
Exploitable result type (way to exploit)	R: Report (static knowledge repository); SKR: Searchable Knowledge Repository (ontology, semantic web) S: Software; T: Tool; M: Methodology (Procedure, Best Practice, Guidelines) WS: Web Service I: Intangibles (improvements in internal processes, certifications, etc.)
Expected development stage at the end of the project	UI: Untested Idea ED: Embryonic Development P: Prototype N: new and needing further development

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	MP: market proven
Amount of work required after the end of the project to ensure the exploitation	Estimation of man month
Time to Market (Time to use)	Months after project end (external exploit.) Project month or months after project end (for what concern internal exploitation)

In the following chapters the exploitable results are presented and classified according to the WP where they belong. First table describes the result following the template by the EC, the second is a further definition done according to the specific checklist developed by the consortium.

### II.2.1 WP1 Strategic REMPLANET Model

The nature of some of WP1 deliverables was vague in the description of work, the time at which a first list of potential exploitation results was derived (see table1). For this reason, during the M04 REMPLANET WP meeting in Aachen, a brainstorming involving the various WP1 members was undertaken in order to provide an updated understanding of the contents of these deliverables (see WP1 M04 meeting minutes). These modifications have also an impact on the nature of the exploitation results linked to WP1.. Three WP1 results contributes to two potential exploitable results, in the following table they are characterised, later on is also presented a first draft of the stand alone exploitation strategy for each of the two exploitable results.

**Table 3: Result description: Platform for open process innovation in the domain of mass customization**

Describe the innovation content of result	<ul style="list-style-type: none"> <li>- This exploitable result is not using any new technology!</li> <li>- The innovation character results from the collaboration and collection of content on the platform.</li> <li>- The platform will provide a dynamic knowledge repository in the field of mass customization, which is not available at this point of time.</li> </ul>
Who will be the customer?	Academics, practitioners, consultants, scholars, service providers, etc.
What benefit will it bring to the customers?	<p>Three different benefit groups can be identified: providers of content, consumers of content and providers of secondary services:</p> <p>Providers of content can benefit from feedback, ratings and comments of other users.</p> <p>Consumers of content benefit from the platform because it enables them to access information and respective experts.</p> <p>Providers of secondary services could be consultants or service providers that 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</p>

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	with potential customers.
When is the expected date of achievement in the project (Mth/yr)?	(04/2012)
When is the time to market (Mth/yr)?	(04/2012)
What are the costs to be incurred after the project and before exploitation?	Cost of maintenance, hosting, etc: 250 €/ month. This does not include the cost of content editing! The editing will at least cause costs of 400 €/month.
What is the approximate price range of this result / price of licences?	<ul style="list-style-type: none"> <li>- Membership fee: should not be raised in order to reach the needed, critical number of active members.</li> <li>- Fee for being listed as provider of secondary services: tbd.</li> <li>- Commission for intermediation: depends on individual case.</li> <li>- Possible revenues from advertisement: depends on individual case.</li> </ul>
What is the market size in M€ for this result and relevant trend?	<p>There is no accurate estimation of market size, but the following indicators can be provided:</p> <ul style="list-style-type: none"> <li>- Conferences such as the bi-annual MCPC conference have app. 250 – 500 attendees from academia.</li> <li>- There are several databases on MC configurators. One of the biggest databases lists more than 500 companies that offer MC products.</li> <li>- From our experiences in the field of MC, we know around 100 providers of secondary services (consultants, software providers, etc.).</li> </ul> <p>From these estimates, we consider the following worst and best cases:</p> <p>Worst case: 1 registered person from 5 % of the companies → 50 active members</p> <p>Best case: 3 registered persons from 50% of the companies → 1500 active members</p>
How this result will rank against competing products in terms of price / performance?	There is currently no comparable website available.
Who are the competitors for this result?	As there is no comparable website available, there are no competitors at this point of time.
How fast and in what ways will the competition respond to this result?	n/a

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

Who are the partners involved in the result?	SUPSI will complete this part according to B and F matrix
Who are the industrial partners interested in the result (partners, sponsors, etc...)?	--
Have you protected or will you protect this result? How? When?	<p>The software features used are mostly open source components. Thus, the value of the platform results solely from the uploaded content 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.</p> <p>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.</p>

**Table 4: Platform for open process innovation in the domain of mass customization Exploitable result characterisation**

Deliverable	D1.1 Technical description and operating (business) model of an open innovation platform for process innovation
Benefits and their impact	Open innovation platform for process innovation Impact: High
Usability / Complexity	SU: Seamless Utilisation IS: information system improvement
Exploitation	B: Both
Exploitable result type (way to exploit)	R: Report (static knowledge repository); SKR: Searchable Knowledge Repository (ontology, semantic web) WS: Web Service I: Intangibles
Expected development stage at the end of the project	MP: market proven
Amount of work required after the project end to ensure exploitation	12
Time to Market / Time to use	0

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

**Table 5: Results description: Tool for integration of customer ideas and innovations**

Describe the innovation content of result	<p>Innovational character lies within the methodologies and procedures:</p> <ul style="list-style-type: none"> <li>- The result is a generic managerial procedure that helps mass customizing companies to make a fair and transparent evaluation of customer ideas and innovations</li> <li>- The innovation content of the result lies within the formal description of a process</li> <li>- and the matching of existing management tools and methods with the respective process steps.</li> </ul>
Who will be the customer?	<ul style="list-style-type: none"> <li>- Validation will be achieved through a FESTO-internal pilot.</li> <li>- As soon as the result reaches a mature state, it could be offered to all mass customizing companies.</li> </ul>
What benefit will it bring to the customers?	<ul style="list-style-type: none"> <li>- Fair and transparent procedure for the integration of customer ideas and innovations</li> <li>- The process could act as a decision aid and help to identify the “right” customer ideas.</li> </ul>
When is the expected date of achievement in the project (Mth/yr)?	(04/2012) The results will not go beyond a prototype stage.
When is the time to market (Mth/yr)?	(04/2012) theoretically, but the tool needs to be adapted for the implementation in another company’s context.
What are the costs to be incurred after the project and before exploitation?	Cost of adapting the results to another company’s context differs for each company and cannot be determined at this point of time.
What is the approximate price range of this result / price of licences?	n/a
What is the market size in M€ for this result and relevant trend?	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.
How this result will rank against competing products in terms of price / performance?	n/a
Who are the competitors for this result?	Existing MC consultancies.

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

How fast and in what ways will the competition respond to this result?	n/a
Who are the partners involved in the result?	SUPSI will complete this part according to B and F matrix
Who are the industrial partners interested in the result (partners, sponsors, etc...)?	--
Have you protected or will you protect this result? How? When?	No

The result here described is a union of the following two deliverables that were identified by the consortium before the day dedicated to the ESS.

**Table 6: Tool for integration of customer ideas and innovations Exploitable result characterisation**

Deliverable	D1.3 Technical description and operating (business) model of a user innovation platform (tool for user co-design)
Benefits and their impact	User innovation platform (tool for user co-design) Impact: High
Usability / Complexity	TR: Training Required CR : Consulting Required NS: New skills required IS: information system improvement
Exploitation	I: Internal
Exploitable result type (way to exploit)	R: Report (static knowledge repository); T: Tool; M: Methodology (Procedure, Best Practice, Guidelines)
Expected development stage at the end of the project	P: Prototype
Amount of work required after the project end to ensure exploitation	24
Time to Market / Time to use	12



Project	<b>REMPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

**Table 7: D1.4 Exploitable result characterisation**

Deliverable	D1.4 Checklist and implementation guideline to build a platform for open process innovation
Benefits and their impact	Checklist and implementation guideline <b>Impact:</b> not clearly assessable
Usability / Complexity	TR: Training Required CR : Consulting Required NS: New skills required IS: information system improvement
Exploitation	I: Internal
Exploitable result type (way to exploit)	R: Report (static knowledge repository); T: Tool; M: Methodology (Procedure, Best Practice, Guidelines)
Expected development stage at the end of the project	P: Prototype
Amount of work required after the project end to ensure exploitation	24
Time to Market / Time to use	12

## II.2.2 WP2 Operational REMPLANET Model

The potential exploitation results of the WP2 are focused on deliverable D2.3, as it is shown in table 6. However, the deliverables D2.1 PF-P&O-SN alignment model for mass customization scenarios and D2.2 PF-P&O-SN decoupling points toolbox and guidelines will be the previous basis to achieve the exploitation result of WP2. The first deliverable will develop an exhaustive analysis of existing literature models, as well as a new ‘product families structures - processes and operations management strategies - supply network structures’ alignment model for mass customization scenarios. On the other hand, the second deliverable will provide a comprehensive toolbox and guidelines for identifying the most appropriate decoupling points in the PF-P&O-SN triad configurations for different mass customization scenarios. These outputs will be the inputs of the Operational Resilient Supply Network model and toolbox which is described in more detail in the following table:

**Table 8: Results description: Operational REMPLANET Model and Toolbox**

Describe the innovation content of result	The existing problem: - <i>“When firms do not explicitly acknowledge and manage product, process and supply chain design as a concurrent activity they often encounter problems late in product development, or with manufacturing launch, logistical support, quality control, and production costs”</i> (Fine, 1998: p. 133)
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Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	<ul style="list-style-type: none"> <li>- <i>“... the decisions made during the conceptual design stage have direct impact on over 70% of the production-manufacturing and supply chain costs, even though the actual cost of the design phase accounts for only 6% of the total development cost ” (Shehab and Abdalla, 2001).</i></li> </ul> <p>New knowledge model and procedure to deal with the unsolved existing problem:</p> <ul style="list-style-type: none"> <li>- An alignment model between the triad PF-P&amp;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)</li> </ul> <p>As well as structured known content:</p> <ul style="list-style-type: none"> <li>- In the form of a Toolbox and guidelines that support the development stages of the PF-P&amp;O-SN alignment model and facilitate responding to customized market demands at the lowest possible cost and time.</li> </ul> <p>Nature of exploitable result:</p> <ul style="list-style-type: none"> <li>- Self assessment web questionnaire based on a quantitative survey. Followed by a technical consulting service based on D23 (problems to be solved, concepts involved in the solution, model’s blocks / data involved in the solution, support tools from the toolbox) that provides guidance on future courses of action: e.g. <a href="https://www.improve-innovation.eu/home/imp3rove-assessment/">https://www.improve-innovation.eu/home/imp3rove-assessment/</a> from <a href="https://www.improve-innovation.eu/">https://www.improve-innovation.eu/</a></li> <li>- Training services: (1) online courses and videos; (2) webinars; (3) workshops; (4) custom map building</li> </ul>
Who will be the customer?	<p>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.</p> <p>Specially enterprises formed by global multi-plant networks.</p>
What benefit will it bring to the customers?	See the following table:

Project	<b>REMPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	<table border="1"> <tr> <td><b>Supply Network Configuration</b></td> </tr> <tr> <td>Determine the appropriate configuration of the supply network for different demand scenarios</td> </tr> <tr> <td>Determine the appropriate configuration of the supply network to supply products through a distribution channel or to a specific geographical area</td> </tr> <tr> <td>Determine a new supply network configuration resulting from the adding or eliminating suppliers, plants, warehouses, retail outlets, and so on</td> </tr> <tr> <td><b>Product Structure and Supply Network Configuration</b></td> </tr> <tr> <td>Determine the appropriate configuration of the supply network regards different customers' behaviors, i.e. customized products</td> </tr> <tr> <td>Determine the appropriate configuration of the supply network to supply products belonging to one product family</td> </tr> <tr> <td><b>Processes and Operation Management and Supply Network Configuration</b></td> </tr> <tr> <td>Determine the appropriate production capacity of the supply network for different demand scenarios</td> </tr> <tr> <td>Define the appropriate process structure for different resource and capacity scenarios of the supply network</td> </tr> <tr> <td>Determine the appropriate replenishment strategy and the more appropriate inventory levels for the products belonging to a node of the supply network</td> </tr> <tr> <td>Determine the most appropriate planning and launch frequency for production orders</td> </tr> <tr> <td><b>Products, Processes and Supply Network Configurations</b></td> </tr> <tr> <td>Determine the appropriate product structure for different resource and capacity scenarios of the supply network</td> </tr> <tr> <td>Determine the point in the process and in the supply network where the customer order is customized</td> </tr> <tr> <td>Determine the appropriate order fulfillment strategy for each product family</td> </tr> </table>	<b>Supply Network Configuration</b>	Determine the appropriate configuration of the supply network for different demand scenarios	Determine the appropriate configuration of the supply network to supply products through a distribution channel or to a specific geographical area	Determine a new supply network configuration resulting from the adding or eliminating suppliers, plants, warehouses, retail outlets, and so on	<b>Product Structure and Supply Network Configuration</b>	Determine the appropriate configuration of the supply network regards different customers' behaviors, i.e. customized products	Determine the appropriate configuration of the supply network to supply products belonging to one product family	<b>Processes and Operation Management and Supply Network Configuration</b>	Determine the appropriate production capacity of the supply network for different demand scenarios	Define the appropriate process structure for different resource and capacity scenarios of the supply network	Determine the appropriate replenishment strategy and the more appropriate inventory levels for the products belonging to a node of the supply network	Determine the most appropriate planning and launch frequency for production orders	<b>Products, Processes and Supply Network Configurations</b>	Determine the appropriate product structure for different resource and capacity scenarios of the supply network	Determine the point in the process and in the supply network where the customer order is customized	Determine the appropriate order fulfillment strategy for each product family
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When is the expected date of achievement in the project (Mth/yr)?	M18: October 2010																
When is the time to market (Mth/yr)?	It has been estimated in 3 months after project end = about September 2012																
What are the costs to be incurred after the project and before exploitation?	The amount of work required after the end of the project to ensure the exploitation has been estimated in 6MM = 56.777 Eur.																
What is the approximate price range of this result / price of licences?	<p>The main exploitation vehicle already considered is the consultancy service one. The fee for the consulting service will vary according to each consulting firm, e.g. 100€/hour/consultant. An ordinary consulting service could imply 15-20 sessions of two consultants = around 30,000€/service.</p> <p>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 1,500€ per person plus a 200€ fee for the certificate.</p> <p>Ordinary training services like online courses and videos, webinars, workshops, etc, will be priced according to market standards.</p>																
What is the market size in M€ for this result and relevant trend?	As stated in section B3-Impact of REMPLANET Annex I, 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																

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	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.
How this result will rank against competing products in terms of price / performance?	In terms of performance, regards the tasks described in the previous table, 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.
Who are the competitors for this result?	Currently no management consulting firm is offering such kind of service.
How fast and in what ways will the competition respond to this result?	As a preliminary assumption it could be said that if the competitors audit their consultants and they apply the model and tools developed with high frequency, the competitive advantage (expertise) we begin with could be significantly reduced in about 5-10 years.
Who are the partners involved in the result?	SUPSI will complete this part according to B and F matrix
Who are the industrial partners interested in the result (partners, sponsors, etc...)?	<p>IKERLAN, RWTH, UPVLC, BIMATEC, VL-IDRODINAMICA, CRIT</p> <p>VL Idrodinamica is interested in exploiting this result. The operational Reference Model could be useful to lead and help our company in different and preliminary tasks related to the triad PF-P&amp;O-SN (product families' structure-processes and operations management strategies-supply network structure), in order to study the current situation and the way to align it to the different events that can happen every day in the management of the relations between VL and other actors of its supply network.</p> <p>Reading about the benefit that this result could bring to the customers, the expected impact is on the following VL's tasks:</p> <ul style="list-style-type: none"> <li>• SUPPLY NETWORK CONFIGURATION <ul style="list-style-type: none"> <li>- Determine the appropriate configuration of the supply network for different supply scenarios.</li> </ul> </li> <li>• PRODUCT STRUCTURE AND SUPPLY NETWORK CONFIGURATION <ul style="list-style-type: none"> <li>- Determinate the appropriate configuration of the supply network to supply products belonging to one product family.</li> </ul> </li> <li>• PROCESSES AND OPERATION MANAGEMENT AND SUPPLY NETWORK CONFIGURATION <ul style="list-style-type: none"> <li>- Determine the appropriate replenishment strategy and the more appropriate inventory levels for the products belonging to a node of the supply network.</li> <li>- Determine the most appropriate planning and launch frequency for production orders.</li> </ul> </li> <li>• PRODUCTS, PROCESSES AND SUPPLY NETWORK</li> </ul>

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	<p><b>CONFIGURATIONS</b></p> <ul style="list-style-type: none"> <li>- Determine the point in the process and in the supply network where the customer order is customized.</li> </ul> <p>During the pilot's implementation (that in VL concerns the partial change of the supply network configuration and the consequent creation of new connections between VL and other actors) it could be useful to have a standard model to analyse and plan the steps to be carried out.</p>
Have you protected or will you protect this result? How? When?	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.

**Table 9: Operational REPLANET Model and Toolbox Exploitable result characterisation**

Deliverable	D2.3 Operational Resilient Supply Network model and toolbox
Benefits and their impact	<p>An alignment model between the triad PF-P&amp;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).</p> <p><b>Impact:</b> VH (Very High) or H (High) in sectors with medium/high degree of customized orders</p> <p>A toolbox and guidelines to identify the PF-P&amp;O-SN decoupling points that, based on the demand orders characteristics, facilitate response to customized market demands at the lowest possible cost and time.</p> <p><b>Impact:</b> VH (Very High) or H (High) in sectors with medium/high degree of customized orders</p>
Usability / Complexity	<p>TR: Training Required</p> <p>CR : Consulting Required</p>
Exploitation	B: Both
Exploitable result type (way to exploit)	<p>R: Report (static knowledge repository);</p> <p>M: Methodology (Procedure, Best Practice, Guidelines);</p>
Expected development stage at the end of the project	N: new and needing further development
Amount of work required after the project end to ensure exploitation	Estimation of man month = 6MM
Time to Market / Time to use	Months after project end = 3

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

### II.2.3 WP3 Integrated REPLANET Framework

A single potential exploitable result was identified for WP3 and is related to D3.5 Validated REPLANET Integrated Framework. This means that this exploitable result capitalises upon the results of the overall activities and deliverables of WP3 in order to develop a conceptual framework for coherently integrating the strategic and operational view of the resilience concept as well as providing methodologies and tools required for effectively applying this framework in real industrial context (validation of the proposed framework in collaboration with the consortium industrial partners). The comprehensive result was named Integrated strategic alignment workbook and tool

**Table 10: Result description: Integrated strategic alignment workbook and tool**

Describe the innovation content of result	<p>This result will comprise of a workbook to help companies with high variety products and customised products. This workbook will be based on and extend existing knowledge on manufacturing strategy, operations, network structure, collaborative initiatives and KPIs. The workbook will allow companies to link network structure, operations and strategy. It will help companies to implement collaborative initiatives essential/useful to make their network structure, strategy and operations more efficient.</p> <p>The workbook will guide companies to identify their network/strategy/operations and consider how these should fit together and how changes to these could align their business. It will then guide the user to KPI's that are most appropriate for measuring performance for this network, strategy and operations.</p> <p>Workbooks considering linking operations and strategy are already in existence. The innovation content of this result will be the extension of this to consider manufacturers where customisation plays an important part in the business and the extension of the model to consider network type, collaborative initiatives and KPI's.</p>
Who will be the customer?	Customers are primarily small and medium-sized companies 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.
What benefit will it bring to the customers?	This tool will allows the customer to better align strategy and operations so has a very wide potential remit for changing potential processes and activities. The main benefit will be the identification of relevant collaborative initiatives which once implemented should allow the company to improve partnerships within the supply chain and improve efficiency in their own processes and the interactions within the supply chain.
When is the expected date of achievement in the project (Mth/yr)?	04/2011

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

When is the time to market (Mth/yr)?	Approximately end of 2012
What are the costs to be incurred after the project and before exploitation?	At the end of the product this workbook will be complete and the only costs would be printing and binding costs of around £20 per workbook.
What is the approximate price range of this result / price of licences?	Cost of work book plus potential consultancy fee to the University for guidance.
What is the market size in M€ for this result and relevant trend?	It is likely companies will need help working through this workbook for this reason the market size is restricted to the companies the University of Liverpool comes into contact with.
How this result will rank against competing products in terms of price / performance?	N/A
Who are the competitors for this result?	N/A
How fast and in what ways will the competition respond to this result?	N/A
Who are the partners involved in the result?	SUPSI will complete this part according to B and F matrix
Who are the industrial partners interested in the result (partners, sponsors, etc...)?	This workbook will be used in the Newton and King and Fowler pilot studies starting from April 2011 when the workbook will be finished. In the case of King and Fowler the aim is to use the workbook to aid flexibility in the operations processes and to improve partnerships in the supply chain. In the case of Newton the focus is more on improving partnerships to allow the company to benefit from a more open innovation culture.
Have you protected or will you protect this result? How? When?	Appropriate advice will be sought

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

**Table 11: D3.5 Integrated strategic alignment workbook and tool Exploitable result characterisation**

Deliverable	D3.5 Validated REPLANET Integrated Framework
Benefits and their impact	<p>Report and associated workbook of the Integrated Resilient Multi-Plant Network model. The model will be the culmination of WP1, WP2 and WP3 and will be validated at collaborators' sites. Tools, methods and guidelines associated with the model will be fully documented.</p> <p><b>Impact:</b> VH (Very High) or H (High) in resilient and collaborative supply networks for the purpose of the open innovation in the mass customisation manufacturing sector.</p> <p>A standard business process mapping tool for collaborative projects in the above context, which enable partners to understand, communicate, and plan their activities for building up an open and dynamic collaboration initiatives.</p> <p>An integration model for mapping strategic and operational activities in the above context, which supports assessment of potential collaboration opportunities and decision making in both strategic and operational activities for building up the supply networks dynamically.</p> <p>A best practice repository for knowledge of practice that is identified and explored during the project, which provides guidance to internal and external users for developing and implementing resilience network strategies and approaches in the future.</p> <p><b>Impact:</b> VH (Very High) or H (High) in resilient and collaborative supply networks for the purpose of the open innovation in the mass customisation manufacturing sector.</p>
Usability / Complexity	<p>TR: Training Required</p> <p>CR : Consulting Required</p>
Exploitation	B: Both internal and external
Exploitable result type (way to exploit)	<p>R: Report and tools;</p> <p>M: Methodology (Procedure, Best Practice, Guidelines);</p>
Expected development stage at the end of the project	N: Adaptation to new theories, approaches and tools is needed
Amount of work required after the project end to ensure exploitation	Estimation of man month = 6MM
Time to Market / Time to use	Months after project end = 6



Project	REPLANET - Resilient Multi-Plant Networks	Project - No	229333
Work Package	Exploitation	WP - No	WP8
Document	Deliverable D8.1	Save Date	29/10/2010

## II.2.4 WP4 REPLANET Simulation and Optimization Decision Support

**Table 12: Result description: REPLANET Computational DSS Tool**

Describe the innovation content of result	<p>The existing problem:</p> <ul style="list-style-type: none"> <li>- <i>“<b>Supply networks</b> are complex systems with high level of interdependence between its elements, as well as inherent feedback loops, non-linearities, and delays” (Forrester, 1961; Sterman, 2000).</i></li> <li>- <i>“It is difficult to understand <b>complex systems</b> and make changes to globally improve their performance without a model of the system. In order to make informed decisions, decision makers must have a <b>holistic view</b> 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 chain performance” (Cope et al, 2007).</i></li> <li>- <i>“With decision support tools based on <b>mathematical models, spreadsheets</b> or <b>process map methodologies</b>, decision makers are making decisions based on <b>too many assumptions</b> that very rarely hold true” (Fowler, 1998).</i></li> <li>- <i>“Simulation provides the essential level of <b>realism</b> and utility <b>required to model supply chain environments</b> accurately” (Cope et al, 2007).</i></li> <li>- <i>“Simulation is a <b>versatile and powerful tool</b> for approaching the study of <b>supply networks’ configurations</b>, dynamic behaviour, and performance, in different conditions and environments” (Shapiro, 2001; Terzi and Cavalieri, 2004).</i></li> </ul> <p>New uses of known technology through implementing <b>Result-3</b> in a computational simulation-optimization environment:</p> <ul style="list-style-type: none"> <li>- Simulation &amp; Optimization computational decision support tool to re-design and innovate a multi-plant network architectural and managerial design, by conducting realistic what-if simulations of the alignment between the triad PF-P&amp;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), evaluating alternative flexible multi-plant network dynamic structures, strategies and policies, that optimize the response to customized market demands at the lowest possible cost and time.</li> </ul> <p>Nature of exploitable result:</p> <ul style="list-style-type: none"> <li>- Professional consulting service software tool</li> <li>- Basic web DSS tool version (management flight simulator or microworlds) e.g. (1) <a href="http://www.iseesystems.com/community/downloads/NetsimModels.aspx">http://www.iseesystems.com/community/downloads/NetsimModels.aspx</a>, (2) <a href="http://www.strategydynamics.com/shop/">http://www.strategydynamics.com/shop/</a>, (3) <a href="http://forio.com/">http://forio.com/</a></li> <li>- Licensed tool with training services for different profiles (developers / users): (1) online courses and videos; (2) webinars; (3) workshops; (4) technical support.</li> </ul>
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Project	<b>REMPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

Who will be the customer?	<p>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.</p> <p>Specially enterprises formed by global multi-plant networks.</p>																														
What benefit will it bring to the customers?	<p>Optimize the response to customized market demands at the lowest possible cost and time. As stated in section B3-Impact of REMPLANET Annex I the estimations are:</p> <table border="1"> <thead> <tr> <th>IMPACT</th> <th>%</th> <th>unit</th> </tr> </thead> <tbody> <tr> <td>Increase the efficiency and robustness of the mass customization production flexibility balance to enable smaller lot sizes.</td> <td>29%</td> <td>lot sizes reduction</td> </tr> <tr> <td colspan="3">Increasing the efficiency and robustness of global manufacturing-logistics networking:</td> </tr> <tr> <td>- lead-time reductions</td> <td>29%</td> <td>time reduction</td> </tr> <tr> <td>- improvements in delivery reliability</td> <td>19%</td> <td>reliability increase</td> </tr> <tr> <td>- increase customer service level</td> <td>23%</td> <td>service increase</td> </tr> <tr> <td>- reductions in process and finished products' stock</td> <td>16%</td> <td>stock reduction</td> </tr> <tr> <td>- reduction of logistics costs</td> <td>18%</td> <td>cost reduction</td> </tr> <tr> <td>- total cost reduction</td> <td>17%</td> <td>cost reduction</td> </tr> <tr> <td>Overcoming the complexity of operating in several production networks at the same time facilitating an increase in the business volume.</td> <td>19%</td> <td>business volume increase</td> </tr> </tbody> </table>	IMPACT	%	unit	Increase the efficiency and robustness of the mass customization production flexibility balance to enable smaller lot sizes.	29%	lot sizes reduction	Increasing the efficiency and robustness of global manufacturing-logistics networking:			- lead-time reductions	29%	time reduction	- improvements in delivery reliability	19%	reliability increase	- increase customer service level	23%	service increase	- reductions in process and finished products' stock	16%	stock reduction	- reduction of logistics costs	18%	cost reduction	- total cost reduction	17%	cost reduction	Overcoming the complexity of operating in several production networks at the same time facilitating an increase in the business volume.	19%	business volume increase
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When is the expected date of achievement in the project (Mth/yr)?	M36: April 2012																														
When is the time to market (Mth/yr)?	The time to market estimation is 12 months after project end = May 2013																														
What are the costs to be incurred after the project and before exploitation?	The amount of work required after the end of the project to ensure the exploitation (full product with GUI, training material, tutorial, etc) has been estimated in 18MM (around 170,000€)																														
What is the approximate price range of this result / price of licences?	<ul style="list-style-type: none"> <li>Professional consulting service software tool: The fee for the consulting service will vary according to each consulting firm, e.g. 100€/hour/consultant. An ordinary consulting service could imply 40-60 days of two consultants = around 90,000€/service.</li> <li>Basic web DSS tool version (management flight simulator or microworlds) e.g. (1) <a href="http://www.iseesystems.com/community/downloads/NetsimModels.aspx">http://www.iseesystems.com/community/downloads/NetsimModels.aspx</a>, (2) <a href="http://www.strategydynamics.com/shop/">http://www.strategydynamics.com/shop/</a>, (3) <a href="http://forio.com/">http://forio.com/</a> Ordinary training services like online courses and videos, webinars, workshops, etc, will be priced according to market standards.</li> <li>Licensed tool with training services for different profiles (developers / users): Developers: Initial estimation of 15,000€/license plus 2,500€/year/license for general maintenance and general technical support issues. Users: Initial estimation of 10,000€/license plus 2,000€/year/license for general maintenance and general technical support issues.</li> </ul>																														

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

<p>What is the market size in M€ for this result and relevant trend?</p>	<p>As stated in section B3-Impact of REPLANET Annex I, 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.</p>																
<p>How this result will rank against competing products in terms of price / performance?</p>	<p>In terms of performance, regards the tasks described in the following table, it will rank in the top positions.</p> <table border="1" data-bbox="517 714 1366 1346"> <tr> <td><b>Supply Network Configuration</b></td> </tr> <tr> <td>Determine the appropriate configuration of the supply network for different demand scenarios</td> </tr> <tr> <td>Determine the appropriate configuration of the supply network to supply products through a distribution channel or to a specific geographical area</td> </tr> <tr> <td>Determine a new supply network configuration resulting from the adding or eliminating suppliers, plants, warehouses, retail outlets, and so on</td> </tr> <tr> <td><b>Product Structure and Supply Network Configuration</b></td> </tr> <tr> <td>Determine the appropriate configuration of the supply network regards different customers' behaviors, i.e. customized products</td> </tr> <tr> <td>Determine the appropriate configuration of the supply network to supply products belonging to one product family</td> </tr> <tr> <td><b>Processes and Operation Management and Supply Network Configuration</b></td> </tr> <tr> <td>Determine the appropriate production capacity of the supply network for different demand scenarios</td> </tr> <tr> <td>Define the appropriate process structure for different resource and capacity scenarios of the supply network</td> </tr> <tr> <td>Determine the appropriate replenishment strategy and the more appropriate inventory levels for the products belonging to a node of the supply network</td> </tr> <tr> <td>Determine the most appropriate planning and launch frequency for production orders</td> </tr> <tr> <td><b>Products, Processes and Supply Network Configurations</b></td> </tr> <tr> <td>Determine the appropriate product structure for different resource and capacity scenarios of the supply network</td> </tr> <tr> <td>Determine the point in the process and in the supply network where the customer order is customized</td> </tr> <tr> <td>Determine the appropriate order fulfillment strategy for each product family</td> </tr> </table> <p>And in terms of price, as the main exploitation vehicle already considered is the consultancy one, it will depend on the service fee applied.</p>	<b>Supply Network Configuration</b>	Determine the appropriate configuration of the supply network for different demand scenarios	Determine the appropriate configuration of the supply network to supply products through a distribution channel or to a specific geographical area	Determine a new supply network configuration resulting from the adding or eliminating suppliers, plants, warehouses, retail outlets, and so on	<b>Product Structure and Supply Network Configuration</b>	Determine the appropriate configuration of the supply network regards different customers' behaviors, i.e. customized products	Determine the appropriate configuration of the supply network to supply products belonging to one product family	<b>Processes and Operation Management and Supply Network Configuration</b>	Determine the appropriate production capacity of the supply network for different demand scenarios	Define the appropriate process structure for different resource and capacity scenarios of the supply network	Determine the appropriate replenishment strategy and the more appropriate inventory levels for the products belonging to a node of the supply network	Determine the most appropriate planning and launch frequency for production orders	<b>Products, Processes and Supply Network Configurations</b>	Determine the appropriate product structure for different resource and capacity scenarios of the supply network	Determine the point in the process and in the supply network where the customer order is customized	Determine the appropriate order fulfillment strategy for each product family
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<p>Who are the competitors for this result?</p>	<p>Management &amp; IT consultancy firms.</p>																
<p>How fast and in what ways will the competition respond to this result?</p>	<p>As a preliminary assumption it could be said that if we sell licenses to our potential competitors and their consultants are also trained as auditors in Result 3, the competitive advantage (expertise) we begin with could be significantly reduced in about 5-10 years.</p>																
<p>Who are the partners involved in the result?</p>	<p>SUPSI will complete this part according to B and F matrix</p>																

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

Who are the industrial partners interested in the result (partners, sponsors, etc...)?	IKERLAN, UPVLC, SUPSI, BIMATEC, GHEPI, CRIT
Have you protected or will you protect this result? How? When?	The result would be protected through COPYRIGHT before its launch to the market and afterwards through LICENCE AGREEMENTS when required.

**Table 13: REMPLANET Computational DSS Tool Exploitable result characterisation**

Deliverable	D4.2 Integrated REMPLANET Simulation and Optimization DSS prototype
Benefits and their impact	<p>Re-design and innovate a multi-plant network architectural and managerial design, by conducting realistic what-if simulations of the alignment between the triad PF-P&amp;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), evaluating alternative flexible multi-plant network dynamic structures, strategies and policies, that optimize the response to customized market demands at the lowest possible cost and time.</p> <p><b>Impact:</b> VH (Very High) or H (High) in sectors with medium/high degree of customized orders</p>
Usability / Complexity	CR : Consulting Required
Exploitation	B: Both
Exploitable result type (way to exploit)	<p>S: Software;</p> <p>T: Tool;</p> <p>WS: Web Service</p>
Expected development stage at the end of the project	<p>P: Prototype</p> <p>N: new and needing further development</p>
Amount of work required after the project end to ensure exploitation	Estimation of man month = 18MM
Time to Market / Time to use	Months after project end = 12

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP - No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## II.2.5 WP5 REPLANET SOP4EBPM Implementation

**Table 14: result description: ICT platform for collaborative business processes**

Describe the innovation content of result	<p>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.</p> <p>Most of currently used tools supporting them are based on ERP systems or internally deployed Business Process Management Systems. Poor BP integration mechanisms are provided and interoperability barriers are high.</p> <p>The ICT Platform for Collaborative Business Processes will be supported in three main pillars:</p> <ul style="list-style-type: none"> <li>- Modelling and execution of extended business processes for industrial applications.</li> <li>- Open Source BPMS as a core component of extended BPM</li> <li>- Service-oriented architecture approach when lowering interoperability barriers for newcomers is needed.</li> </ul> <p>Those three components will be combined into a single solution intended to support mass-customization scenarios.</p>
Who will be the customer?	Companies being able of managing their whole supply chain. As many partners are involved, more profitable may be this solution.
What benefit will it bring to the customers?	<p>The expected benefits are:</p> <ul style="list-style-type: none"> <li>- Global view of their business processes</li> <li>- Single application for extended business process management</li> <li>- A service oriented architecture enabling seamless integration and interoperability with partners</li> <li>- Open source-supported solution. The platform will run on top of an OS BPMS.</li> </ul>
When is the expected date of achievement in the project (Mth/yr)?	08/2011 (prototyped version)
When is the time to market (Mth/yr)?	12/2012
What are the costs to be incurred after the project and before exploitation?	0,7 M€

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

What is the approximate price range of this result / price of licences?	Server: 30-70K € (estimated) Additional node: 3-6K € (estimated annual fee)
What is the market size in M€ for this result and relevant trend?	Unknown
How this result will rank against competing products in terms of price / performance?	Market study must be carried out
Who are the competitors for this result?	Next generation of ERP systems.
How fast and in what ways will the competition respond to this result?	They may react quickly since the conceptual base is already available. However, we expect to identify additional revenue sources and making nodes almost free (or fee based)
Who are the partners involved in the result?	SUPSI will complete this part according to B and F matrix
Who are the industrial partners interested in the result (partners, sponsors, etc...)?	GHEPI? VL Idrodinamica is interested in exploiting this result. The ICT platform for collaborative business process could be useful in VL to model and perform current and future business processes for industrial applications. Every process which involves two or more actors of the supply chain could be mapped and put into the system. The involved actors could have the access to the platform and have a general view of the different phases of the process. VL expects the platform will provide the following benefits: - Global view of business processes - Single application for extended business process management In order to directly manage relations with existing and new customers and their suppliers, and to rapidly and efficiently satisfy their requests, VL considers the study and the implementation of the platform as tasks to be carried out as soon as possible.
Have you protected or will you protect this result? How? When?	To be discussed

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

**Table 15: ICT platform for collaborative business processes Exploitable result characterisation**

Deliverable	D5.6 SOA <sup>4</sup> EBPM Platform
Benefits and their impact	Methodology to define EBP in Multi-Plants Networks (Impact: High) Efficient real time collaboration planning and execution (Impact: High) Interoperability functionalities for systems integration (Impact: High) Provide business and Information Technology flexibility (Impact: High)
Usability/Complexity	TR: Training Required CR: Consulting Required
Exploitation	B: Both (External & Internal)
Exploitable result type (way to exploit)	S: Software M: Methodology (Procedure, Best Practice, Guidelines)
Expected development stage at the end of the project	P: Prototype
Amount of work required after the end of the project to ensure the exploitation	To be defined
Time to Market (Time to use)	12 Months

### II.3 EXPLOITATION STRATEGY AND IPR MANAGEMENT

The establishment of a suitable exploitation strategy requires to previously identify the characteristics of the exploitable results, the benefits they can provide and the nature of the potential addressees. For this reason, the content and structure of the proposed framework for exploitation strategy establishment and assessment (table 10) is still under development and can vary according to the evolution of the information obtained in section II.2. In the preliminary phase the information are mainly qualitative and are mostly provided by the RTD partners responsible of leading the various work-packages. However, a first draft of the structure is provided in order to start validating and enriching it, through the contributions of the involved consortium members, from the project beginning.

Another checklist is developed and presented in this section (table 11), the one describing the IPR ownership and management. This is necessary for recognising from the beginning potential conflicts and according to that preparing suitable rules and documents for ensuring to all project consortium members the fair project results exploitation.

From the ESS meeting the partners identified background and foreground knowledge and the IPR claims of each result. Here below is presented the table summarising the information about the knowledge that each partner contributes for each exploitable result. The knowledge is divided in Background (B) and Foreground (F). Finally in the same table each partner's exploitation claims are shown using specific alphabetical letters.

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

- making them and selling them (M)
- using them internally to make something else for sale (U). U applies also to universities willing to use the result in new research projects.
- to license them to 3rd parties (L);
- to provide services such as consultancy, etc...(O).

**Table 16: Exploitation Strategy checklist**

RESULTS/ PARTNERS	Platform for open process innovation	Toolkit for customer codesign	Operational reference model and Toolbox	Integrated strategic alignment workbook and tool	Resilient Multi-Plant Networks Computational DSS Tool	ICT platform for collaborative business processes
UPVLC			F U O	O	F U O	B F M U L O
IKERLAN	B F U O	B F U	B F M U O	F U O	B F M U L O	
RWTH	B F M U L O	B F M U L O	F U O	F U O		
ULIV				F M L O		
SUPSI	F U O	U			F U O	
BIMATEC	U	U	B F U	F U	F U	
FESTO	F U	B M U L O				
VL-idrodinamica			U			F U
GHEPI					F U	F U
KING & FOWLER				B U		
NEWTON	U	U				
ITI						B M U L O
CRIT	B U		U	U	U	B M U O

The ESS coach made the following comments about the table:

- The exploitation claim matrix looks quite dense.
- There are research organisations (for instance UPVLC, IKERLAN, RWTH) that claim the intention to exploit nearly all the exploitable results even through activities (manufacturing and selling) that are not typical of a research organisation such as manufacturing.
- Many beneficiaries don't seem to have yet a consolidated strategic orientation about the exploitation of the identified results. They declare the intention of exploiting them in any possible way apparently without any specific business model in their mind. This aspect is particularly evidenced in the exploitation claims of the Research Organisation but also, to a much lesser extent, by FESTO



Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

- Looking just at the industry beneficiaries, the tables don't show worrying conflicts about their intentions of manufacturing or licensing. Indeed all the industrial organisation, but FESTO, express the intention to use the exploitable result within their organisation but do not claim to exploit them as products or services to be put on the market.

Some of the problems underlined by the ESS coach have already been mitigated with the revised table presented above. Moreover, the detailed checklists provided in Table 10 and 11 will be used during the second half of the project for further refining background and foreground ownership as well as all exploitation claims. A preliminary and partial version of the information provided for each exploitable result by the various partners about Exploitation Strategy and IPR Management have been already presented in the previous version of this deliverable. Updated versions of the content of these checklists will be regularly provided, at the end of the project the finalised version will be integrated into the "D8.3 Exploitation supporting toolkit".

**Table 17: Exploitation Strategy checklist**

<p>Addressees</p> <p>(it is required from the RTD and partially from the Industrial partners to provide the typology of addresses in order to further undertake the quantitative assessments)</p>	<p>Type: Sector, Size, Existing/New markets, etc.</p> <p>Potential user groups: list</p> <p>Number (Awareness Interest Decision Achievement -AIDA- model)</p> <p>SUPSI will provide quantitative estimation with the support/contributions of RTD &amp; industrial partners</p>
<p>Plan for future development</p> <p>(Comments: it is advisable to distinguish between Internal and external exploitation/development)</p>	<p>SR: Sponsored Research</p> <p>FP: Funded project</p> <p>SD: Self Development</p> <p>S/L: Selling or Licensing</p> <p>BA: Business Angels</p> <p>VC: Venture Capitalists</p> <p>IB: Invention Brokers</p>
<p>Exploitation Vehicles</p>	<p>MF: Membership Fees</p> <p>SR: Software Registration</p> <p>L: Licensing (many types)</p> <p>A: Advertising</p> <p>C: Consultancy</p> <p>IU: Internal Use</p> <p>US: Use them for making something else to Sell</p> <p>S : Selling</p> <p>NC: New Company owned by the consortium</p>

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

Exploitation	SA: Stand Alone I: Integrated
Standards and Accreditations	NC: Not Compliant PC: Partially Compliant FC: Fully Compliant CCA: Compliance as Competitive Advantage
Importance of Standards and Accreditations	VH: Very High H: High M: Medium L: Low VL: Very Low
Suppliers (list and roles)	CM: Consortium Member TT: Technology Transfer Office NC: New Company owned/participated by consortium members PO: Professional Organisation CC: Chambers of Commerce SP: Service Provider EC: External Company JV: Joint Venture
Main Stakeholders (list, role, when they have to participate, who have to contact them)	TRP: Technological and Research Partners FP: Financial Partners CP: Commercial Partners C: Competitors CEU: Customers and End Users PLA: Public and Legal actors IL: Influencers and Lobbyists NGO: Non Governmental Organisations
Role Return of Investment (ROI)	The Role and ROI of each partner taking part to REMPLANET should be processed.
Market evolution (Porter 5 forces)	Cannot be yet specified
Route to market (marketing approach and strategy): tools, rules	Cannot be yet specified

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

**Table 18: IPR management checklist**

Required Background (positive list, rights of the various consortium members)	<p>List</p> <p>O: Ownership</p> <p>U: Use for exploitation</p> <p>A: Access during the project</p>
Background Management & Protection (Comments: dependent from the way to exploit and the involved entities)	<p>Licensing Type</p> <p>FU: Free of charge Use</p> <p>FRL: Free of Charge Research purpose Licensing (of Foreground and necessary Background)</p> <p>FEL: Free of Charge Educational purpose Licensing (of Foreground and necessary Background)</p> <p>FCL: Free of charge Commercial Licensing</p> <p>RCL: Royalty based Commercial Licensing</p> <p>CL: Cross Licensing</p> <p>Licensing Domain</p> <p>EL: Exclusive Licensing</p> <p>NEL: Non Exclusive Licensing</p> <p>Nature (irrevocable or not)</p> <p>Duration (perpetual, etc.)</p> <p>Territory (worldwide, etc.)</p> <p>Field of use (list of applications)</p> <p>Rights (sub-license, assign, first refusal, etc.)</p>
Required Foreground	<p>List</p> <p>O: Ownership</p> <p>U: Use for exploitation</p> <p>A: Access during the project</p>
Foreground Management & Protection	<p>Type of Ownership</p> <p>JO: Joint Ownership</p> <p>SO: Single (Separate) Ownership</p> <p>IPR protection</p> <p>Required Level of Protection (VH: Very High</p>

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

	<p>H: High M: Medium L: Low VL: Very Low)</p> <p>Owner(s) Willingness to protect: Yes/No</p> <p>Consortium member willing. to protect: Y/N</p> <p>Foreground Licensing</p> <p>FU: Free of charge Use</p> <p>FRL: Free of Charge Research purpose Licensing (of Foreground and necessary Background)</p> <p>FEL: Free of Charge Educational purpose Licensing (of Foreground and necessary Background)</p> <p>FCL: Free of charge Commercial Licensing</p> <p>RCL: Royalty based Commercial Licensing</p> <p>CL: Cross Licensing</p> <p>Licensing Domain</p> <p>EL: Exclusive Licensing</p> <p>NEL: Non Exclusive Licensing</p> <p>Nature (irrevocable or not)</p> <p>Duration (perpetual, etc.)</p> <p>Territory (worldwide, etc.)</p> <p>Field of use (list of applications)</p> <p>Rights (sub-license, assign, first refusal, etc.)</p>
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## II.4 CONCLUSIONS

At this stage the deliverable provided a comprehensive list of the exploitable project outcomes also thanks to the ESS meeting that helped the consortium to focus on the concrete results description and the initial exploitation strategy. Moreover, the information about background and foreground management and ownership is complete in its starting framework, but it is partial and reflects mainly the beliefs of the work-package leaders, who were the most involved in the redaction of this first version of the deliverable. Nevertheless, on the basis of the project objectives and of the information collected till now a series of interesting remarks can be made:

- the project aims at helping SMEs in the manufacture of machinery and equipment sector;
- the project proposes a radical paradigm change, fostering the adoption of mass-customisation, open innovation, non-hierarchical manufacturing network and the recourse to non-centralised decision-making;

Project	<b>REMPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

- the identification of a suitable resilient network is rather complex and involve many “variables”, this requires the development of a reference model and of a simulation and optimisation decision support software;
- the applicability of existing software, for instance simulation and optimisation, is evaluated giving the priority to open source packages;
- the Business Process Modelling Notation is defined as much as possible on the basis of existing standards;
- a Service Oriented Architecture is developed to ensure interoperability and re-use of the developed tool in the framework of dynamic collaboration in non-hierarchical manufacturing networks.

The use of simulation and optimization software requires specific competences usually not mastered by SMEs. It should be remarked that the efforts required for undertaking simulation studies can be cumbersome for SMEs, for this reason production management simulation is not part of the day-by-day company activities but it is employed on a one shot basis for evaluating the best alternative when radical changes are required. Furthermore, considering the dynamic composition of the company networks, no guarantees can be provided that the SME acquiring these competences will continue to be involved in the network.

For the reasons cited above, at this stage of project development, the most promising exploitation strategy of some of the REMPLANET results seems linked to their utilization by consulting companies/institutes. This is in compliance with the information collected till now about exploitable results, which show that usually consulting activities are required in order to effectively exploit their benefits.

Nevertheless, the development of a BPMN-based extended business process modelling methodology as well as the recourse to a Service Oriented Architecture (SOA,) ensuring interoperability and an easily re-use of the developed tools, can also facilitate the direct use of some of the REMPLANET results and tools by the SMEs wishing to establishing a non-hierarchical manufacturing networks or more generally being involved in collaborative activities. In particular, the use of a SOA can facilitate the development of some web services in which the first step of the analysis is directly undertaken by the involved SMEs that, in a second phase, send the required information to a third party in charge of undertaking some specific analysis/task. This strategy can be particularly interesting and effective when some task requires specific competences and/or (expensive) tools. For instance, if some proprietary simulation software is required (for which an industrial licence can cost various dozen of thousand Euros to which should be added the time required to learn to use it), the SME can undertake the modelling of its own business processes according to the developed BPMN and transfer the data via a web service to the consultant who takes care of running the simulation model and collecting the results. In this way, the investments due to the acquisition of specific knowledge/tool can be easily leveraged while allowing a stronger involvement of the potential network members into the methodological phases.

Other REMPLANET results, supporting collaborative activities on a day-by-day basis for which thus the investments/efforts made by companies to implement and integrate them are easily leveraged due to their positive impact on many operational activities, can be easily

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

exploited by the companies belonging to the consortium as well as by other companies external to it without the recourse to any intermediary/consultant.

As soon as more detailed data about the various exploitable results will be available a suitable exploitation strategy and the relative business model will be developed. The latter will also depend on the use of a specific stand alone exploitation strategy for each result instead of the recourse to an integrated exploitation strategy, which aims to deliver a complete framework enabling the concurrent and coherent utilisation of many of the exploitable results. The development of an integrated exploitation strategy is more challenging due to the potentially different requirements, in terms of usability/complexity and exploitation vehicles that can characterise the various exploitation results. However, both exploitation strategies can be carried out in parallel involving different consortium members and/or external partners and relying upon different business models.

Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

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([http://www.ipr-helpdesk.org/documents/ES\\_IPRManCons\\_0000006640\\_00.xml.pdf](http://www.ipr-helpdesk.org/documents/ES_IPRManCons_0000006640_00.xml.pdf))

Project	<b>REMPANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## TABLES

Table 1: List of exploitable results, involved partners and main RTD responsible .....	10
Table 2: Exploitable result characterisation checklist .....	11
Table 3: Result description: Platform for open process innovation in the domain of mass customization .....	12
Table 4: Platform for open process innovation in the domain of mass customization Exploitable result characterisation.....	14
Table 5: Results description: Tool for integration of customer ideas and innovations .....	15
Table 6: Tool for integration of customer ideas and innovations Exploitable result characterisation.	16
Table 7: D1.4 Exploitable result characterisation .....	17
Table 8: Results description: Operational REMPLANET Model and Toolbox.....	17
Table 9: Operational REMPLANET Model and Toolbox Exploitable result characterisation.....	21
Table 10: Result description: Integrated strategic alignment workbook and tool .....	22
Table 11: D3.5 Integrated strategic alignment workbook and tool Exploitable result characterisation .....	24
Table 12: Result description: REMPLANET Computational DSS Tool.....	25
Table 13: REMPLANET Computational DSS Tool Exploitable result characterisation .....	28
Table 14: result description: ICT platform for collaborative business processes.....	29
Table 15: ICT platform for collaborative business processes Exploitable result characterisation.....	31
Table 16: Exploitation Strategy checklist .....	32
Table 17: Exploitation Strategy checklist .....	33
Table 18: IPR management checklist .....	35



Project	<b>REPLANET - Resilient Multi-Plant Networks</b>	Project - No	<b>229333</b>
Work Package	Exploitation	WP – No	<b>WP8</b>
Document	Deliverable D8.1	Save Date	<b>29/10/2010</b>

## **ANNEX I**

### **ESS Synthesis Report**

Separated document.