



## *D8.6 FITMAN Phase III Package and SEs Terms and Conditions (Final)*

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## VERSION HISTORY

VERSION	DATE	NOTES AND COMMENTS
0.1	29/05/2014	First version of Table of Contents with contributors shown
0.2	06/06/2014	Minor corrections made to ToC: added a D1.6 v2 summary; subsection 5.2 is about D6.4, not D4.4; POLIMI not INNOV is responsible for the D1.2 summary; the D9.2 summary is now confirmed; section 7.4 is now confirmed; ENG is responsible for section 6.2
1.0	22/06/2014	First drafts of all materials added, except introductory text of Section 4.1 (D5.1 summary), introductory text of Section 5.1 (D6.1 summary), text of Section 6.1 (T&Cs for SEs) and text of Section 8.1 (Assessing D8.5).
1.1	27/06/2014	First drafts of remaining materials added: introductory text of Section 4.1 (D5.1 summary), introductory text of Section 6.1 (D6.1 summary), text of Section 6.1 (T&Cs for SEs) and text of Section 8.1 (Assessing D8.5).
1.2	30/06/2014	Updated Google Analytics data about country of origin (section 8.1.2). Added the WireCloud GE for Trial #5 (section 3.1), updated the APR trial information about SEs and GEs (section 5.1). Various updates made in light of peer review feedback (see deliverable peer review summary table).
1.3	02/07/2014	Minor edits to improve clarity.

## DELIVERABLE PEER REVIEW SUMMARY

ID	Comments	Addressed (✓) Answered (A)
1	General comments in line; consider generating a list of abbreviations / acronyms.	In-line feedback from Reviewer One has been acted upon. A Terms List includes abbreviations and acronyms.
2	There's quite a lot of repetition of similar information: e.g. the description of components for DF, VF, SF and for individual trials. Can this not be replaced with cross-references? It may be difficult to maintain the document with similar information distributed across the document.	This is true, and reflects the dual nature of D8.6: the primary mechanism by which Phase III Participants will access this Package is the website, where each section will have an individual page. It is therefore helpful to include relevant text or images within each individual page – or in this case, within each individual section of the document. For this reason and as is observed, some material is repeated (i.e. Figures 12 and 13; Figures 17 and 19).
3	Consider consolidating common sections (e.g. when describing the ECOGRAI-derived assessment methodology) to avoid duplication.	See response to comment 2.
4	Comments, questions and suggestions are presented along the text.	In-line feedback from Reviewer Two has been acted upon.

5	Update Word automatic fields	Done.
6	There are several figures and tables. Consider to include a “Table of Figures” and a “Table of Tables”	Done.

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## EXECUTIVE SUMMARY

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This deliverable is a follow-on to D8.5, providing further information to FI-PPP Phase III participants, both the 16 Phase III “accelerator” projects and project partners joining in the Open Calls that start later in 2014. There are updates to content already introduced in D8.5, such as summaries of the final technical deliverables on the FITMAN architecture, selection of FI-WARE General Enablers (GEs) and the Specific Enablers (SEs) developed in FITMAN. The final Terms and Conditions for the SEs are also included.

Further information about the smart, digital and virtual factory trials is included in the form of summaries of deliverables concerning the systems (prototypes demonstrating use of Generic Enablers in combination with the FITMAN Specific Enablers in the given domains) and business and technical indicators. As in D8.5, the online version of this deliverable includes links to full versions of public deliverables and public versions of confidential deliverables.

D8.5 presented several methodologies, tools and check lists available to both Phase III accelerators and Open Call projects. We add to this repository a methodology for conducting a socio-economic impact assessment of Future Internet technologies, based on the FITMAN trials with a specific discussion of applying this methodology to Phase III Proposals and Projects.

As FITMAN is a Phase II use case project, having run for 15 months at the time of writing, this deliverable also includes a section on the lessons learned regarding involvement in the FI-PPP, which is primarily targeted at the 16 Phase III accelerators. In addition, there is a section on the assessment of the Phase III support impact, which includes an assessment of D8.5 and the results from the webinars that FITMAN hosted for Phase III. We also present updates made to D8.5 in terms of usability improvements and the support process, which now focuses on supporting the Phase III accelerators and project partners joining via the Open Calls.

The online version of this deliverable will be continually maintained during the course of the project. Interested readers can keep up to date via the following channels:

- Website: <http://www.fitman-fi.eu/phase-iii-package>
- Support email: [fitman-phase-iii-info@txtgroup.com](mailto:fitman-phase-iii-info@txtgroup.com)
- Twitter: <https://twitter.com/FitmanFI>
- LinkedIn: <http://www.linkedin.com/groups?about=&gid=4986259>



## TERMS USED

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**FITMAN – Future Internet Technologies for MANufacturing:** EC project No. 604674 (The FITMAN Consortium, 26 June 2013), under which work described in this report was carried out.

**FI-PPP - Future Internet Public-Private Partnership:** The Public-Private Partnership programme for Internet-enabled innovation, in the scope of which the FITMAN project is funded.

**FoF - Factories of the Future:** One of the Public-Private Partnership programmes included in the European Commission's recovery package. The objective is to help EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by improving the technological base of EU manufacturing across a broad range of sectors (European Factories of the Future Research Association).

**SF - Smart Factories:** One of the three Domains defined by FoF. Its scope is agile manufacturing, customisation, efficiency and safety.

**DF - Digital Factories:** One of the three Domains defined by FoF. Its scope is manufacturing design and product lifecycle management.

**VF - Virtual Factories:** One of the three Domains defined by FoF. Its scope is global networked manufacturing and logistics.

**UC - Use Case:** The behaviour of a complex system (people + organisation + infrastructure + software) targeted at the achievement of a specific business goal. In the FITMAN context, it may refer to one of the implemented experiments in a Trial, or to one of the abstract and generic cases characterizing the FoF Domains.

**GE - FI-WARE Generic Enabler:** Software element which offers reusable and commonly shared functions serving a multiplicity of usage areas across various sectors (FI-WARE)

**SE - Specific Enabler:** Software element which offers reusable and commonly shared functions in the context of a specific usage area (FI-WARE).

**TSC - FITMAN Trial-Specific Component:** Software element which offers a set of ad-hoc functions in the context of a specific FITMAN Trial.

**FP - FITMAN Platform:** A platform constructed as an integrated set of GEs and SEs, targeted at a specific Use Case.

**SME – Small and Medium Enterprise:** companies whose personnel numbers fall below certain limits. Small companies consist of up to 50 employees, while medium companies have up to 250 employees. SMEs are expected to participate in Phase III of the FI-PPP.

**WE – Web Entrepreneur:** An entrepreneur whose business depends upon the web. Like SMEs, WEs are expected to participate in Phase III of the FI-PPP.

**STEEP - Social Technological Economical Environmental Political:** STEEP objectives are included in the 'ICT for Manufacturing' and 'Future Internet Enterprise Systems' EU research roadmaps (The FITMAN Consortium, 26 June 2013). One FITMAN goal is to contribute to the STEEP of EU manufacturing industries.

**RFID – Radio Frequency Identification:** the wireless non-contact use of radio-frequency electromagnetic fields to transfer data. This technology has been identified as relevant to various of the FITMAN trials.

## 1 INTRODUCTION

This report documents FITMAN D8.6, the Phase III Information Package, which is a set of resources to support the use of FITMAN results in Phase III, and is disseminated via the FITMAN website<sup>1</sup>. First, FITMAN Task 8.4 is described, after which a description of the scope and structure of the document is provided. The links between D8.6 and other FITMAN work packages and deliverables is enumerated, including an index linking sections of D8.5 with other FITMAN deliverables. This lets the reader to lookup summaries of specific FITMAN deliverables with ease. This is followed by an overview of the relationship of this final iteration to the Phase III Information Package with the first version, D8.5.

Note that this report describes FITMAN D8.6, but is not identical to it. Material provided within this section, Section 1, does not appear on the D8.6 website, with the exception of Table 2, which shows the mapping between FITMAN deliverables and their summaries within D8.6.

### 1.1 Task 8.4 Description

This document exists to support FI-PPP Phase III proposals which intend to address Use Case expansion in the manufacturing domain. The task that led to this document, FITMAN Task 8.4 (T8.4), is entitled FITMAN Support to Phase III Expansion of Use Cases. The task is to: “package FITMAN knowledge (namely methods and conceptual frameworks) and assets (namely Specific Enablers and Reference Architectures) in order to be used by Phase III proposals and projects in obj 1.8 Expansion of the Use Cases, including SEs Terms and Conditions” (The FITMAN Consortium, 26 June 2013).

T8.4 yields two deliverables:

- 1) D8.5, the predecessor to this document, which was due at M06 of the FITMAN project and supported Phase III proposals
- 2) D8.6, this document, due at M15. D8.6 supports the 16 successful Phase III “accelerators” and the projects who will bid to the Open Calls of these later in 2014.

After its release at FITMAN M15 (July 2014), the online version of this document will be regularly updated to reflect updates to the information contained within. In the case of questions, please use the information channels described in the Executive Summary.

At the FITMAN M6 review, reviewers advised FITMAN partners to pay heed to the assessment of impact of support to Phase III: Section 8 focuses on this topic. Other advice from the M6 review included that we report on how access will be granted to FITMAN Platforms and SEs (Section 6), and report on support procedures (Section 9.2).

### 1.2 Document Scope and Structure

As noted in Section 1.1, D8.6 packages FITMAN knowledge (methods and conceptual frameworks) and assets (Specific Enablers and Reference Architectures) from month six to month fifteen of the FITMAN project. D8.6 is available as an interactive website<sup>2</sup> and as a standalone PDF document. The website includes materials from the predecessor to this document, D8.5. This document, D8.6, provides the following information:

Section 2 of D8.6 provides information and updates regarding the FITMAN architecture and trials. Sections 3, 4 and 5 present overviews of the systems and technical / business indicators

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<sup>1</sup> <http://fitman-fi.eu/>

<sup>2</sup> <http://www.fitman-fi.eu/phase-iii-package>

for the FITMAN smart, digital and virtual trials respectively. Section 6 provides details of the terms and conditions for FITMAN Specific Enablers and Platforms, while Section 7 details lessons learned regarding involvement in the FI-PPP, information about socio-economic impact assessment in the context of FITMAN, and early information about the methodology and tools for FITMAN trials expansion and web entrepreneurship. Section 8 details assessment of Phase III support impact, and Section 9 gives details of updates made to the D8.5 website in the months between M6 and M15. Section 10 concludes the deliverable, and is followed by six annexes recounting: the Phase III Package survey; questions and answers in each of the two Phase III Support webinars (two annexes); questionnaires sent to participants of each of the two Phase III support webinars (two annexes); and a list of FITMAN assets to support.

Among other items, this document packages M06 – M15 FITMAN deliverables, some of which are reports and some of which are prototypes. In the case of prototypes, D8.6 includes reports that describe the content of those prototypes and how Phase III participants may use them. Table 2 in Section 1.3 maps FITMAN deliverables with the sections that report on them within this document.

Table 1 specifies which FITMAN partners provided which sections of D8.6.

Section	Partner
Executive summary	IT INNO
1 Introduction	IT INNO
2 FITMAN Architecture and Trials	IT INNO
2.1 FITMAN Trials IT Requirements (2 <sup>nd</sup> )	POLIMI
2.2 FI-WARE Generic Enablers Selection for FITMAN (2 <sup>nd</sup> )	ATOS
2.3 FI-WARE Platform Instantiation for FITMAN smart-digital-virtual (2 <sup>nd</sup> )	ENG
2.4 FI-PPP Capacity Building Analysis (2 <sup>nd</sup> )	ENG
2.5 FI-based FITMAN Specific Enablers	PTIN
2.6 Enterprise and Data Interoperability Specific Enablers	TXT
2.7 Integrated FITMAN System	ATOS
3 FITMAN Smart Factory Trials	IT INNO
3.1 FITMAN System for Smart Factory	ATOS
3.2 Technical / Business Indicators for Smart Factory	POLIMI
4 FITMAN Digital Factory Trials	IT INNO
4.1 FITMAN System for Digital Factory	INNO
4.2 Technical / Business Indicators for Digital Factory	UNINOVA
5 FITMAN Virtual Factory Trials	IT INNO
5.1 FITMAN System for Virtual Factory	TXT
5.2 Technical / Business Indicators for Virtual Factory	UB1
6 Terms and Conditions of FITMAN Specific Enablers and Platforms	IT INNO

Section	Partner
6.1 Terms and Conditions of FITMAN Specific Enablers	PTIN
6.2 Terms and Conditions of FITMAN Platforms	ENG
7 Lessons Learned, Socio-Economic Impact and Roadmapping	IT INNO
7.1 Lessons Learned Regarding Involvement in the FI-PPP	IT INNO
7.2 Socio-Economic Impact Assessment	ATOS, IT INNO, NTUA
7.3 Methodology and Tools for Trials Expansion and Web Entrepreneurship	I-VLab
8 Assessment of Phase III Support Impact	IT INNO, INNOV
9 Updates made to D8.5	IT INNO
10 Conclusions	IT INNO

Table 1. Partner contributions to D8.6

### 1.3 Contribution to Other WPs and Deliverables

Figure 1 shows the relationship of this deliverable with other FITMAN WPs and Deliverables.

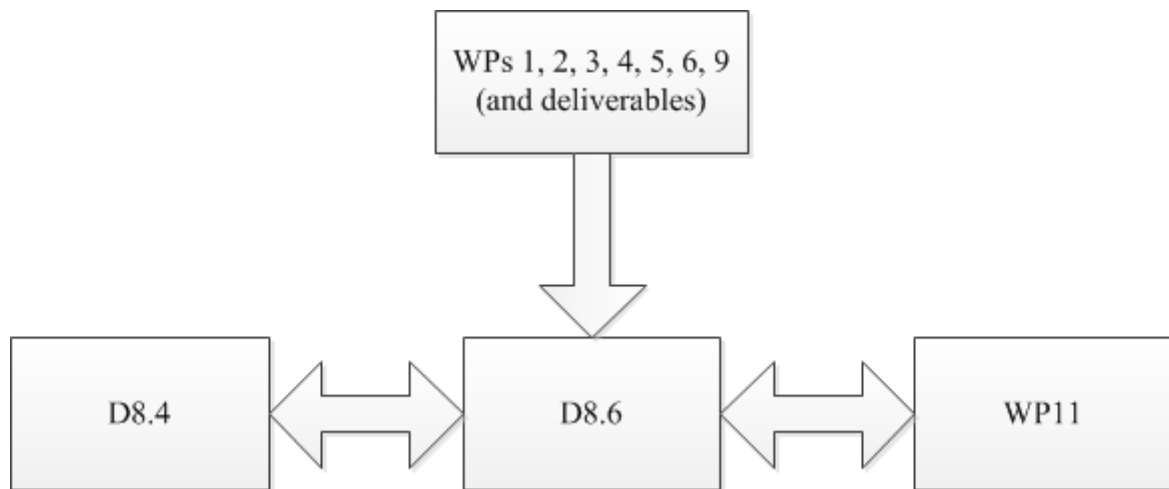
At the WP level, with the exception of WP10 (Project Management and Coordination), D8.6 interacts with all FITMAN WPs that were active in M06 – M15, packaging outputs from WPs 1, 2, 3, 4, 5, 6, 8 and 9. There has also been collaboration with WP11 about the process of disseminating WP8-relevant materials.

In terms of Deliverables, it can be seen that D8.6 and D8.4 interrelate. This is because D8.4 is responsible for producing updates to the following methodologies:

- 1) A methodology to engage and create technology awareness throughout the European networks of innovation and entrepreneurship
- 2) A methodology for SME service and application development in Phase III based on the FITMAN platform
- 3) A methodology for the proactive communication for achievements and innovation generated by SMEs in Phase III.

It is clear that these methodologies are related to the task of increasing awareness of the D8.6 materials.

Of course, all deliverables from the above named WPs relate to D8.6 in that they are packaged and presented here. For simplicity, these are not individually displayed in Figure 1, but instead are enumerated in Table 2.



**Figure 1. D8.6's relationship with other FITMAN Work Packages and Deliverables**

Table 2 shows the mapping between FITMAN deliverables and Sections of D8.6, the Phase III Package.

Topic	FITMAN Deliverable	D8.6 Section
Trials IT Requirements (2 <sup>nd</sup> )	D1.2	2.1
FI-WARE Generic Enablers Selection for FITMAN (2 <sup>nd</sup> )	D1.3	2.2
FI-WARE Platform Instantiation for FITMAN smart-digital-virtual (2 <sup>nd</sup> )	D1.4	2.3
FI-PPP Capacity Building Analysis	D1.6	2.4
FI-based FITMAN Specific Enablers	D3.3	2.5
Enterprise and Data Interoperability Specific Enablers	D3.4	2.6
Integrated FITMAN System	D3.5	2.7
FITMAN System for Smart Factory	D4.1	3.1
Technical / Business Indicators for Smart Factory	D4.4	3.2
FITMAN System for Digital Factory	D5.1	4.1
Technical / Business Indicators for Digital Factory	D5.4	4.2
FITMAN System for Virtual Factory	D6.1	5.1
Technical / Business Indicators for Virtual Factory	D6.4	5.2

**Table 2. Mapping between FITMAN deliverables and sections of D8.6**

Note that the socio-economic part of D9.2 can be found in Section 7.2 of this document, while the planned activities of T8.2 can be found in Section 7.3.

#### 1.4 Relationship with D8.5

This deliverable does not repeat materials already included in D8.5: please consult that document (Hooper, et al., 2013) to view information about FITMAN outputs up to M6 of the project. The website of the Phase III Package bundles outputs captured in D8.5 with outputs captured in D8.6. As in the first version of this deliverable, the website is not an exact replica

of this document, and for example excludes materials such as the version history, peer review summary and Sections 1.1 and 1.4.

## 2 FITMAN ARCHITECTURE AND TRIALS

This section describes outputs about the FITMAN architecture and trials at a level above that of the specific factory platforms. This includes second versions of outputs about the FITMAN trials IT requirements, FI-WARE Generic Enablers Selection for FITMAN, FI-WARE Platform Instantiation for FITMAN, and FI-PPP Capacity Building Analysis. It also includes outputs about FI-based FITMAN Specific Enablers, Enterprise and Data Interoperability Specific Enablers, and the Integrated FITMAN System.

### 2.1 D1.2 FITMAN Trials IT Requirements (2<sup>nd</sup>)

The first release of D1.2 was issued at Project Month 4 (see <http://www.fitman-fi.eu/phase-iii-package/information-for-phase-iii-bidders/fitman-architecture-and-trials/trials-it-requirements>). A second release was issued at Project Month 10, providing:

1. the second and third releases of the Generic Enablers (GEs)
2. the refined structure and contents for selected Specific Enablers (SEs) and the closure of the Open Call which brought on board new SEs components.

This deliverable will be useful to Phase III Projects as it defines a methodological approach to IT Requirements collection and definition in the context of a project that is not a “classical” software development process, but which needs to consider user and business objectives and General Enablers/Specific Enablers availability and maturity. The classification of the IT Requirements (functional and non-functional) is also allowing an analysis of their structure identifying key needs and open issues.

In order to utilize the information contained in the document it is important to gain confidence with the proposed methodology for IT Requirement classification and the Agile data collecting process. A continuous collaboration with Trials and Tasks in charge of GE analysis and SE analysis is required.

D1.2 summarises activity from T1.2. This includes analysis of trials and functional and non-functional requirements for the FI-WARE platform. The M10 release identified 178 requirements for 26 GEs (11 more than the previous release) and 233 requirements for the 8 identified SEs.

For any specific information regarding approach and details please refer to D8.5 Section 4.2 and the D1.2 M10 release.

### 2.2 D1.3 FI-WARE Generic Enablers Selection for FITMAN (2<sup>nd</sup>)

Deliverable D1.3 is useful to Phase III participants as it explains which FI-WARE Generic Enablers have been considered to be used in the FITMAN project. FITMAN is a project oriented to the manufacturing domain considering three different domains of application: Smart – Virtual – Digital. This deliverable also provides a complete description of all the Generic Enablers that have been analysed in the task in an easy to understand format, where main capabilities are highlighted. Information provided is structured following the FI-WARE chapter distribution.

FITMAN has the objective to provide the FI PPP with a set of industry-led use case trials in the Smart, Digital and Virtual Factories of the Future domains in order to test and assess the suitability openness and flexibility of FI-WARE Generic Enablers.

The FI-PPP will provide a set of tools, the FI-WARE Generic Enablers Implementations belonging to most of the identified technological Chapters of FI-WARE, to be introduced to SMEs and Entrepreneurs. By itself, each Generic Enabler will not satisfy company requirements but working together with other Generic Enablers and Specific Enablers will



provide a very complete set of tools for solving current company troubles as, for example, reducing interoperability issues, which is a main topic for manufacturing.

Task 1.3 analyses the FI-WARE Generic Enablers Implementations from the perspective of FITMAN Trials IT requirements. Obviously not all the Generic Enablers provided by FI-WARE present capabilities that are required to be introduced in a manufacturing domain, in our case, represented by the trials. That is why it is necessary to do a selection on all the available Generic Enablers from FI-WARE.

To ensure a proper knowledge for having a reasoned selection of the Generic Enablers, FITMAN project decided to have two different iterations of Deliverable D1.3 to be able to have a deep background on all the available FI-WARE Generic Enablers. Due to time constraints and FI-WARE Generic Enabler release availability, the first iteration of D1.3 covered Generic Enablers from the first release, while this second iteration of D1.3 will cover the second and third releases of the Generic Enablers.

The analysis of the Generic Enabler is mainly based on the information provided by FI-WARE in the Open Specification Chapter available at the FI-WARE Wiki. Also, other available information like Technical Roadmap or licensing was considered very important to cover all the possible aspects of the GEs. When it was possible, due to GE implementation availability, some testing or hands-on experience on the GEs was done, trying to understand as much as possible the technical capabilities of the GEs and how they can they be introduced into FITMAN.

Also, to make a correct selection, a criteria selection was created. These criteria are summarised in the table below:

Criteria followed	
<b>Mandatory</b>	Relevance to Manufacturing Domain
	GE Specifications meet FITMAN Trials' requirements
	Implementation Availability and Technical Roadmap
	Implementation Release is available and is interoperable with existing IT systems
	Terms and Conditions acceptable by FITMAN Trials
<b>Optional</b>	Ease of combining the GEs with other GEs
	Hands-on Experimentation with GEs

Taking all these information, below is the list of selected GEs:

Generic Enabler	Owner	Selected at
Applications/Services Ecosystem and Delivery Framework Chapter		
Apps.LightSemanticComposition	ATOS	1 <sup>st</sup> Release of D1.3
Apps.ApplicationMashup	UPM	1 <sup>st</sup> Release of D1.3
Apps. Repository	SAP	1 <sup>st</sup> Release of D1.3
Apps.Marketplace	SAP	1 <sup>st</sup> Release of D1.3
Apps.Mediator	Telecom Italia / Thales	1 <sup>st</sup> Release of D1.3
Apps.BusinessModeler	iMinds	2 <sup>nd</sup> Release of D1.3
Apps.BusinessCalculator	iMinds	2 <sup>nd</sup> Release of D1.3
Apps.Registry	SAP	2 <sup>nd</sup> Release of D1.3
Cloud Hosting Chapter		
Cloud.DCRM	IBM	1 <sup>st</sup> Release of D1.3



Cloud.SM	Telefónica I+D	1 <sup>st</sup> Release of D1.3
Cloud.ObjectStorage	INTEL	1 <sup>st</sup> Release of D1.3
Cloud.SelfServiceInterfaces	UPM	1 <sup>st</sup> Release of D1.3
Cloud.SDC	Telefónica I+D	2 <sup>nd</sup> Release of D1.3
Cloud.PaaS	Telefónica I+D	2 <sup>nd</sup> Release of D1.3
Internet of Things (IoT) Services Enablement Chapter		
IoT.Gateway.DataHandling	Orange	1 <sup>st</sup> Release of D1.3
IoT.Gateway.ProtocolAdapter	Telecom Italia	1 <sup>st</sup> Release of D1.3
IoT.Backend.IoTBroker	NEC	1 <sup>st</sup> Release of D1.3
IoT.Backend.ConfMan	Telefónica I+D	1 <sup>st</sup> Release of D1.3
IoT.Backend.DeviceManagement	Telefónica I+D	2 <sup>nd</sup> Release of D1.3
Data/Context Management Chapter		
Data.PubSub	Telecom Italia	1 <sup>st</sup> Release of D1.3
Data.SemanticApplicationSupport	ATOS	1 <sup>st</sup> Release of D1.3
Data.BigData	Telefónica I+D	2 <sup>nd</sup> Release of D1.3
Data.PubSub (ConfMan)	Telefónica I+D	2 <sup>nd</sup> Release of D1.3
Data.UDA	ATOS	2 <sup>nd</sup> Release of D1.3
Security Chapter		
Security.IdentityManagement (KeyRock)	UPM	2 <sup>nd</sup> Release of D1.3
Security.Optional_Security_Enablers.DBAnonymizer	SAP	2 <sup>nd</sup> Release of D1.3

## 2.3 D1.4 FI-WARE Platform Instantiation for FITMAN smart-digital-virtual (2<sup>nd</sup>)

The current version of this prototype deliverable is an update over the Month 6 release: it is also the final outcome of the T1.4 task, which was extended up to Month 12 in order to take advantage of a second iteration of the Generic Enabler selection process performed in FITMAN (see D1.2 and D1.3 sections above). As the deliverable title implies, the prototype is a specific instantiation of the FI PPP core platform for the needs of Smart, Digital and Virtual Factories, with the objective of providing a baseline system of generic functionality on which a FITMAN-specific IT layer can be added (see WP3 sections, and D3.5 in particular, for more details). The result synthesizes several months of work on the analysis and the assessment of the FI-WARE Platform, matching manufacturing IT requirements to GE features and capabilities. *Phase III participants who do not want to build their own IT solutions on FITMAN-specific functionality, but would rather start from the barebones of the FI PPP core platform instead, might find this deliverable useful.*

One of the main goals of the FITMAN project is to assess the suitability, openness and flexibility of the FI-WARE Generic Enablers (GE) within the European Manufacturing Industry domain. FITMAN is setting up ten trial experiments to test the FI-WARE Platform on real IT and business cases in all the Factories of the Future (FoF) domains: Smart Factory (SF), Digital Factory (DF) and Virtual Factory (VF). To this end, task T1.4 defines one specific FITMAN Baseline Platform (FBP) for each FoF domain, plus an additional FITMAN Baseline Environment (FBE) providing meta-platform functionality – e.g., cross-domain utility services, cloud hosting support components, etc. These 3+1 packages fulfil business and IT requirements originating from the ten FITMAN Trials and aggregated at the domain-level, while still maintaining a flexible and open approach.

The first version of this deliverable, released by M6, was the first prototype instantiation of FI-WARE GEs in the FITMAN context - i.e., the detailed description of how and why selected GEs from the FI-WARE catalogue are grouped into three FBPs and one FBE, which

represent more coarse-grained functional units. The deliverable did not report about the analysis and selection of individual GEs, or about the mapping of Trial requirements to GE capabilities; instead, references were given to the relevant documentation from task T1.2 and T1.3, which are in charge of this analysis. A prototype implementation of the three FITMAN Baseline Platforms was also provided as a set of Virtual Machines (VM), suitable for off-the-shelf cloud deployment. No prototype of the FITMAN Baseline Environment was implemented, as these GEs are extremely specific to the building of virtualization/cloud infrastructures, and as such they are not suitable to be embedded into a VM themselves.

In this second and final deliverable release, M6 content has been updated / enriched with M12 results of task T1.4. More specifically, the three FBPs have been enriched by the new GEs selected by the second release of deliverable D1.2 / 1.3 This is reflected both in IT artefacts (downloadable VMs) and in documentation (platform design and factsheets). In addition, some minor corrections and adjustments were applied to the original text, taking into account changes in FITMAN terminology occurred during these last 6 months (e.g., from “FITMAN Platform” to “FITMAN Baseline Platform”).

To summarise, these are the new GE implementations added to the FBPs:

### **Smart Factory**

- IoT.Backend.DeviceManager - IDAS by Telefónica

### **Digital Factory**

- Data.PubSub – Orion Context Broker by Telefónica
- Data.UnstructuredDataAnalysis – ref. impl. by Atos
- Data.BigData – Cosmos by Telefónica
- Security.DbAnonymizer – DBA by SAP

### **Virtual Factory**

- Apps.Registry – ref. impl. from SAP
- Apps.BusinessCalculator – ref. impl. by iMinds
- Apps.BusinessModeler – ref. impl. by iMinds

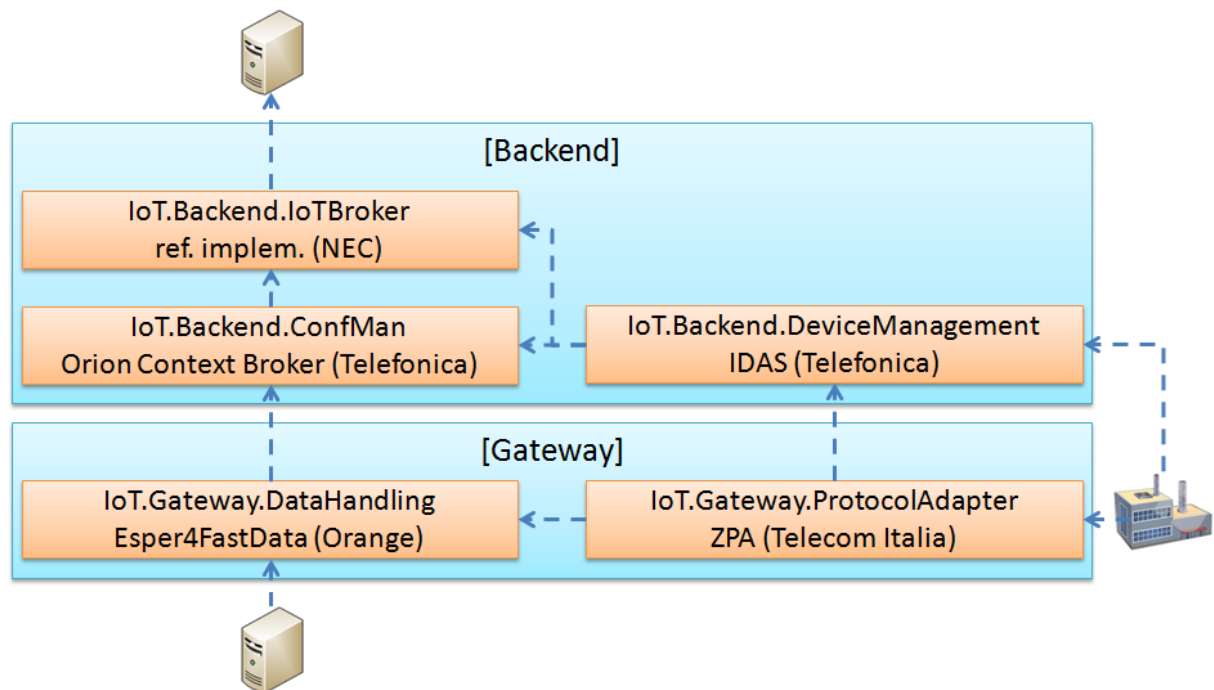
In the following sub-sections, the three FITMAN Base Platforms are briefly described.

## **FITMAN Base Platform for Smart Factories**

The SF Baseline Platform resulting from the GE selection is displayed below. This representation highlights connection and collaboration between components. When deployed in the context of some specific Trial experimentation, the baseline Platform will be enhanced by FITMAN Specific Enablers and by Trial Specific Components, resulting in a Trial Platform which fully supports the implementation of the target FITMAN business processes.

As the diagram shows, two distinct logical blocks are defined, which reflect the architecture of the FI-WARE Internet of Things Services Enablement chapter:

- The Backend: GEs that are typically deployed on the cloud
- The Gateway: GEs that are typically deployed on local premises - i.e., in proximity to devices



**Figure 2 - FITMAN Base Platform for Smart Factories**

### **FITMAN Base Platform for Digital Factories**

The DF Baseline Platform resulting from the GE selection is displayed below. This representation highlights connection and collaboration between components. When deployed in the context of some specific Trial experiment, the baseline Platform will be enhanced by FITMAN Specific Enablers and by Trial Specific Components, resulting in a Trial Platform which fully supports the implementation of the target FITMAN business processes.

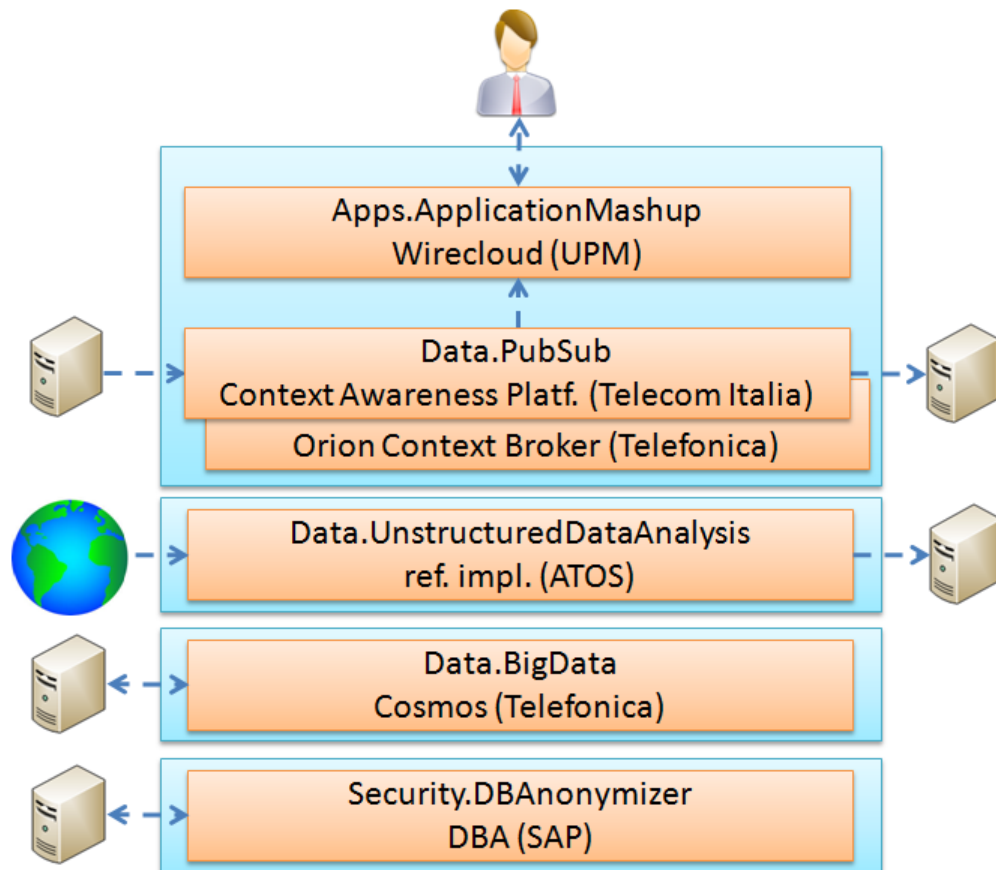


Figure 3 - FITMAN Base Platform for Digital Factories

### FITMAN Base Platform for Virtual Factories

The VF Baseline Platform resulting from the GE selection is displayed below. This representation highlights connection and collaboration between components. When deployed in the context of some specific Trial experiment, the baseline Platform will be enhanced by FITMAN Specific Enablers and by Trial Specific Components, resulting in a Trial Platform which fully supports the implementation of the target FITMAN business processes.

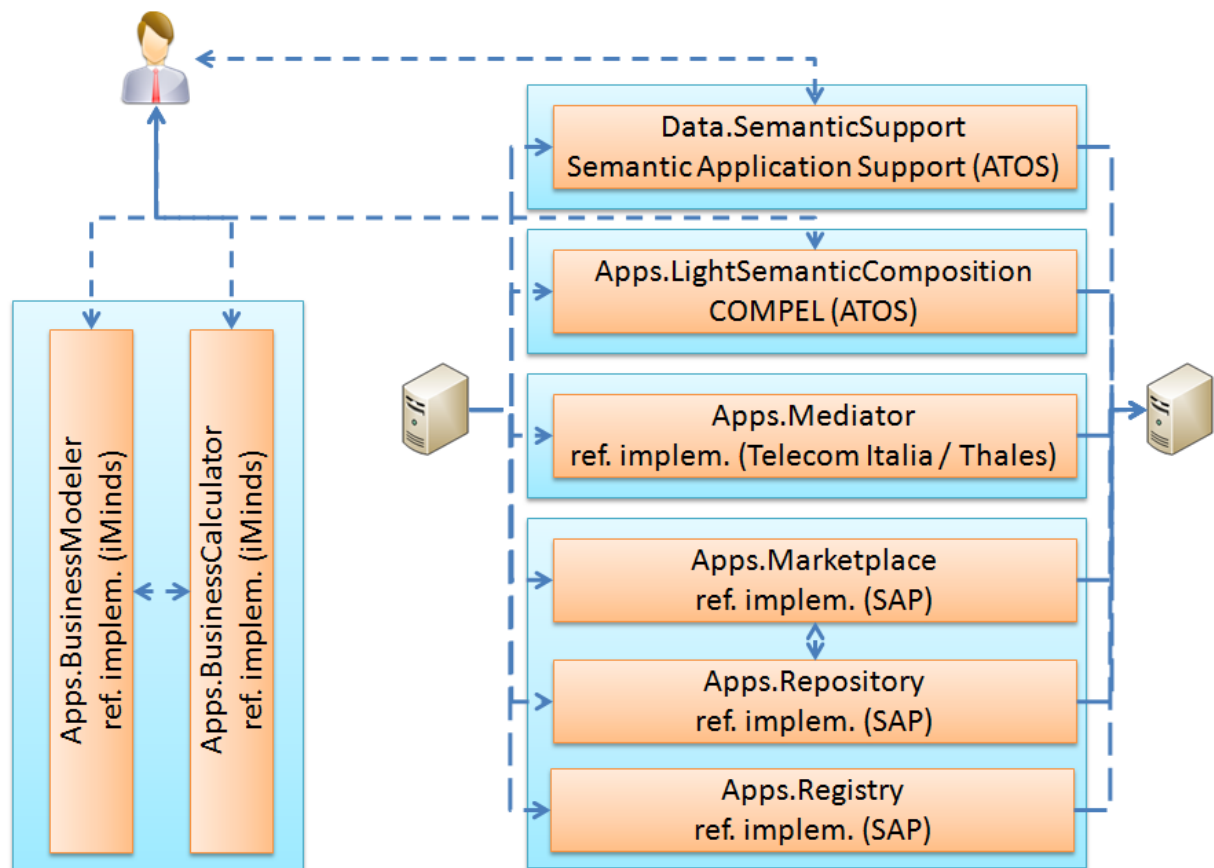


Figure 4 - FITMAN Base Platform for Virtual Factories

## 2.4 D1.6 FI-PPP Capacity Building Analysis (2<sup>nd</sup>)

The D1.6 deliverable has three objectives: to report about the interconnections between FITMAN and the FI PPP Capacity Building projects, to define the long-term *cloud vision* of the FITMAN project, and to state the *cloud strategy* of FITMAN Trials – i.e., to identify which Trials will actually follow a cloud approach in their present and future experiments, and how are they going to leverage the cloud option. *From the point of view of Phase III participants, this document provides a real-world context to information provided by deliverables D1.4 and D3.5. More specifically, examples of actual deployments done by FITMAN Trials are given which may be used as a blueprint for similar projects.*

This deliverable is the final result of the T1.6 task, “FI PPP Capacity Building Analysis”, which has been extended up to Month 12. In the Month 4 release, two thread of analysis were considered: A) achievements of the INFINITY project and their connection with the FITMAN Trials; B) FITMAN requirements targeted at the XIFI project. Concerning the latter, a major difficulty was the partial availability of such information at the time of writing. To address this, a second iteration of the T1.6 task was scheduled, so that the FITMAN Trials will have enough time to consolidate their cloud-related requirements. This second release of the D1.6 deliverable, delivered at Month 12 of FITMAN and reflecting the status of FITMAN technologies at that time, is then mainly an update on this topic, which is also re-targeted to a more generic “cloud infrastructure provider” in place of XIFI.

To summarize, this document completes the assessment of the INFINITY infrastructures, which by M4 identified three candidates: iMinds iLab.t, FOKUS Smart Communications Playground, and BonFIRE. In Section 3.5 we report on the outcome of our hands-on experimentation, which ultimately did not yield any useful results for FITMAN.

Then, Section 4.3 updates the M4 FITMAN cloud vision with some insight on the Identity Management topic, which we now perceive as a key IT issue for the sustainability of enterprise ecosystems on the cloud. We also report about an example implementation which attempts to address this issue in a different context – i.e., a different EC research project where a key FITMAN partner is also involved.

Finally, Section 5 deals with the cloud strategy of our Trials: eight out of ten are planning a cloud deployment – full or partial – of the FITMAN solution; of these, six will leverage some external commercial infrastructure, while two are going to build their own *private* cloud for internal use. Some details are given about how GEs, SEs and trial-specific components are going to be deployed in these environments, and IT requirements for cloud providers are collected from those Trials which wish to exploit third-party providers.

In the following diagrams, the six *externalized* Trial deployments are graphically represented.

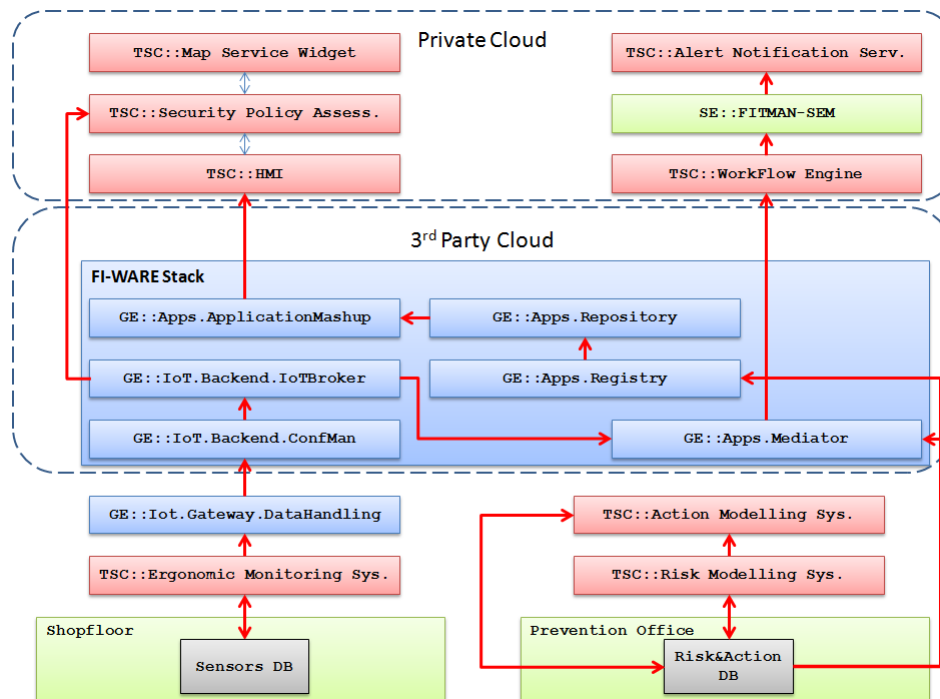


Figure 5 - TRW Deployment

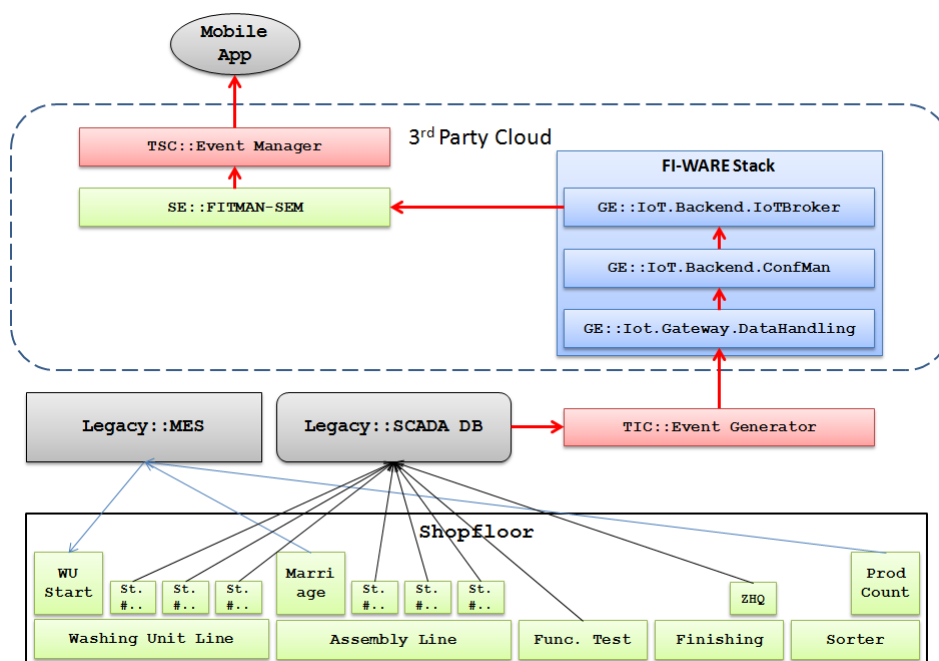


Figure 6 - Whirlpool Deployment

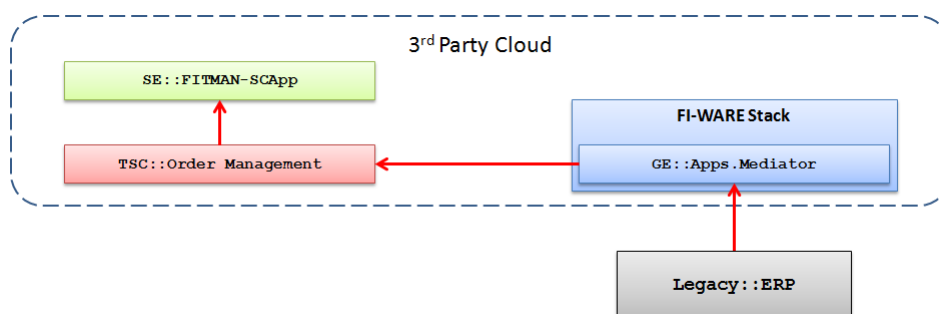


Figure 7 - Piacenza Deployment (VF scenario)

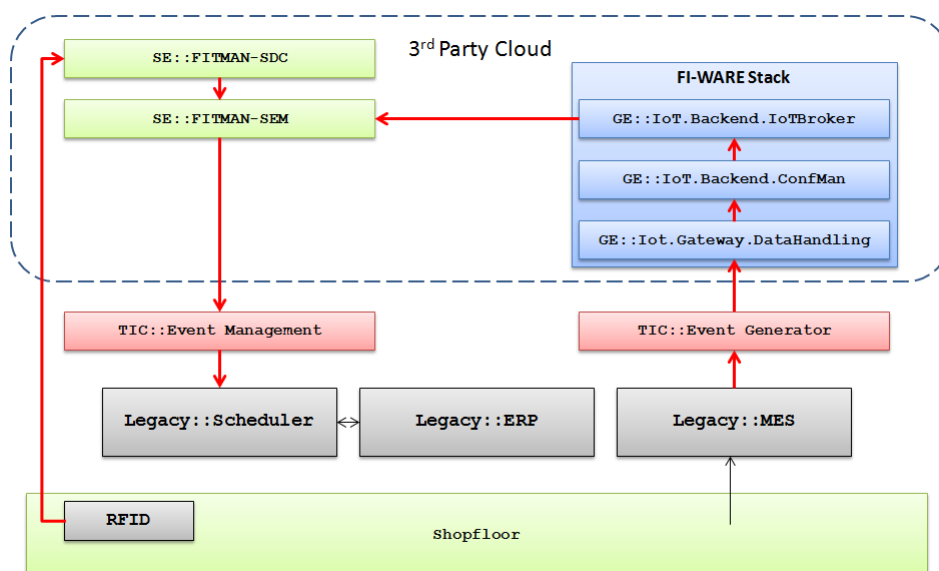


Figure 8 - Piacenza Deployment (SF scenario)

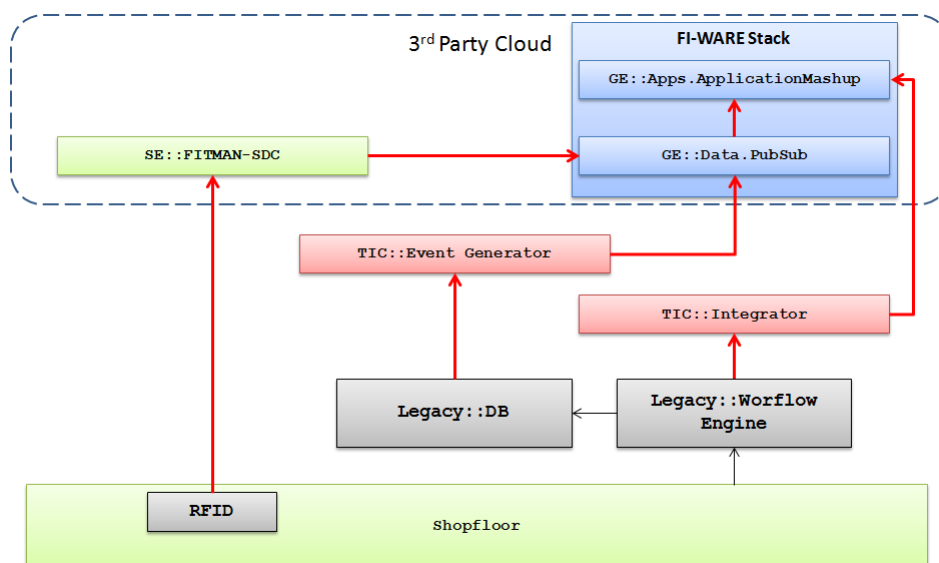


Figure 9 - Consulgal Deployment

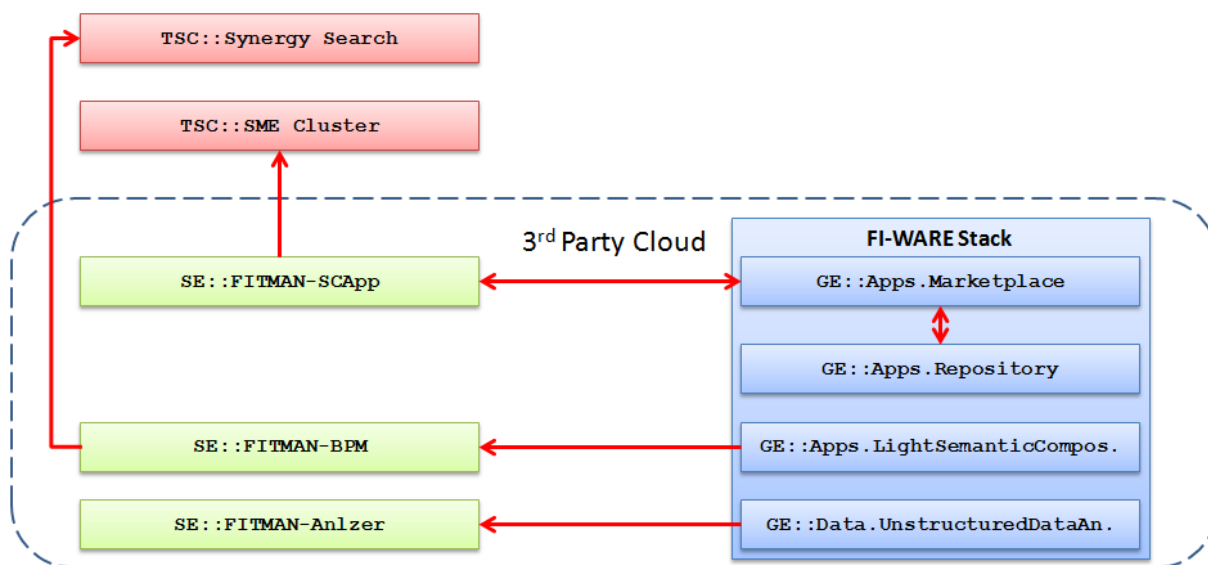


Figure 10 - TANet Deployment



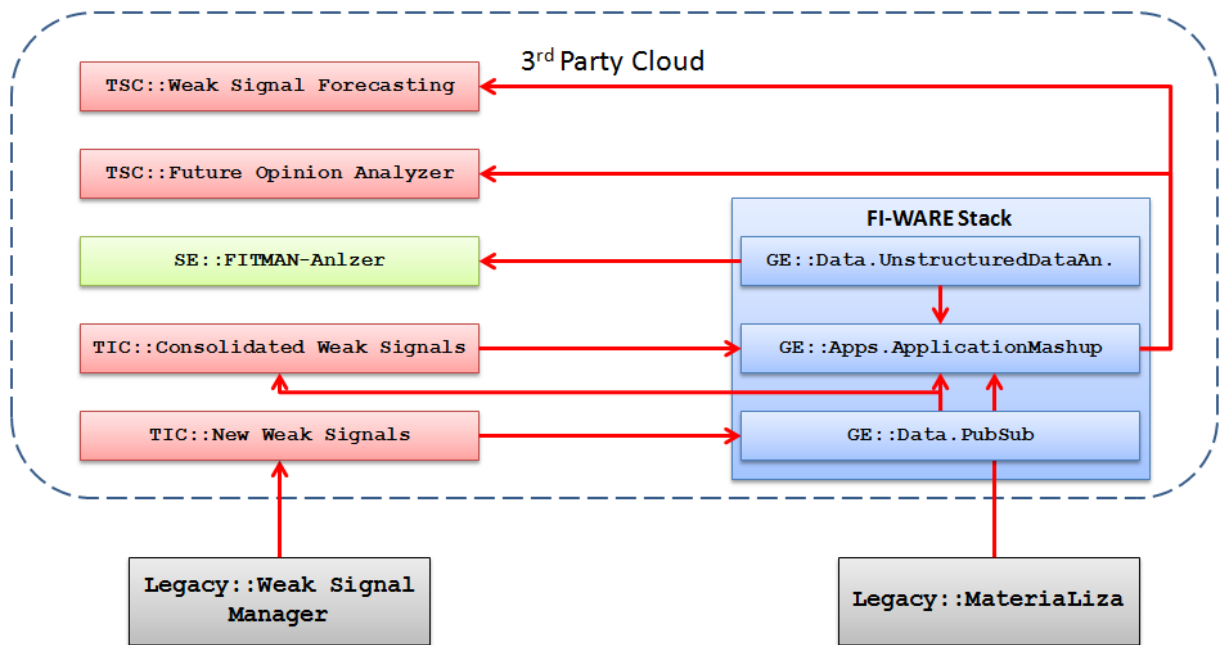


Figure 11 - AIDIMA Deployment

## 2.5 D3.3 FI-based FITMAN Specific Enablers

The FITMAN project builds on top of the Generic Enablers (GE) available within the FI-WARE platform. The mapping between the FITMAN requirements and the GEs, shown that to concurrently meet and jointly support, over a single technological platform, the business requirements of various industries and types of companies a set of Specific Enablers have to be developed and make available.

Within the FITMAN project a Specific Enabler (SE) is a component that is used in more than one of the eleven FITMAN trials to leverage business requirements.

Deliverable D3.3 delivers the technical description of FITMAN's Specific Enabler. Those technical descriptions are so called Open Specifications and include the link to a SE's source code and a downloadable instance.

The Specific Enablers reported in D3.3 are briefly described hereafter.

### Shopfloor Data Collection

This SE is dedicated to the collection of data from shop floor. It is developed to act as the middleware between the data producers in the shop floor and the data consumers. At the same time this SE also decouples the event producers from event consumers to provide flexibility in the processing of production data and further dispatch the events to event processing engines like Secure event Management in the scenario of FITMAN. Data producers (which can also be the producers of events) are integrated into the main system making use of smart object technologies like RFID and sensorial networks.

The objectives of this SE are:

- Capture and acquire data from tagged objects (e.g. RFID)
- Capture and acquire data from networks of (wireless) sensors.

For more information: <http://catalogue.fitman.atosresearch.eu/enablers/shopfloor-data-collection>

**Secure Event Management** – Event management is a key component of the Smart Factory domain and, in general, of automation systems adopting an Event Driven Architecture. The FITMAN Secure Event Manager Specific Enabler, provides asynchronous and fire-and-forget communication functions. Additionally, to support the Smart Factory demand for properly managing business-confidential and business-critical data, this component enforces a capability-based access control mechanism and offers scalability and resiliency features as envisaged by the AMQP standard<sup>3</sup>.

For more information: <http://catalogue.fitman.atosresearch.eu/enablers/secure-event-management>

**Unstructured and Social Data Analytics** – Today, a new age of engagement and collaboration has emerged with the proliferation of user-generated content in social networks and generally the Web 2.0. Harnessing collective intelligence represents a challenge for any manufacturing industry in order to easily discover needs, satisfaction and buying trends and to eventually become more attuned to their customers' wishes. The FITMAN "Unstructured and Social Data Analytics" (U-SDA) Specific Enabler (FITMAN-Anlzs) aims at extracting unstructured data from selected social media platforms and web resources and at turning such user-generated content to knowledge to be used for the benefit of any manufacturing stakeholder.

For more information: <http://catalogue.fitman.atosresearch.eu/enablers/unstructured-and-social-data-analytics>

**Supply Chain & Business Ecosystem Apps** – Share information with you network partners is always complicated and leading to misunderstandings? The FITMAN SE Supply Chain & Business Ecosystem Apps helps you in collaborating with your supply chain! Use this SE in order to model your company assets and share this information with others. Share information about machineries (Tangible Assets) capacities needed or available to optimize the production planning or share information about people skills (Intangible Assets) to offer or create the perfect team for a specific activity.

For more information: <http://catalogue.fitman.atosresearch.eu/enablers/supply-chain-business-ecosystem-apps>

**Collaborative Assets Management** – The concept of Tangible / Intangible Asset is a key aspect of Virtual Enterprises. The term "asset" represents any item of economic value owned by an Enterprise. Assets are basically divided into two broad categories: resources and capabilities. The former are tangible items, like machinery, hardware, transportation vehicles, buildings, people (employees), etc. The latter are of a more intangible nature: corporate knowledge (e.g., definitions of business or technical processes), individual competences, business relationships, etc. Both Tangible and Intangible Assets are used to achieve the goals of the Enterprise- i.e., production/delivery of products/services. In a Manufacturing Ecosystem, like that of a Virtual Factory scenario, Enterprise-level Tangible / Intangible Assets are leveraged in a collaborative way to realize the common objectives of the Virtual Enterprise; in other words, they are exposed and traded as services within the Ecosystem.

**FITMAN-CAM (Collaborative Asset Management)** – CAM is a web-based, integrated platform for the management of Assets-as-a-Service (AaaS) in the scope of service-oriented

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<sup>3</sup> The Advanced Message Queuing Protocol: see <http://www.amqp.org/>

Manufacturing Ecosystems. It is targeted to the business user, who is not required to have IT expertise, nor an in-depth knowledge of ontology-related concepts and technologies.

For more information: <http://catalogue.fitman.atosresearch.eu/enablers/collaborative-asset-management>

An up-to-date technical description of the different Specific Enablers can be found at <http://catalogue.fitman.atosresearch.eu/>



Figure 12: FITMAN Catalogue – Landing Page

## 2.6 D3.4 Enterprise and Data Interoperability Specific Enablers

This document accompanies the prototype of the FITMAN Specific Enablers (SE) generated in the context of FITMAN Task T3.4 specifically focusing on the enterprise interoperability domain. The document is important for phase III participants because it reports three open specifications of Specific Enablers and info on their technical implementation (prototype).

Reported Specific Enablers are:

- "Collaborative Business Process Management" (FITMAN-BPM) is a web-based, integrated platform for the semantically-enhanced design, execution and monitoring of Business Processes in the scope of service-oriented Manufacturing Ecosystems. It is based on the BPMN 2.0 and RDF open standards, aiming at Virtual Factories and/or Large Enterprises;
- "Data Interoperability Platform Services" (FITMAN-DIPS) is a web-based platform for the management of Data Interoperability services in the scope of the exploitation of the interoperability service. Targeted at the Virtual Factory domain, and based on open standards like WSMO and WSMX, it is delivered as a web platform in order to maximize its collaborative nature;
- "Metadata and Ontologies Semantic Matching" support users through the provision of an infrastructure which will allow the semi-automatic matching of different ontologies (OWL) and also of different XML schemas (XSD). It is based on the COMA 3.0 CE toolkit which is an open source implementation of an advanced schema and ontology matching tool developed by the Database Group Leipzig of the Computer Science department of Leipzig university.

The technical prototypes as well as a copy of the information provided in this document are published in the FITMAN catalogue and have been presented in webinars to both internal and external stakeholders.



Figure 13: FITMAN Catalogue – Landing Page

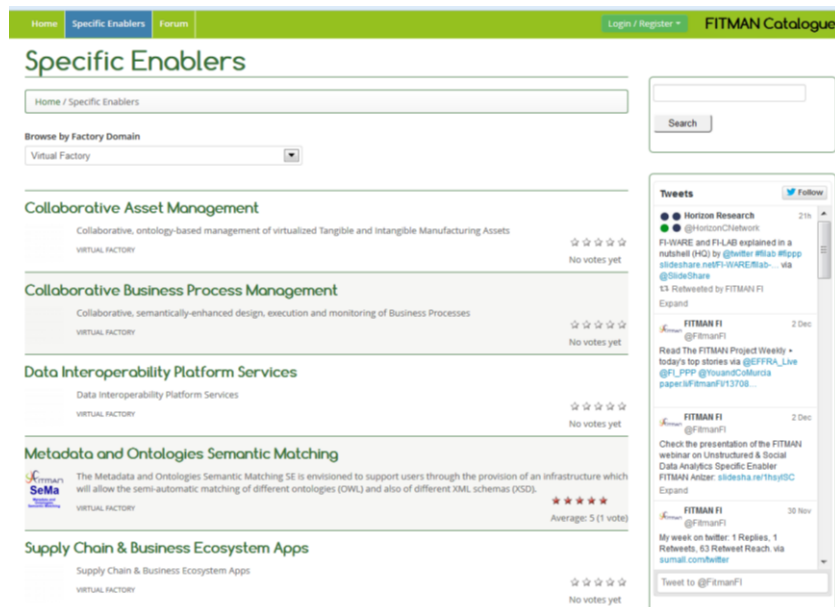


Figure 14: FITMAN Catalogue - T3.4 Specific Enablers

## Data Interoperability Platform Services

Home / Specific Enablers / Data Interoperability Platform Services

Overview Documentation Downloads Instances Terms and conditions

**Factory Domain:**  
Virtual Factory

**Version:**  
Updated:  
2013-11-19

**Rating:**  
☆☆☆☆☆  
No votes yet

**Contact Person:**  
Michele Sesana  
michele.sesana@txtgroup.com

**Research & Innovation Unit**  
TXT e-Solutions S.p.A

**What you get**

The FITMAN "Data Interoperability Platform Services" Specific Enabler (FITMAN-DIPS) is a web-based platform for the management of Data Interoperability services in the scope of the exploitation of the interoperability service. Targeted at the Virtual Factory domain, and based on open standards like WSMO and WSMX, it is delivered as a web platform in order to maximize its collaborative nature.

**Why to get it**

The interoperability is a key factor for the success in collaboration. Typically interoperability problems are related to the exchange of information among different companies in a supply chain or in other forms of aggregation like Business Ecosystems. Applicability can be found as well in information exchange between different part of the same company or, even, in communication between individuals. At the time companies solves interoperability problems they create a value item that is subsequently used into collaborative business processes in order to execute data interoperability. A typical example of that is the creation of a transformation for a specific business document (eg: an invoice) from one standard (eg: UBL) to/from a private format. The generated transformation has a value because it solves a problem. The item is usually exploited only in the network that created the transformation and can be not known to other companies having the same problem. Sometimes it happens as well in the same big companies. The goal of the Specific Enabler "Data Interoperability Platform Services" is to provide a semantic-based platform where to register and manage Enterprise Interoperability Transformations.

**Open Specification reference**

Data Interoperability Platform Services  
The Open Specification can be found in the documentation section

Please login to be able to subscribe to this SEI.

**Figure 15: FITMAN Catalogue - T3.4 Specific Enabler Details**

### Collaborative Business Process Management

#### *What you get*

The FITMAN "Collaborative Business Process Management" Specific Enabler (FITMAN-BPM) is a web-based, integrated platform for the semantically-enhanced design, execution and monitoring of Business Processes in the scope of service-oriented Manufacturing Ecosystems. Targeted at the Virtual Factory domain, and based on open standards like Business Process Model and Notation (BPMN) 2.0, it is delivered as a web portal in order to maximize its collaborative nature.

#### *Why to get it*

The development of business processes in a formal notation requires multi-disciplinary teams, to share domain specific and ICT knowledge required to implement them. FITMAN-BPM simplifies this collaboration allowing a clear separation of concerns, and providing user-friendly online tools.

### Data Interoperability Platform Services

#### *What you get*

The FITMAN "Data Interoperability Platform Services" Specific Enabler (FITMAN-DIPS) is a web-based platform for the management of Data Interoperability services in the scope of the exploitation of the interoperability service. Targeted at the Virtual Factory domain, and based on open standards like WSMO and WSMX, it is delivered as a web platform in order to maximize its collaborative nature.

#### *Why to get it*

Interoperability is a key factor for success in collaboration. Typically interoperability problems are related to the exchange of information among different companies in a supply chain or in other forms of aggregation like Business Ecosystems. Applicability can be found as well in information exchange between different parts of the same company or, even, in communication between individuals.

Currently companies solve the interoperability problems by creating a value item that is subsequently used in collaborative business processes in order to execute data interoperability. A typical example of that is the creation of a transformation for a specific business document (e.g.: an invoice) from one standard (e.g.: UBL) to/from a private format.



The generated transformation has a value because it solves a problem. The item is usually exploited only in the network that created the transformation and may not be known by other companies having the same problem. Sometimes it happens as well in the same big companies.

The goal of the Specific Enabler “Data Interoperability Platform Services” is to provide a semantically-based platform where to register and manage Enterprise Interoperability Transformations.

### **Metadata and Ontologies Semantic Matching**

Semantic matching between different kinds of knowledge is a major issue that restrains the flow of information between different entities. The FITMAN Metadata and Ontologies Semantic Matching SE (FITMAN-SeMa) is envisioned to support the matching of similar semantic content between two sources, aiming both at the acceleration of interoperation between different IT systems and at the facilitation of data sharing/integration between organisations/departments that utilise different knowledge representations.

FITMAN-SeMa is offered as an infrastructure containing installable Windows software which supports users through the provision of an infrastructure which will allow the semi-automatic matching of different ontologies (OWL) and also of different XML schemas (XSD). To achieve efficient semantic matching, a number of different algorithms (ranging from context-dependent, fragment-based, and reuse-oriented matching) are used. The proposed matching is visualised in an intuitive and user-friendly graphical interface that allows for manual alteration and/or completion when needed. The matching can be persistently stored in a repository for future review and usage. Stored matchings of XSD files will be available also through a REST interface in order for users to be able to retrieve them while stored Ontology matchings will allow performing cross-ontology queries based on the functionalities of the FI-WARE “Semantic Application Support” GE.

The current implementation of the FITMAN-SeMa SE is based on the COMA 3.0 CE toolkit which is an open source implementation of an advanced schema and ontology matching tool developed by the Database Group Leipzig of the Computer Science department of Leipzig university.

## **2.7 D3.5 Integrated FITMAN System**

This section summarises FITMAN Deliverable 3.5, *Integrated FITMAN System*. The public results of the T3.5 task, the documentation of the three FITMAN Platforms may be useful for FI-PPP Phases III projects as they synthesize several months of work on the integration, assessment and validation of the FI-WARE Platform enriched with additional specific software components called Specific Enablers (SE), which cover identified gaps in the field of manufacturing, not covered by GEs. New projects which need to go through a similar selection process to compose a platform may use this document as a tool for guidance on reference platforms for specific manufacturing domains.

D3.5, delivered at Month 13 of FITMAN and reflecting the status of FITMAN technologies at that time, reflects the results of task T3.5. This deliverable is a prototype which covers the actions performed in order to deliver the final Reference FITMAN system, composed by three FITMAN reference platforms each of them focus on a specific Factory of the Future (FoF) domain: Smart, Digital and Virtual, where each of these platforms is focused on addressing specific aspects concerned with ICT for manufacturing.

These FITMAN platforms are composed of a set of selected FI-WARE Generic Enablers (GE) together with the developed FITMAN Specific Enablers (SE), outcomes of other FITMAN tasks responsible for providing software solutions to specific requirements of

partners. It should be noted that work done will ultimately offer an instantiation of the three FITMAN platforms.

The following picture shows an overall view of how the Generic Enablers selected to be part of the FITMAN platforms as well as the FITMAN Specific Enablers developed have been distributed in the three FITMAN reference platforms for Smart, Digital and Virtual domains.

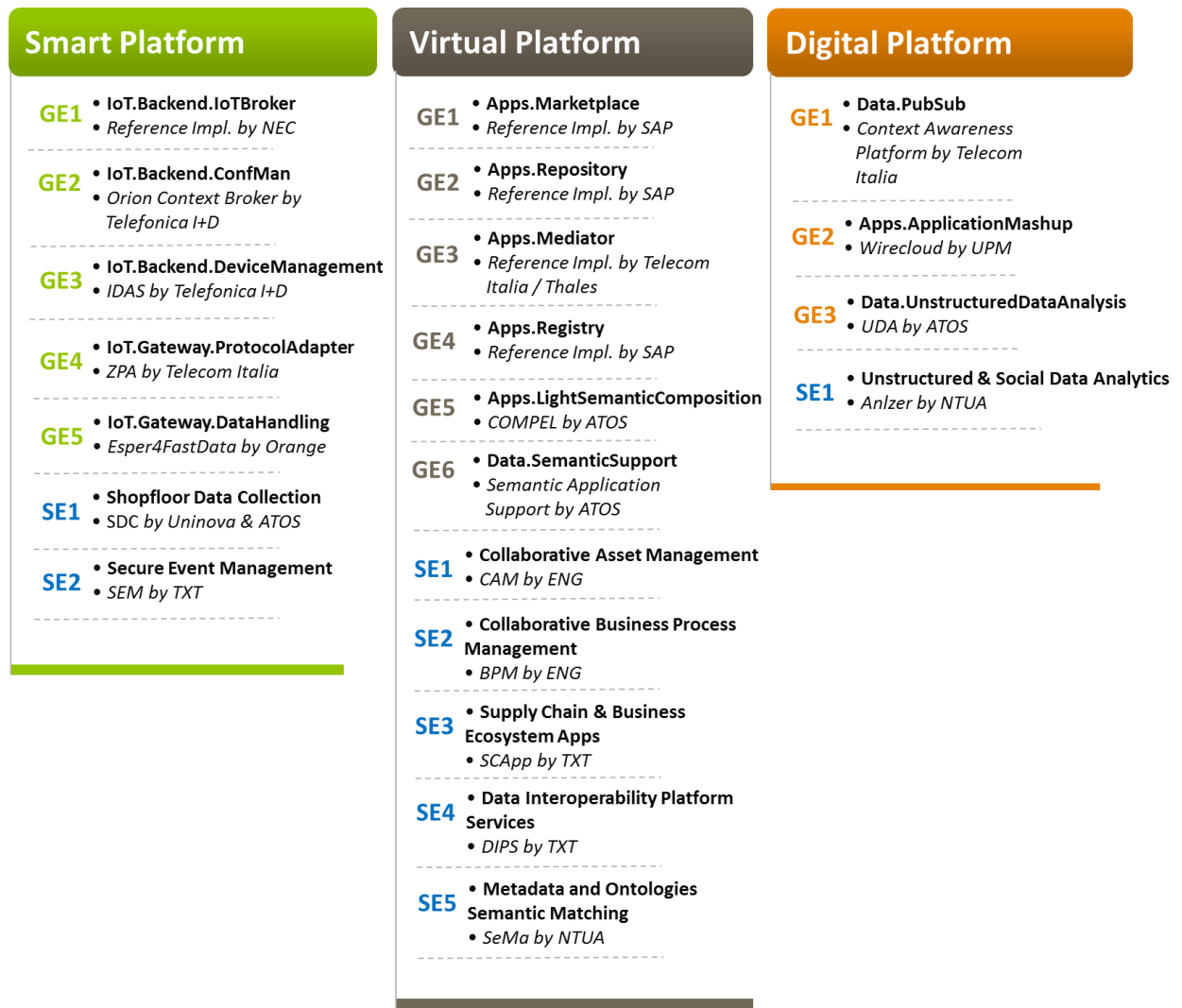


Figure 16: FITMAN Reference Platforms composition

It is important to highlight that the three FITMAN platforms presented here may be regarded as an initial version of FITMAN FoF platforms because even contemplating the 14 selected FI-WARE GEs in the two iterations made taking into consideration 2nd/3rd release GEs in D1.3 (M6 and M12) and the 8 FITMAN Specific Enablers outcomes of T3.3 and T3.4, coming soon they can be extended with new Specific Enablers coming from the Open Call projects. However, the three FITMAN platforms presented are fully functional and fulfil all the requirements identified by the ten trials.

In the following subsections are described the concrete set of FI-WARE Generic Enablers (GE) and Specific Enablers (SE) that make up each of the three FITMAN platforms, indicating the Open specification and the Implementation of each of them.

### The FITMAN Platform for Smart Factory

The FITMAN Smart Factory platform reference is the composition of a set of FI-WARE Generic Enablers and FITMAN Specific enablers, creating a functional platform for the Smart

Factory domain. The specific information of each of the GEs and SEs that form the Smart Factory Platform is displayed in the following table:

Smart Factory Platform Composition		
SW Component	Open Specification	Implementation
<b>FI-WARE GE</b>	IoT.Gateway.DataHandling <sup>4</sup>	Esper4FastData by Orange <sup>5</sup>
<b>FI-WARE GE</b>	IoT.Backend.IoTBroker <sup>6</sup>	Ref. impl. by NEC <sup>7</sup>
<b>FI-WARE GE</b>	IoT.Backend.ConfMan <sup>8</sup>	Orion Context Broker by Telefónica <sup>9</sup>
<b>FI-WARE GE</b>	IoT.Gateway.ProtocolAdapter <sup>10</sup>	ZPA by Telecom Italia <sup>11</sup>
<b>FI-WARE GE</b>	IoT.Backend.DeviceManagement <sup>12</sup>	IDAS by Telefónica <sup>13</sup>
<b>FITMAN SE</b>	Shop Floor Data Collection <sup>14</sup>	SDC FITMAN T&T by Atos SDC FITMAN SN by Uninova <sup>15</sup>
<b>FITMAN SE</b>	Secure Event Management <sup>16</sup>	SEM by TXT <sup>17</sup>

## The FITMAN Digital Factory platform

The FITMAN Digital Factory platform reference is the composition of a set of FI-WARE Generic Enablers and FITMAN Specific enablers, creating a functional platform for the Digital Factory domain. The specific information of each of the GEs and SEs that form the Digital Factory Platform is displayed in the following table:

Digital Factory Platform Composition		
SW Component	Open Specification	Implementation
<b>FI-WARE GE</b>	Data.PubSub <sup>18</sup>	Context Awareness Platform by Telecom Italia <sup>19</sup>

<sup>4</sup> <http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.IoT.Gateway.DataHandling>

<sup>5</sup> <http://catalogue.fi-ware.eu/enablers/gateway-data-handling-ge-esper4fastdata>

<sup>6</sup> <http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.IoT.Backend.IoTBroker>

<sup>7</sup> <http://catalogue.fi-ware.eu/enablers/nec-iot-broker>

<sup>8</sup> <http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.IoT.Backend.ConfMan>

<sup>9</sup> <http://catalogue.fi-ware.eu/enablers/configuration-manager-orion-context-broker>

<sup>10</sup> <http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.IoT.Gateway.ProtocolAdapter>

<sup>11</sup> <http://catalogue.fi-ware.eu/enablers/protocol-adapter-zpa>

<sup>12</sup> <http://forge.fi-ware.org/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.IoT.Backend.DeviceManagement>

<sup>13</sup> <http://catalogue.fi-ware.org/enablers/backend-device-management>

<sup>14</sup> <http://catalogue.fitman.atosresearch.eu/enablers/shopfloor-data-collection>

<sup>15</sup> <http://catalogue.fitman.atosresearch.eu/enablers/shopfloor-data-collection/documentation>

<sup>16</sup> <http://catalogue.fitman.atosresearch.eu/enablers/secure-event-management>

<sup>17</sup> <http://catalogue.fitman.atosresearch.eu/enablers/secure-event-management/documentation>

<sup>18</sup> <http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Data.PubSub>

<sup>19</sup> <http://catalogue.fi-ware.eu/enablers/publishsubscribe-context-broker-context-awareness-platform>



<b>FI-WARE GE</b>	Apps.ApplicationMashup <sup>20</sup>	Wirecloud by UPM <sup>21</sup>
<b>FI-WARE GE</b>	Data.UnstructuredDataAnalysis <sup>22</sup>	UDA by ATOS <sup>23</sup>
<b>FITMAN SE</b>	Unstructured and Social Data Analytics <sup>24</sup>	Anlzer by NTUA <sup>25</sup>

## The FITMAN Virtual Factory platform

The FITMAN Virtual Factory platform reference is the composition of a set of FI-WARE Generic Enablers and FITMAN Specific enablers, creating a functional platform for the Virtual Factory domain. The specific information of each of the GEs and SEs that form the Virtual Factory Platform is displayed in the following table:

Virtual Factory Platform Composition		
SW Component	Open Specification	Implementation
<b>FI-WARE GE</b>	Apps.Marketplace <sup>26</sup>	Ref. impl. by SAP <sup>27</sup>
<b>FI-WARE GE</b>	Apps.Repository <sup>28</sup>	Ref. impl. by SAP <sup>29</sup>
<b>FI-WARE GE</b>	Apps.Registry <sup>30</sup>	Ref. impl. by SAP <sup>31</sup>
<b>FI-WARE GE</b>	Data.SemanticSupport <sup>32</sup>	Semantic Application Support by ATOS <sup>33</sup>
<b>FI-WARE GE</b>	Apps.LightSemanticComposition <sup>34</sup>	COMPEL by ATOS <sup>35</sup>
<b>FI-WARE GE</b>	Apps.Mediator <sup>36</sup>	Ref. impl. by Telecom Italia / Thales <sup>37</sup>
<b>FITMAN SE</b>	Supply Chain & Business Ecosystem Apps <sup>38</sup>	SCApp by TXT <sup>39</sup>

<sup>20</sup><http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Apps.ApplicationMashup>

<sup>21</sup><http://catalogue.fi-ware.eu/enablers/application-mashup-wirecloud>

<sup>22</sup><http://forge.fi-ware.org/plugins/mediawiki/wiki/fiware/index.php/FIWARE.ArchitectureDescription.Data.UnstructuredDataAnalysis>

<sup>23</sup><http://catalogue.fi-ware.eu/enablers/unstructured-data-analysis>

<sup>24</sup><http://catalogue.fitman.atosresearch.eu/enablers/unstructured-and-social-data-analytics>

<sup>25</sup><http://catalogue.fitman.atosresearch.eu/enablers/unstructured-and-social-data-analytics/documentation>

<sup>26</sup><http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Apps.Marketplace>

<sup>27</sup><http://catalogue.fi-ware.eu/enablers/marketplace-sap-ri>

<sup>28</sup><http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Apps.Repository>

<sup>29</sup><http://catalogue.fi-ware.eu/enablers/repository-sap-ri>

<sup>30</sup><https://forge.fi-ware.org/plugins/mediawiki/wiki/fiware/index.php/FIWARE.ArchitectureDescription.Apps.Registry>

<sup>31</sup><http://catalogue.fi-ware.org/enablers/registry-sap-ri>

<sup>32</sup><http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Data.SemanticSupport>

<sup>33</sup><http://catalogue.fi-ware.eu/enablers/semantic-application-support>

<sup>34</sup><http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Apps.LightSemanticComposition>

<sup>35</sup><http://catalogue.fi-ware.eu/enablers/light-semantic-composition-editor-compel>

<sup>36</sup><http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FIWARE.OpenSpecification.Apps.Mediator>

<sup>37</sup><http://catalogue.fi-ware.org/enablers/mediator>

<sup>38</sup><http://catalogue.fitman.atosresearch.eu/enablers/supply-chain-business-ecosystem-apps>

<b>FITMAN SE</b>	Metadata and Ontologies Semantic Matching <sup>40</sup>	SeMa by NTUA <sup>41</sup>
<b>FITMAN SE</b>	Data Interoperability Platform Services <sup>42</sup>	DIPS by TXT <sup>43</sup>
<b>FITMAN SE</b>	Collaborative Business Process Management <sup>44</sup>	CBPM by ENG <sup>45</sup>
<b>FITMAN SE</b>	Collaborative Asset Management <sup>46</sup>	CAM by ENG <sup>47</sup>

<sup>39</sup><http://catalogue.fitman.atosresearch.eu/enablers/supply-chain-business-ecosystem-apps/documentation>

<sup>40</sup><http://catalogue.fitman.atosresearch.eu/enablers/metadata-and-ontologies-semantic-matching>

<sup>41</sup><http://catalogue.fitman.atosresearch.eu/enablers/metadata-and-ontologies-semantic-matching/documentation>

<sup>42</sup><http://catalogue.fitman.atosresearch.eu/enablers/data-interoperability-platform-services>

<sup>43</sup><http://catalogue.fitman.atosresearch.eu/enablers/data-interoperability-platform-services/documentation>

<sup>44</sup><http://catalogue.fitman.atosresearch.eu/enablers/collaborative-business-process-management>

<sup>45</sup><http://catalogue.fitman.atosresearch.eu/enablers/collaborative-business-process-management/documentation>

<sup>46</sup><http://catalogue.fitman.atosresearch.eu/enablers/collaborative-asset-management>

<sup>47</sup><http://catalogue.fitman.atosresearch.eu/enablers/collaborative-asset-management/documentation>

### 3 FITMAN SMART FACTORY TRIALS

In this section the FITMAN system for a Smart Factory is described, and is followed by the technical and business indicators for a Smart Factory.

#### 3.1 D4.1 FITMAN System for Smart Factory

This document concerns the prototype Deliverable 4.1, which results from Task 4.1. This prototype demonstrates the usage of the Generic Enablers in combination with the FITMAN Specific Enabler in the Smart Factory Domain. In this manner, Task T4.1 is in charge of the instantiation of the FITMAN System for the Smart Factory domain. In other words, the main result will be several instances of the FITMAN system, concretely of the FITMAN Smart factory platform to be run on the trials. From the project point of view, it will consolidate the work done in WP1 and WP3.

To achieve the objective of the task, three different Trials from the Smart Factory Domain have been considered to represent the Smart Factories:

- TRW as an automotive supplier representing the automotive sector
- WHIRLPOOL representing the White Goods sector
- Piacenza representing the Textile sector.

The following text lists the Generic and Specific Enablers to be used per trial.

#### #Trial 2: TRW

##### *Generic Enablers*

CHAPTERS	FI-WARE GEs	OWNER	DESCRIPTION OF USE	EXPERTISE
Apps Chapter	Apps.Repos itory	SAP	Premise of Mashup, common location for storage centrally or distributed and replicated	Beginner
	Apps.Appli cationMash up - Wirecloud	UPM	Integrate heterogeneous data and UI components (widgets/gadgets) sourced from the Web to create new coherent composite applications of online risk analysis tools.	Beginner
	Apps.Media tor	Telecom Italia/Thal es	Deploy in private cloud to provide Interoperability among different communication protocols and among different data models, which could benefit from private cloud to coordinates the different preventions actions specific for TRW ergonomic risks.	Intermediate
	Apps.Regist ry	SAP	Premise of Mashup, universal directory of information for web services.	Beginner
IoT Chapter	IoT.Backen	NEC	Register risk event and context	Intermediate

	d.IoTBroker		information in Data handling GE through HTTP REST API. Deploy in public cloud, as the incoming data transferred from Data Handling GE will not reveal private information of the worker.	
	IoT.Backend.ConfMan	Telefónica I+D	Deploy in public cloud, use in combination with IoT Broker GE to subscribe context information and being notified when changes on context information are available.	Intermediate
	IoT.Gateway.DataHandling	Orange	Complex Event Processor, deploy with the monitoring system locally to be able to deal with vast amounts of asynchronous incoming sensing video stream at the gateway.	Advanced

*Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Smart Factory	Secure Event Management	TXT	Deploy as a middleware that mediates data exchanges between shop floor event sources and consumer services both within and outside the production facilities.

**#Trial 4: WHIRLPOOL***Generic Enablers*

CHAPTERS	FI-WARE GEs	OWNER	DESCRIPTION OF USE
Data Chapter	Data.BigData	Telefónica I+D	This will be integrated in the Trial as part of a separate use case (still in the same business scenario), starting from the second phase of the experimentation.
IoT Chapter	IoT.Backend.IoT Broker	NEC	Coordinates multiple event consumers
	IoT.Backend.ConfMan	Telefónica I+D	Coordinates multiple event producers on the shopfloor
	IoT.Gateway.DataHandling	Orange	Executes the custom event processing logic, evaluates conditions based on event payload, generates new events when conditions are met. This is the core GE in the Trial, and its actual capability of delivering the expected functionality and the expected performance are the key aspect of the

			experimentation.
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*Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Smart Factory	Secure Event Management	TXT	Enables flexible and secure management of event distribution lists.

**#Trial 5: Piacenza***Generic Enablers*

CHAPTERS	FI-WARE GEs	OWNER	DESCRIPTION OF USE	EXPERTISE
Apps Chapter	Apps.Repository	SAP	As part of SCApp, to save assets as a service	Intermediate
	Apps.Marketplace	SAP	As part of SCApp, to expose assets as a service on marketplace	Intermediate
	Apps.Mediator	Telecom Italia / Thales	To allow different kind of factories to connect to the virtual cloud	Beginner
	Apps.Application Mashup - Wirecloud	UPM	Application layer at Smart Factory	Intermediate
IoT Chapter	IoT.Backend.IoT Broker	NEC	To manage legacy events (from the local MES)	Advanced
	IoT.Backend.Conf Man	Telefónica I+D	To manage legacy events (from the local MES)	Advanced
	IoT.Gateway.Data Handling	Orange	To manage legacy events (from the local MES)	Advanced

*Specific Enablers*

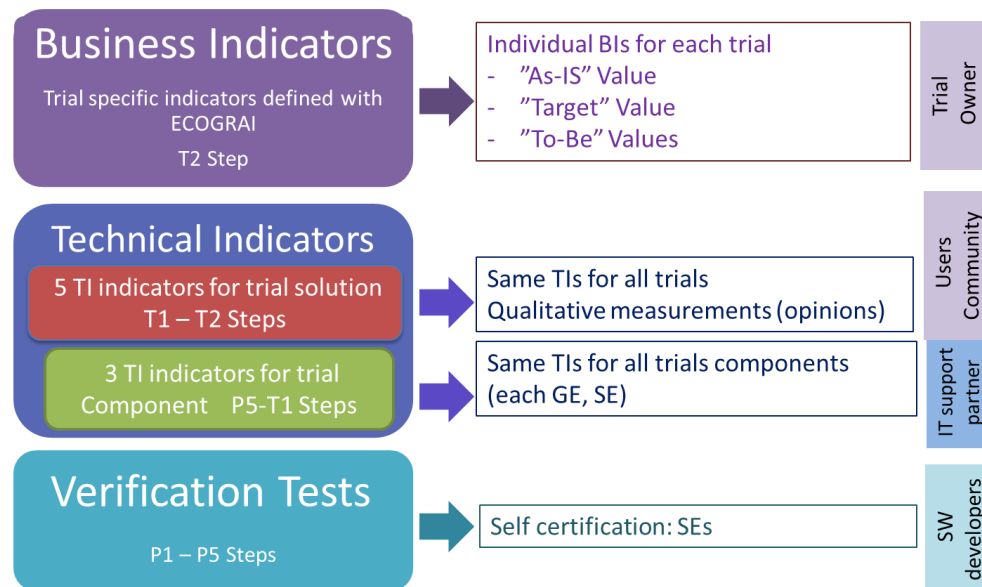
Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Smart Factory	Shop Floor Data Collection - FitmanT&T	UNINOVA	To collect info from RFID
	Secure Event Management	TXT	As event manager
Virtual Factory	Supply Chain & Business Ecosystem Apps	TXT	As interface for marketplace and assets as service configuration

**3.2 D4.4 Technical / Business Indicators for Smart Factory**

The objective D4.4 has been the definition and coordination of suitable metrics used during experimentation and coordination of Smart Factory best practices. In particular, methodological approaches have been used to define the proper Business and Technical Indicators for Smart Factory Trials. As a consequence, D4.4 represents the concrete reference

point for the correct set-up of the assessment process for this kind of Trials. Therefore, its general concepts and suggestions can be successfully reused to new industrial cases.

In D4.4, the FITMAN Verification and Validation Assessment Package has been applied to Smart Factory Trials by means of the following conceptual framework



**Figure 17 - FITMAN V&V Assessment Package overview**

While Verification Tests have been performed outside the boundaries of the Trials, Technical and Business Indicators have been defined to evaluate the impact of FITMAN solutions in each of them.

From a Technical point of view, a set of common Indicators has been used for all the Trials. Three functional Technical Indicators have been defined to assess each of the GEs and SEs composing the Trial Integrated Solution, i.e.:

**Table 3 - Functional Technical Indicators for Smart Factory Trials**

Technical Indicators for GEs/SEs (P5)	Levels for the selection
<b>Openness</b>	<p>Level 0: Open specifications – Developers can view &amp; study the requirements posed and implement them as they wish.</p> <p>Level 1: Enablers as a Service – Developers can utilize software provided as a service through open interfaces.</p> <p>Level 2: Releasing code as open source - Developers can inspect, download, run and improve the open source code according to their needs.</p> <p>Level 3: Consulting with the use cases about their needs and collaboratively contributing to the source repository, design documents, and bug reports.</p>
<b>Interoperability maturity</b>	<p>Level 0: Isolated Approach: No API exposing the GE / SE functionalities is available.</p> <p>Level 1: Baseline Unified Approach (International Standards exists): Offering an API exposing main part of the GE / SE functionalities, in its own format.</p> <p>Level 2: Open Unified Approach (No International</p>

	Standards exists): Offering an API exposing main part of the GE / SE functionalities, in its own format. Level 3: Standardized Integrated Approach (International Standards exists): Offering an API exposing main part of the GE / SE functionalities, following international standards.
<b>Ease of application</b>	Level 0: No applicability in our environment without extra applying actions or means. Level 1: Applicable with significant amount of work. Level 2: Applicable with limited amount of work. Level 3: Easily applicable in our environment.

The assessment of these values has been the responsibility of the single Trial Owner, with the support of the related IT Partner.

Another five non-functional Technical Indicators have been used to assess the whole Trial Integrated Solution, i.e.:

**Table 4 - Non-functional Technical Indicators for Smart Factory Trials**

<b>Technical Indicators for the Trial Integrated Solution (T1)</b>	<b>Statements to be assessed</b>
Fulfilment of requirements	“The solution fulfils the Trial requirements”
Learnability	“It is easy to start to use the solution and learn functionalities.”
Understandability	“The solution is easy and self-clear to understand and the concepts and terminology are understandable.”
User’s attraction level	“The solution is attractive to the user. I feel satisfied and comfortable when using it.”
Efficiency	“The time and resources required to achieve the objectives of the solution are reasonable, the solution is fast enough and does not require too many steps.”

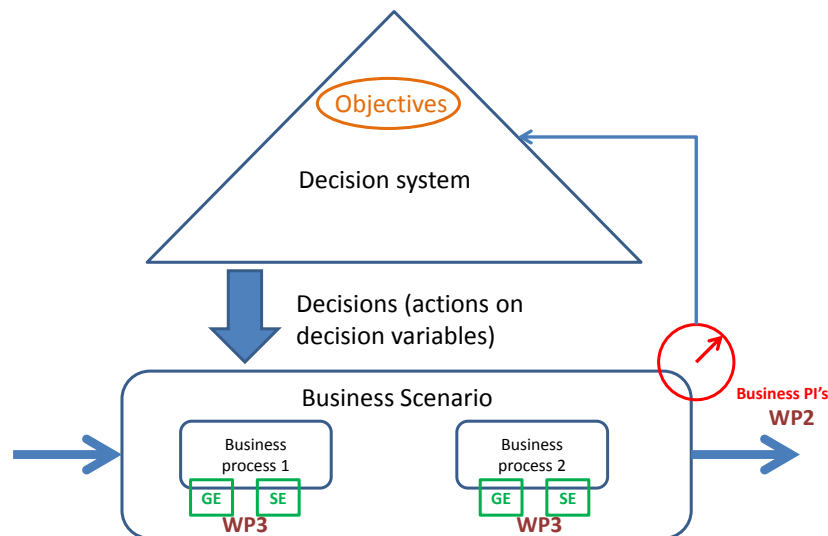
For each of these Technical Indicators a specific statement should be assessed by the user. For each of the sentences, he/she should express his/her own level of agreement according to his/her experience and by choosing one option among the following ones:

- *I strongly agree*
- *I agree*
- *I disagree*
- *I strongly disagree*

From the Business point of view, the Simplified ECOGRAI Methodology has been used for the definition of the Performance Indicators needed for the assessment of the business improvements related to the different FITMAN solutions. The specific objective of this kind of Performance Indicator system is to see what happens in the controlled system in order to make the right decisions at the right time.

The figure below shows these principles and related results of various WP’s:





**Figure 18 - Simplified ECOGRAI Methodology approach**

The Simplified ECOGRAI Methodology includes only three phases in order to facilitate the application and to be in line with the size of the use cases and the duration of the project. The phases are:

**First Phase:** Description of the system in which the Performance Indicators (PIs) will be defined, including Functions, Processes, Boundaries and Business Objectives.

**Second Phase:** According to the Objectives of the system the owner of the system determines the potential actions to reach them (called Decision Variables (DV) or Action Variables (AV)).

**Third Phase:** the Performance Indicators indicate or characterize the reaching of the Objectives by using the DV/AV.

Thanks to this methodology, specific Business Performance Indicators has been defined for each Trial, according to the particular components and business objectives of each system. Then, AS-IS and Target Values (as *ratios* based on the initial AS-IS Values) have been collected. In a second moment, the TO-BE Values of the different Business Performance Indicators will be collected and compared with the related Target value and with each other in order to check the achievement of the desired value and the temporal evolution of the business performances of the controlled system.

Finally, it has been possible to group the different Business Performance Indicators of Smart Factory in four categories, i.e.:

- Time
- Cost
- Productivity
- Quality



## 4 FITMAN DIGITAL FACTORY TRIALS

This section describes the FITMAN system for a Digital Factory as well as the technical and business indicators for a Digital Factory.

### 4.1 D5.1 FITMAN System for Digital Factory

This document concerns the prototype Deliverable 5.1, which results from Task 5.1. The main objective of task T5.1 is the instantiation of the FITMAN systems in the context of the four digital trials. In other words, the main result will be a several instances of the FITMAN system, concretely of the FITMAN Digital factory platform to be run on the trials. From the project point of view, it will improve the work done in WP1 and WP3 by extending the Generic Platform already define.

To achieve the objective of the task, four different Trials from the Digital Factory Domain have been involved:

- ✓ VOLKSWAGEN as automotive OEM
- ✓ AgustaWestland SpA as aeronautics OEM
- ✓ CONSULGAL representing the construction sector
- ✓ AIDIMA representing the furniture sector

Considering the objective of the task and the Trials involved, T5.1 will help FITMAN to achieve one of its main goals, which is to assess the suitability, openness and flexibility of the FI-WARE Generic Enablers in a Manufacturing context more specifically in the Digital factory domain. The result of the task is a prototype implementation.

The following section includes the FI-WARE Generic Enablers and FITMAN Specific Enablers that are going to be used and implemented in the different Digital Trials.

#### #Trial 1: VOLKSWAGEN

##### *Generic Enablers*

CHAPTERS	FI-WARE GES	OWNER	DESCRIPTION OF USE	EXPERTISE
Data Chapter	Data. PubSub	Telecom Italia / Telefónica I+D	Notification to End User when MR content has changed	Brief knowledge on GE based on FI-WARE Catalogue home page
Apps Chapter	Apps. Repository	SAP	Stores widgets description	Testing and Experimentation on GEs has been done successfully
	Apps. Marketplace	SAP	Provides widgets	Testing and Experimentation on GEs has been done successfully
	Apps. ApplicationMa shup -	UPM	Provides GUI and Data aggregation.	Expert. Integration between GEs have been performed

	Wirecloud			
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*Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE	EXPERTISE
Virtual Factory	Collaborative Asset Management	ENG	<p>Conversation of different used data formats.</p> <p>The SE is planned to be used for the asset of MR resources and some simple calculations. It is connected to its own database containing cost and other data for calculations.</p> <p>The data will be provided via the GE Apps.ApplicationMashup – Wirecloud to the user.</p>	Complete knowledge on GEs specifications and capable to propose a planning of use
	Collaborative Business Process Management	ENG	<p>Store and manage MR data.</p> <p>The SE is planned to be used for the modelling of the Logo Layout which illustrates the value-adding processes of MR modules. The model will be saved in the SE database and the images will be used in MR.</p> <p>The image will be provided via the GE Apps.ApplicationMashup – Wirecloud to the user.</p>	Testing and Experimentation on GEs has been done successfully

**#Trial 3: AgustaWestland***Generic Enablers – Digital Trial*

CHAPTERS	FI-WARE GES	OWNER	DESCRIPTION OF USE	EXPERTISE
Apps Chapter	Apps. Application Mashup	UPM	To support the aggregated visualisation of data	Complete knowledge on GEs specifications and capable to propose a planning of use
	Apps. Mediator	Telecom Italia	To help creating transformation between XML file formats at modelling time and	Complete knowledge on GEs specifications and capable to propose a planning of use

			runtime	
Data Chapter	Data. PubSub - CAP Context Broker	Telecom Italia	To support the visualisation of correlated data	Complete knowledge on GEs specifications and capable to propose a planning of use

*Specific Enablers – Digital Trial*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE	EXPERTISE
Virtual Factory	Metadata and Ontologies Semantic Matching	NTUA	To support the transformation between different XML formats at modelling time	Complete knowledge on GEs specifications and capable to propose a planning of use

*Generic Enablers – Smart Trial*

CHAPTERS	FI-WARE GES	OWNER	DESCRIPTION OF USE	EXPERTISE
IoT Chapter	IoT. Gateway. Data Handling	Orange	To detect potential dangerous behaviours	Complete knowledge on GEs specifications and capable to propose a planning of use
	IoT. Backend. IoTBroker	NEC	To manage events brokering	Complete knowledge on GEs specifications and capable to propose a planning of use
	IoT. Backend. Device Management	Telefónica I+D		

*Specific Enablers – Smart Trial*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Smart Factory	Shop Floor Data Collection	UNINOVA – ATOS	Trigger
	Secure Event Management	TXT	To control the data access

**#Trial 7: CONSULGAL***Generic Enablers*

CHAPTERS	FI-WARE GES	OWNER	DESCRIPTION OF USE	EXPERTISE
Data Chapter	Data. PubSub - Context Awareness Platform	Telecom Italia / Telefónica I+D	To generate context information (publish) and to query and subscribe (subscribe) for being notified about context events that may emerge from different sources.	Expert. Integration between GEs have been performed
Apps Chapter	Apps. Application Mashup - Wirecloud	UPM	Provide consolidated workspace for the users to view data that arise from various heterogeneous sources.	Expert. Integration between GEs have been performed

*Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Smart Factory	Shop Floor Data Collection - FitmanT&T	ATOS	Will be used for keeping track of tagged objects at the site. This will ease the tasks of the users working on the site for identification of the sample items and enhance related information when available. This will not only make the task easier but will also decrease the possibilities of inconstant recordings.

**#Trial 11: AIDIMA***Generic Enablers*

CHAPTERS	FI-WARE GES	OWNER	DESCRIPTION OF USE	EXPERTISE
Data Chapter	Data. PubSub - Context Awareness Platform	Telecom Italia / Telefónica I+D	The PubSub GE entitles AIDIMA trial with the capacity to inform designers, manufacturers and other stakeholders with weak signals news so that they can start to consider that information as soon as possible, according to the types of weak signals they want be inform with.	Testing and experimenta tion on GEs has been done successfully
	Data. Unstructured DataAnalysis	ATOS	Analyse automatically the already existing sources of information (textual and if possible, also multimedia content) and will (i) generate a list of weak signals (words,	Brief knowledge on GE based on FI- WARE Catalogue

			adjectives, pronominal sentences) with statistics about its relevance and (ii) for each term submitted, a number of references (sentences where the word appears) will be returned.	home page
Apps Chapter	Apps. Application Mashup - Wirecloud	UPM	Integrate heterogeneous data, application logic, and UI components (widgets/gadgets) sourced from the Web to create new composite applications. It will serve as front-end “window” for BS, under a main console fashion.	Testing and Experimentation on GEs has been done successfully

#### *Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Digital Factory	Unstructured and Social Data Analytics	NTUA	Primary component for BS2. It will make use of the widely available social media cloud, in the form of blogs, forums, Twitter, Facebook that have been previously targeted by analysts and designers. Furniture concepts, brands, hashtags, trends, etc., from social media platforms will be obtained as well as a customized opinion mining analysis in order to identify topics, sentiments and trends that will facilitate actors their work with the goal of attending more in detail to the final customer real needs.

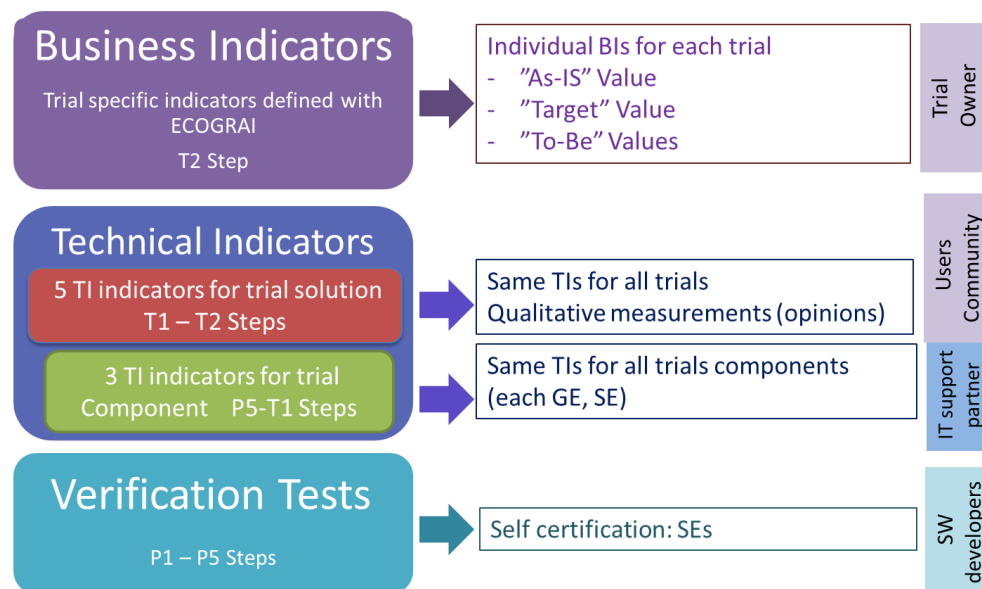
## 4.2 D5.4 Technical / Business Indicators for Digital Factory

Deliverable D5.4 presents the Business and Technical Indicators for each of the Digital Factory trials. The presented framework is based in the Methodology for Validation and Verification for the Technical and Business Performance Indicators from WP2. The Technical indicators do not present values as it would need trial execution and at that time the trials were not mature enough for data collection. The Trial owners for Digital Factory are Aidima, Volkswagen, Consulgal and AugustaWestland.

Business and Technical indicators provide a means of assessment as they allow collection of values for the As-Is of the trials and compare with the To-Be values. Those in conjunction with several measurements allow an identification of success for Trial execution. For the Technical assessment, three Indicators have been designed in order to validate each of the Software Component (i.e. GEs/SEs) implemented in the Digital Factory Trials, taking into account their effective operation once instantiated in the specific Trial Use Case. Then, another five Indicators have been designed in order to have feedback on the whole Trial Integrated Solution, collecting in this case the different perceptions of all the stakeholders, via a community-based survey, of the Trial. The final result is a solid common framework able to validate at different levels of detail the IT aspects of the Digital Factory Trials. The Business Indicators and the functional technical indicators are addressed to the Trial Owner; the non-

functional technical indicators require crowd engagement, therefore all the trial team members; the software component developers are responsible to evaluate their components with recommended or alternative techniques, and report results through self-certification.

In D5.4, the FITMAN V&V Assessment Package has been applied to Digital Factory Trials by means of the following conceptual framework:



**Figure 19 - FITMAN V&V Assessment Package overview**

For FITMAN Digital Factory Trials Business Indicator collection a simplified version of ECOGRAI was used, with only three phases in order to facilitate the application and to be in line with the size of the use cases and the duration of the project. The phases are:

**First Phase:** Description of the system in which the Performance Indicators (PIs) will be defined, including Functions, Processes, Boundaries and Business Objectives.

**Second Phase:** According to the Objectives of the system the owner of the system determines the potential actions to reach them (called Decision Variables (DV) or Action Variables (AV)).

**Third Phase:** the Performance Indicators indicate or characterize the reaching of the Objectives by using the DV/AV.

While Verification Tests have been performed outside the boundaries of the Trials, Technical and Business Indicators have been defined to evaluate the impact of FITMAN solutions in each of them.

The complete list includes eight Technical Indicators, i.e. three specific for the evaluation of the single GEs/SEs and five for the evaluation of the whole Trial Integrated Solution.

**Table 5 - Functional Technical Indicators for Smart Factory Trials**

Technical Indicators for GEs/SEs (P5)	Levels for the selection
Openness	Level 0: Open specifications –Developers can view & study the requirements posed and implement them as they wish.



	<p>Level 1: Enablers as a Service – Developers can utilize software provided as a service through open interfaces.</p> <p>Level 2: Releasing code as open source - Developers can inspect, download, run and improve the open source code according to their needs.</p> <p>Level 3: Consulting with the use cases about their needs and collaboratively contributing to the source repository, design documents, and bug reports.</p>
<b>Interoperability maturity</b>	<p>Level 0: Isolated Approach: No API exposing the GE / SE functionalities is available.</p> <p>Level 1: Baseline Unified Approach (International Standards exists): Offering an API exposing main part of the GE / SE functionalities, in its own format.</p> <p>Level 2: Open Unified Approach (No International Standards exists): Offering an API exposing main part of the GE / SE functionalities, in its own format.</p> <p>Level 3: Standardized Integrated Approach (International Standards exists): Offering an API exposing main part of the GE / SE functionalities, following international standards.</p>
<b>Ease of application</b>	<p>Level 0: "no applicability in our environment without extra applying actions or means".</p> <p>Level 1: "applicable with significant amount of work".</p> <p>Level 2: "applicable with limited amount of work".</p> <p>Level 3: "Easily applicable in our environment".</p>

The assessment of these values has been responsibility of the single Trial Owner, with the support of the related IT Partner.

Another five non-functional Technical Indicators have been used to assess the whole Trial Integrated Solution, i.e.:

**Table 6 - Non-functional Technical Indicators for Smart Factory Trials**

<b>Technical Indicators for the Trial Integrated Solution (T1)</b>	<b>Statements to be assessed</b>
Fulfilment of requirements	"The solution fulfils the Trial requirements"
Learnability	"It is easy to start to use the solution and learn functionalities."
Understandability	"The solution is easy and self-clear to understand and the concepts and terminology are understandable."
User's attraction level	"The solution is attractive to the user. I feel satisfied and comfortable when using it."
Efficiency	"The time and resources required to achieve the objectives of the solution are reasonable, the solution is fast enough and does not require too many steps."

For each of these Technical Indicators a specific statement should be assessed by the user. For each of the sentences, he/she should express his/her own level of agreement according to his/her experience and by choosing one option among the following ones:

- *I strongly agree*
- *I agree*
- *I disagree*
- *I strongly disagree*

The combination of these two different levels of Technical Indicators will hence guarantee the systematic and complete Validation of all the IT aspects of a Trial. Two different perspectives are taken into account, i.e. the one of the specific Software Component (i.e. GEs/SEs) and the one of the final solution that results from the combination of these different elements and that will be concretely used in the Trials environment.

Phase III trials would benefit from the experience of the Digital Factory trials in order to establish the process of gathering the Business and Technical indicators and the interaction needed with the Trials.

## 5 FITMAN VIRTUAL FACTORY TRIALS

This section first presents the FITMAN system for Smart Factory before addressing the technical and business indicators for Smart Factory.

### 5.1 D6.1 FITMAN System for Virtual Factory

This document concerns the prototype Deliverable 6.1, which results from Task 6.1. The main objective of task T6.1 is instantiation of FITMAN systems in the context of the three virtual trials:

- Trial 6: APR
- Trial 8: TANET
- Trial 9: COMPlus

This builds on work from WP1 and WP3, extending the Generic Platform.

Considering the objective of the task and the Trials involved, T6.1 helps FITMAN achieve its goal to assess the suitability, openness and flexibility of the FI-WARE Generic Enablers in a Manufacturing context, specifically in the virtual factory domain. The result of the task is a prototype implementation.

The following text describes the FI-WARE Generic Enablers and FITMAN Specific Enablers to be used and implemented in the Virtual Factory Trials.

#### #Trial 6: APR

##### *Generic Enablers*

CHAPTER	FI-WARE GEs	OWNER	DESCRIPTION OF USE	EXPERTISE
Data Chapter	Data.SemanticSupport	ATOS	Support the transformation of XSD files in order to perform mediation activities between meta-models (customers and suppliers profiles) and customer's projects classification	Beginner
Apps Chapter	Apps.LightSemanticComposition	ATOS	Support the development of BPMN business process for collaboration design through the implementation of developed services.	Intermediate
	Apps.Mediator	Telecom Italia/Thales	Support the development of services and the connection with different legacy system through the ESB	Expert

##### *Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Virtual Factory	Collaborative Business Process	ENG	This SE is complementary to the Compel GE and allows to setup more complete environment of the development our BPMN Collaborative processes

	Management		with SSO add-on.
	Data Interoperability Platform Services	TXT	The DIPS platform will be used as a repository for the services published from the mediator. Later, published services can be semantically searched in order to facilitate their implementation in service tasks at the business application level (Compel).
	Metadata and Ontologies Semantic Matching	NTUA	In connection with the Data.SemanticSupport GE, we will use this SE for ontology mapping activities in order to share web service specifications. Also, ontology matching is used to classify customer projects (premium, standard or basic).

**#Trial 8: TANET***Generic Enablers*

CHAPTERS	FI-WARE GEs	OWNER	DESCRIPTION OF USE	Expertise
Data Chapter	Data.Unstructured DataAnalysis	ATOS	Used by the Unstructured and Social Data Analytics SE	Beginner
Apps Chapter	Apps.Repository	SAP	Used by the Collaborative Assets Management SE	Advanced
	Apps.Marketplace	SAP	Used by the Collaborative Assets Management SE	Advanced
	Apps.Light Semantic Composition	ATOS	Used by the Collaborative Business Process Management SE	Beginner
	Apps.Mediator	Telecom Italia/Thales	Used by the Data Interoperability Platform Services SE	Beginner
IoT Chapter	IoT.Gateway. DataHandling	Orange	Used to process events raised by drilling assembly	Advanced
	IoT.Gateway. ProtocolAdapter	Telecom Italia	Used to communicate with our network of Zigbee-enabled devices	Intermediate

*Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Smart Factory	Shop Floor Data Collection - FitmanT&T	UNINOV A	Used to communicate with RFID tags as components pass through drilling assembly
Digital Factory	Unstructured and Social Data Analytics	NTUA	Used to extract meaningful data from various sources
Virtual Factory	Collaborative Asset Management	ENG	Used to create and maintain a data collection of offers and opportunities

	Collaborative Business Process Management	ENG	Used to maintain a semantic ontology and apply it to offers and opportunities
	Data Interoperability Platform Services	TXT	Used to align disparate data types for communication between systems
	Supply Chain & Business Ecosystem Apps	TXT	Used to match opportunities to offers and form clusters
	Semi-automatic VAaaS generation	Open Call - STI	Used to create opportunities from raw or partially-transformed data
	VAaaS Discovery & Composition	Open Call - DITF	Used to match opportunities to offers and form clusters
	Semantic Transformations	Open Call - STI	Used for conversion of semantic ontologies when communicating between systems e.g. the Collaborative BP Management SE and SME Cluster's Synergy TSC

**#Trial 9: COMPlus***Generic Enablers*

CHAPTERS	FI-WARE GEs	OWNER	DESCRIPTION OF USE	EXPERTISE
Apps Chapter	Apps. Marketplace	SAP	This GE should be used in order to facilitate the common entry point as well as best practice services	Advanced
	Apps. Application Mashup - Wirecloud	UPM	This GE is suppose t be used in order to support the common entry point	Advanced
Data Chapter	Data. Semantic Support	ATOS	A set of tools that facilitate the development and management of ontologies. For this User Trial, it is envisaged that the User (supply Network Members and Network Manager) are able to manage and enrich the Supply Network Knowledge Base using a ontology repository.	Beginner
Cloud Chapter	Cloud. DCRM	IBM	The GEs from the Cloud chapter should be used to support the private cloud hosting. Due to the limited functionality, this is however to be reconsidered	Beginner
	Cloud.SM	Telefónica I+D	The GEs from the Cloud chapter should be used to support the private cloud hosting. Due to the limited functionality, this is however to be reconsidered	Beginner
	Cloud.Self	UPM	The GEs from the Cloud chapter	Beginner

	Service Interfaces		should be used to support the private cloud hosting. Due to the limited functionality, this is however to be reconsidered	
	Cloud. Object Storage	Intel	The GEs from the Cloud chapter should be used to support the private cloud hosting. Due to the limited functionality, this is however to be reconsidered	Beginner
	Cloud.SDC	Telefónica I+D	The GEs from the Cloud chapter should be used to support the private cloud hosting. Due to the limited functionality, this is however to be reconsidered	Beginner
	Cloud.PaaS	Telefónica I+D	The GEs from the Cloud chapter should be used to support the private cloud hosting. Due to the limited functionality, this is however to be reconsidered	Beginner

### *Specific Enablers*

Domain	FITMAN SEs	OWNER	DESCRIPTION OF USE
Virtual Factory	Collaborative Asset Management	ENG	This SE could be used for the representation of the IT Assets
	Collaborative Business Process Management	ENG	This SE could be used for collaborative presentation of the business processes
	Semantic Transformations	Open Call - STI	Optional

## 5.2 D6.4 Technical / Business Indicators for Virtual Factory

### Introduction: objectives of Technical / Business Indicators for Virtual Factory

This deliverable aims to present the pragmatic method used to define the Business Performance Indicators required to measure the benefits of FITMAN results implementation in the trials. It gives also the final list of Business Performance Indicators (BPIs) that are defined and validated by the three virtual trials: APR, TANET and COMPLUS. This deliverable aims also to demonstrate that BPIs concern FITMAN results success and that there is a harmonisation in the method and framework to define BPIs in each trial. It also aims at presenting the continuous validation of trials during the BPIs identification process and explanation on the BPIs selection.

This text is organised in three sections intended to address two general objectives:

- Part 1 introduces the document and describes T6.4 objectives.
- Part 2 provides a brief overview of the “simplified ECOGRAI” method to determine the business PIs and the V&V method to determine the technical indicators. It also demonstrates that Business PIs are defined using the same methodology and framework. Finally, this section presents the continuous

validation process with trials.

- Part 3 has the content assigned to Deliverable D6.4 that will be devoted to the control of the experimentation metrics to be employed for FITMAN impact assessment. These BPIs aim to measure first the adoption of the FITMAN results by the trials and also the benefits that the trials get from the implementation of FITMAN results.

#### **Why Technical / Business Indicators for Virtual Factory are useful for Phase III participants**

This deliverable is very useful for Phase III participants because first of all the proposed method is very generic and can be applied to any kind of trial.

Moreover, it is important for each trial to measure the benefits of project results implementation and this method is not specific to the FITMAN results only.

The proposed method involves strongly the users in the enterprise in order to improve their appropriateness of the defined PI's. This is very important because the most recurrent failure of Performance Indicator System implementation and appropriation is the lack of use of such indicators.

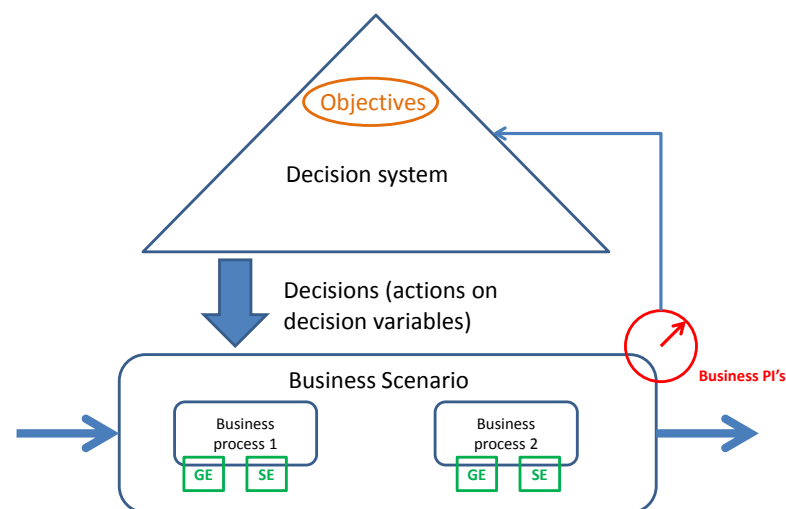
The application of the method demonstrates also that the selected Business Performance Indicators (BPIs) are coherent and defined clearly at the strategic level of decisions.

The proposed method can be combined with a modelling of the enterprise business processes and decisions that will be impacted by the project result implementation.

The defined BPIs cover mainly the performance in terms of cost, quality, lead time and flexibility. A limitation to less than ten BPIs was clearly followed.

#### **How they might put the content to use**

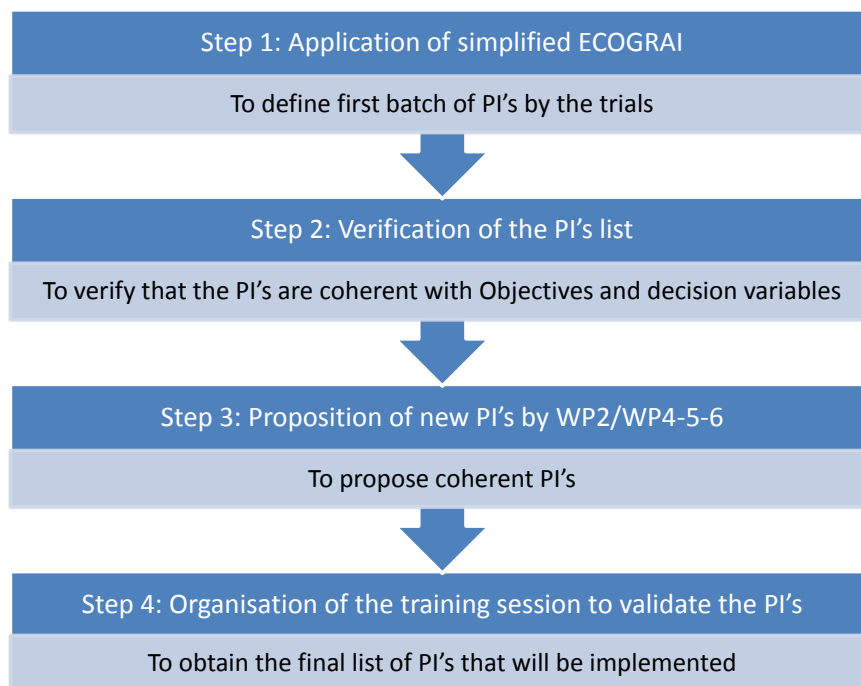
The main principle of the methodology is to understand that performance measurement is only useful if decisions can be made to control the business processes in order to reach the objectives. The main principles are shown in Figure 20.



**Figure 20. Principles of BPIs interest to control business processes**

Figure 21 details the applied structured approach.





**Figure 21. The steps of BPI definition and validation**

This structured approach shows the iterations in the BPIs definition and validation by trials in order to get at the end the final list of BPIs that are the result of a consensus between BP actors and the enterprise management team.

## 6 TERMS AND CONDITIONS OF FITMAN SPECIFIC ENABLERS AND PLATFORMS

This section describes the terms and conditions of the FITMAN Specific Enablers as well as the FITMAN Platforms.

### 6.1 Terms and Conditions of FITMAN Specific Enablers

The eight FITMAN Specific Enablers are the outcome of two prototype deliverables, D3.3 and D3.4.

Some of the Specific Enablers are based on several components that combine different licensing scheme, which impact the final SE licensing. Next tables present such licensing schemes.

<b>Specific Enabler</b>	<b>FITMAN - Collaborative Asset Management</b>	Apache 2.0
<b>Components</b>	Sesame 2 (OpenRDF.org)	BSD-style licence
	FI-WARE Marketplace Generic Enabler (SAP AG)	BSD-style licence
	FI-WARE Repository Generic Enabler (SAP AG)	BSD-style licence
	AAS Manager (Eng Ingegneria Informatica SpA)	Apache 2.0 licence
	Liferay Portal CE (Liferay, Inc.)	LGPL v2.1

<b>Specific Enabler</b>	<b>FITMAN - Collaborative Business Process Management</b>	Apache Licence 2.0
<b>Components</b>	FI-WARE Light Semantic Composition Generic (ATOS Spain) Enabler	GPLv3

<b>Specific Enabler</b>	<b>FITMAN - Secure Event Management</b>	Apache Licence 2.0
<b>Components</b>	RabbitMQ	Mozilla Public Licence version 1.1

Note: RabbitMQ is used as is an external component

<b>Specific Enabler</b>	<b>FITMAN - Unstructured and Social Data Analytics</b>	MIT
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<b>Components</b>	Decision Support Systems (NTUA Greece)	MIT
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<b>Specific Enabler</b>	<b>FITMAN - Metadata and Ontologies Semantic Matching</b>	AGPL
<b>Components</b>	COMA 3.0 CE (Database Group Leipzig - Univ. Leipzig)	AGPL

<b>Specific Enabler</b>	<b>FITMAN - Data Interoperability Platform Services</b>	LGPL
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The Data Interoperability Platform Services SE has no separately-licensed components.

<b>Specific Enabler</b>	<b>FITMAN - Supply Chain &amp; Business Ecosystem Apps</b>	LGPL
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The Supply Chain & Business Ecosystem Apps SE has no separately-licensed components.

<b>Specific Enabler</b>	<b>FITMAN - Shopfloor Data Collection</b>	GPL 2.0
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The Shopfloor Data Collection SE has no separately-licensed components.

## 6.2 Terms and Conditions of FITMAN Platforms

The three FITMAN Platforms for Smart, Digital and Virtual Factories are the outcome of two prototype deliverables, D1.4 and D3.5. The former defines a selection of FI PPP Core technology – i.e., FI-WARE Generic Enablers – as the base layer of generic functionality targeted at the three manufacturing domains; the latter builds on this foundation, adding FITMAN Specific Enablers developed in the scope of WP3.

Being collections of individual components – integrated but still separate, each with its own specific licensing scheme – the three Platforms are not released under a single, *wrapper* licence. However, the common denominator is Open Source: all the FITMAN Specific Enablers are released as OS (see the previous section for details), and we committed to selecting OS implementations from the FI-WARE Catalogue whenever possible. The following tables provide a comprehensive view of the licensing terms for all the FI-WARE Generic Enablers included in the three Platforms. Note that only five GEs are currently *not* OS.

**Table 7 – Licensing terms of FI-WARE Generic Enablers for Smart Factories**

Name	Implementation	Licence
IoT.Gateway.DataHandling	Esper4FastData by Orange	OS – GPL v2
IoT.Gateway.ProtocolAdapter	ZPA by Telecom Italia	<b>Commercial</b>
IoT.Backend.IoTBroker	Ref. impl. by NEC	OS – BSD
IoT.Backend.ConfMan	Orion Context Broker by Telefónica	OS – AGPL v3
IoT.Backend.DeviceManagement	ISAD by Telefónica	OS – AGPL v3

**Table 8 - Licensing terms of FI-WARE Generic Enablers for Digital Factories**

Name	Implementation	Licence
Data.UnstructuredDataAnalysis	Ref. impl. by ATOS	OS - ( <i>tbd</i> )
Data.PubSub	Context Awareness Platform by Telecom Italia	OS - ( <i>tbd</i> )
Data.PubSub	Orion Context Broker by Telefónica	OS – AGPL v3
Data.BigData	Cosmos by Telefónica	OS – Apache v2
Apps.ApplicationMashup	Wirecloud by UPM	OS – AGPL v3
Security.Optional_Security_Enablers.DBAnonymizer	DBA by SAP	OS – BSD

**Table 9 - Licensing terms of FI-WARE Generic Enablers for Virtual Factories**

Name	Implementation	Licence
Apps.Marketplace	Ref. impl. by SAP	OS – BSD
Apps.Repository	Ref. impl. by SAP	OS – BSD
Apps.Registry	Ref. impl. by SAP	OS – BSD
Data.SemanticSupport	Semantic Application Support by ATOS	Composite (per-module): - LGPL - BSD - <b>Commercial</b>
Apps.LightSemanticComposition	COMPEL by ATOS	OS – GPL v3
Apps.Mediator	Ref. impl. by Telecom Italia / Thales	Composite (per-module): - OS – Apache v2 - <b>Commercial</b>
Apps.BusinessModeler	Ref. impl. by iMinds	<b>Commercial</b>
Apps.BusinessCalculator	Ref. impl. by iMinds	<b>Commercial</b>

## 7 LESSONS LEARNED, SOCIO-ECONOMIC IMPACT AND ROADMAPPING

This section falls into three parts. Firstly, lessons learned regarding involvement in the FI-PPP are presented. Next comes information on the FITMAN approach to socio-economic impact assessment, and suggestions for how Phase III Projects may go about such a task. Finally the current methodology and tools for trial expansion and web entrepreneurs are presented.

### 7.1 Lessons Learned Regarding Involvement in the FI-PPP

This section describes lessons learned by FITMAN partners regarding their involvement in Phase II of the FI-PPP. To enable this each partner was interviewed and the results collated and analysed. A summary of the methodology, described in more detail in Chapter 2.3 of D8.3, is below. Following this is an analysis and discussion of interview responses, with lessons learned.

#### Summary of methodology

The methodology was as follows:

1. Identify the participants who may have information of relevance
2. Construct a suitable questionnaire
3. Conduct semi-structured interviews with the participants
4. Conduct a thematic analysis of their responses
5. Enumerate the lessons learned and how they may best be used.

Each of the (then) 11 FITMAN trials has two participant organisations, a manufacturer and an ICT organisation. These 11 pairs were the target of the interviews, with the goal of interviewing one representative of each organisation:

- Whirlpool White Goods and Engineering
- TRW Automotive and Innovalia
- Piacenza Textile and Softeco Sismat
- ComPlus LED Lighting Trails and Fraunhofer IPK
- Volkswagen and Fraunhofer IPK
- AgustaWestland SpA and TXT
- AIDIMA furniture and Universitat Politècnica de Valencia
- ConsulGal construction and Uninova
- APR Plastic and Université Lumière Lyon
- TANet Manufacturing Resources and Coventry University
- PGSO Machinery for Wood, Geoloc Systems and Université Bordeaux

The questions were as follows:

1. How did you hear about the Phase II call?
2. Was it immediately obvious to you that this was relevant to your interests?
3. How was it relevant to your interests?
4. When you wrote your bid in response to the Phase II call, did you find any of the sections particularly easy or difficult to generate? Why?

5. Did you have any particular problems
  - a) when you responded to the call?
  - b) during the contract negotiation period?
  - c) during the project start-up period?
6. [ICT partners only] How and why did you bring your manufacturer partner into FITMAN?
7. Had you worked with your ICT / manufacturer partner previously? If so, has FITMAN changed your working relationship with your ICT / manufacturer partner?
8. Do you have any other comments about your experiences responding to the Phase II call?

21 interviews were held. 17 of these were conducted in person at a FITMAN General Assembly. Of the four remaining interviews, three were conducted as telephone calls and one was conducted via email. One ICT organisation was unable to assist with this work as no representative who had been involved in the start-up phase of FITMAN was available for interview.

To enable a free and frank discussion, the interview responses remain confidential and cannot be disclosed. They were used as input to a systematic thematic analysis, the results of which are discussed below. Responses which were consistent across multiple interviewees are highlighted, along with particularly strong or unexpected responses.

### Analysis of Interview responses

#### *Visibility of call*

Five ICT partners heard about the call via the EC, with the rest hearing via their contacts. Of the manufacturers, only two reported hearing about the call via the EC with the other nine hearing via contacts; five of these nine heard about the call from their ICT partner to be. With the majority of manufacturers hearing about the call through informal, ad hoc networks (not formal, organised networks such as SME or innovation networks) it can be seen that these networks are an important avenue for the dissemination of research opportunities. This is perhaps even more important for manufacturers whose day-to-day focus is not research. It is also the case that involvement in an EC project such as FITMAN is a prime vehicle for creating and establishing new contacts outside an enterprise's immediate domain. This leads to the first lesson learned from this analysis, and one that is highlighted throughout the responses to the interviews:

**Lesson 1: Informal networks amongst manufacturers and ICT partners played an important role throughout the early phases of FITMAN, especially the bidding phase. Involvement in FITMAN provided extensive opportunities to establish and grow these networks. Both formal and informal networks should be used for dissemination of open calls.**

#### *Clarity of call*

Nine of the eleven manufacturers said it was immediately clear that the call was relevant to their interests. Of these nine, six benefitted from having been recruited explicitly by project partners, and thus heard about the call in a way that was tailored to their interests. Seven of the ten ICT partners reported it being clear that the call was of interest. One of the ICT partners stated that another partner recruited them and tailored the information to their interests.

The responses from the interviewees suggest that the call was clear, with the vast majority of current partners understanding the relevance of the call to their enterprise. A significant number of respondents highlighted that other partners showed how the information was relevant to their interests, with comments such as “Yes, because [ICT partner] presented the information tailored to [the partner being interviewed].” This offers our second lesson:

**Lesson 2: It is beneficial, and may even be necessary, to broker links between newcomers and more experienced participants in EC research projects.**

*Motivation for involvement in FITMAN*

Manufacturers were asked how the FITMAN bid was relevant to their interests. Responses included a desire to work on:

- Progressing health and safety strategy
- Industrial processes
- ICT in manufacturing as a web service
- Capabilities
- Certain software
- Marketing and branding
- Technology for dam building
- Quality of product information
- Manufacturing as service industry
- Web technologies for SMEs.

Responses to the same question from ICT partners included a desire to work on:

- New technology to improve their business
- The FI programme
- Plug and play web services
- Improving their competence for ICT in manufacturing
- Enterprise interoperability
- FI-WARE infrastructure development
- FI technology for SMEs
- Manufacturing
- Internet platforms.

The motivations for involvement in FITMAN were as varied as the content of the trials. Manufacturers unsurprisingly cited core trial goals (e.g. improved health and safety, marketing, or quality of product information) as the main motivation, whilst ICT partners tended to be more motivated by ICT aspects (e.g. involvement in the FI, plug and play web services, and enterprise interoperability). There were some overlaps, with manufacturers expressing interest in topics such as web services and web technologies, and ICT partners expressing a desire to be more involved in ICT for manufacturing, and manufacturing itself.

This leads to the third lesson:



**Lesson 3: We need to be open to a wide range of interests and motivations. Especially when dealing with manufacturing and ICT partners, whose longer term goals may be different, we need to look for the common interests and motivations.**

*Engaging with the call*

When asked if they had difficulty developing any parts of the FITMAN bid, four manufacturers, two of which had past experience with EC bids, said nothing. There were no notable patterns in the responses of the other manufacturers, suggesting that any difficulties encountered may have been specific to particular organisations.

Three ICT partners had no comment when asked if parts of the FITMAN bid were especially easy or hard to write. The areas highlighted as difficult by the other seven partners varied. One partner highlighted difficulties understanding FI-WARE (“there was the need to understand what FI-WARE really was, and its current status and what could be achieved with it. This required some digging”). Another partner remarked that analysis of GEs and SEs was difficult due to access issues (“The analysis of all the GEs and SEs was complicated as [ICT partner] did not have full access to them and we did not accurately know the development degree of them”). Whilst this sentiment was certainly not reflected by all partners it is clear that understanding the status of FI-WARE, including expected usage, did prove problematic for more than one partner.

Other interviewees stated that although the immediate potential benefit of the FI to their enterprise was clear, it took time to understand the philosophy of the project (“it was difficult to understand the philosophy of the project”) and the broader context of the FI-PPP (“[FITMAN] was linked with a larger program, understanding of the wider concept was required”). Additionally, several parties highlighted some early confusion regarding dealing with third parties.

This is not unreasonable as the FI-PPP is a very large research program. To enable the full benefit of the project to be realized, every effort should be made to ensure that the FI philosophy is clear and that potential partners understand what is within scope of the project. This brings us to the fourth lesson learned:

**Lesson 4: It is important that FI-PPP participants understand the contractual obligations and constraints of the FI-PPP along with the overall FI philosophy. It is essential to ensure access to information in suitable formats, including information on the FI-PPP, FI-WARE, GEs and SEs (including GE and SE status, and terms of access).**

*Motivation of ICT partner for bringing manufacturing partner into FITMAN*

ICT partners were asked about their motivation for involving their manufacturer partners in FITMAN. The three generic reasons given were:

1. They had previously collaborated with the partner and were familiar with their interests (4 responses)
2. They had worked together for a long time (2 responses)
3. Another party introduced them to their manufacturer partner (2 responses)

It is clear that FITMAN was brought to the attention of the majority of the manufacturers through their ICT provider and this once again highlights the importance of informal networks.

*Impact of FITMAN on the relationship between ICT and manufacturer partners*

Both manufacturing and ICT partners were asked how long they had known their trial partner and what impact, if any, the FITMAN project had had upon their working relationship with their partner.

As would be expected, the answers to these questions generally matched within the trial pairings of manufacturer and ICT provider. One pairing reported having no prior relationship with their partner. Five ICT providers and seven manufacturers reported that the relationship they had with their partner had not changed due to FITMAN. Four ICT providers and three manufacturers reported that FITMAN had improved their working relationship, bringing the two enterprises closer together. No interviewee gave a negative response to this question.

### **7.1.1 Conclusions and lessons learned**

This section presented the results of interviews with 21 FITMAN partners about their experiences of engaging with the FI-PPP. Their comments yielded four lessons for FI-PPP Phase III Intermediaries, and any other groups who are interested in facilitating engagement within the FI-PPP:

Lesson 1: Informal networks amongst manufacturers and ICT partners played an important role throughout the early phases of FITMAN, especially the bidding phase. Involvement in FITMAN provided extensive opportunities to establish and grow these networks. Both formal and informal networks should be used for dissemination of open calls.

Lesson 2: It is beneficial, and may even be necessary, to broker links between newcomers and more experienced participants in EC research projects.

Lesson 3: We need to be open to a wide range of interests and motivations. Especially when dealing with manufacturing and ICT partners, whose longer term goals may be different, we need to look for the common interests and motivations.

Lesson 4: It is important that FI-PPP participants understand the contractual obligations and constraints of the FI-PPP along with the overall FI philosophy. It is essential to ensure access to information in suitable formats, including information on the FI-PPP, FI-WARE, GEs and SEs (including GE and SE status, and terms of access).

## **7.2 Socio-Economic Impact Assessment**

This section summarises the socio-economic impact assessment methodology in FITMAN D9.2 (Vega, 2014) before discussing the application of this methodology with some suggested alternative techniques for assessing the impact of Phase III Proposals and Projects.

### **7.2.1 Socio-economic impact assessment methodology**

FITMAN has a key role in Future Internet adoption by SMEs. FITMAN digital transformation is creating a new ICT and service-intensive ecosystem with lower barriers to SME service development.

D9.2 offers methodologies to assess the level of achievements and innovations in the Manufacturing sector, concretely in the different subsectors present in the ten FITMAN trials. SMEs and Web Entrepreneurs will have quantitative and qualitative indicators and measurements of the expected impact in these specific industrial sectors.

The aim of the socio-economic impact assessment in D9.2 (Vega, 2014) is to give a concrete assessment of the social & economic impact of FITMAN trials at the end of the project itself, as well as estimating the potential for future impacts.

The FITMAN socio-economic impact assessment methodology selected in D9.2 has three components. The methodology will assess the range of socio-economic impacts felt across

industry, society and the scientific community. These impacts will be felt on different time horizons necessitating the use of a combination of different assessment methods.

### Impact on Industry

One of the aims of the FITMAN project is to ensure the European manufacturing industry remains competitive and to improve business processes through Future Internet technologies.

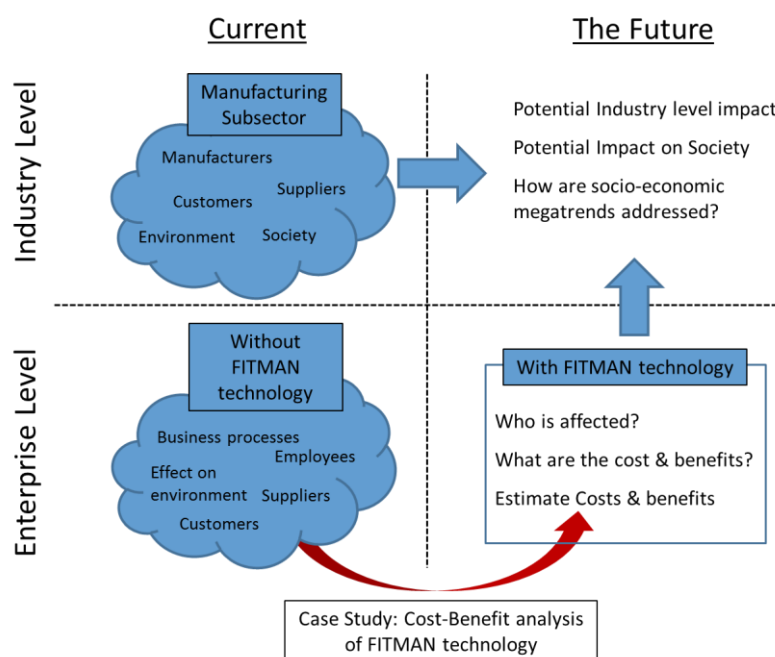
The Factories of the Future 2020 Roadmap outlines a set of long term societal objectives to recover the European manufacturing industry in terms of Employment, Environment and Economic Growth.

The technologies developed in FITMAN can help to achieve these objectives through improved business processes. A methodology for trial by trial analysis of the FITMAN business cases has been established and, at the time of writing, applied to one of the trials as an exemplar. The methodology, which will be applied to all ten FITMAN trials in due course, assesses the potential impact across three categories:

- **Employment:** Effect of technology on individual employees, staffing requirements of enterprise, health & safety, conditions of work, job satisfaction and staff training
- **Environment:** Direct or indirect effects of technology on the environment (e.g. improved energy efficiency, reduced waste, improved product development leading to more environmentally friendly products).
- **Economic Growth:** Economic impact of the technologies for the whole manufacturing ecosystem ( the enterprise itself, its suppliers, the wider manufacturing industry and the economy as a whole)

D9.2 aims at providing a quantitative framework for assessing the potential macro-economic and societal impacts of the Future Internet technologies developed in FITMAN across these three categories. To achieve this goal manufacturing subsectors within which a FITMAN trial is taking place will be assessed.

### Methodology for assessing future impact on industry and society



**Figure 22. Methodology to assess socio-economic impacts of FITMAN.**

Figure 22, above, shows a three step process which will be applied to each manufacturing subsector where the FITMAN trials are taking place.

Initially the current status quo in the manufacturing subsector will be established. This will look at the whole manufacturing ecosystem including its customers, suppliers and its effects on society and the environment. When this has been established the FITMAN trial in the manufacturing sub-sector will be used as a case study in the sector. A cost-benefit analysis covering the trial technology, looking at the effects throughout the manufacturing ecosystem will be undertaken. Where possible the cost-benefit analysis will quantify the individual cost-benefits for the affected parties.

The final step will then draw together the current status quo in the manufacturing subsector, with the lessons learned from the case study using the trial output. Potential industry level impacts will be discussed, including effects throughout the entire manufacturing ecosystem.

### **Impact on Society & Social Innovation**

The assessment of the social innovation of FITMAN includes the processes of analysing, monitoring and managing the intended and unintended social impacts of the outputs of the project as they are applied to the trials. Social innovation assessment in FITMAN is more focused on “service innovation” aspects.

The aspects considered as relevant to the real impact of the project, and which will be the focus of the social innovation impact analysis are:

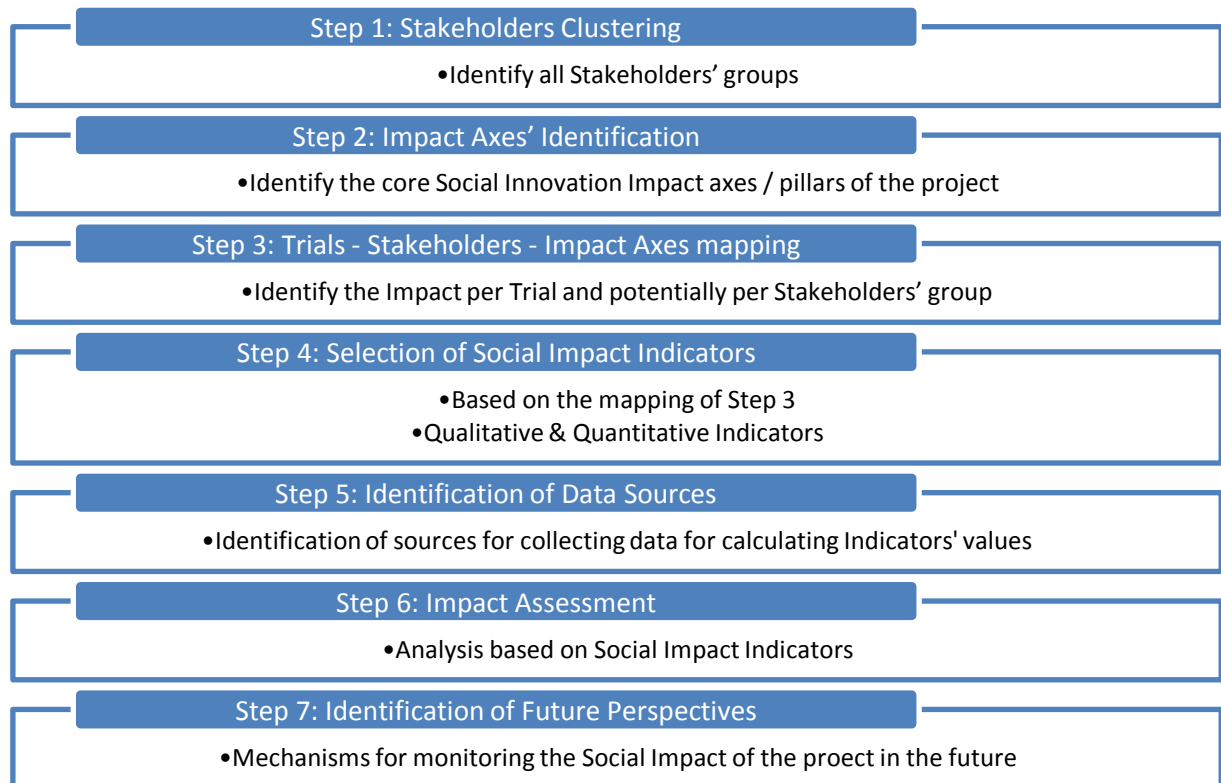
- People’s way of life,
- Their environment,
- Their health and wellbeing and
- Their community

The scope of the proposed approach is to identify the outcomes of the application of the FITMAN solutions which are linked to societal challenges, as well as to define indicators and sources of data for measuring the social impact of each trial.

### **Methodology for assessing the impact on society and the social innovation.**

The objective of using the selected methodology is to estimate and measure the social consequences that are likely to follow the application of FITMAN solutions initially to the trial cases and secondly to the international industrial sector.

This methodology consists of seven steps as follows:



Detailed description of each of the seven steps and of their expected outcomes can be found in D9.2

### Impact on Scientific Community

As FITMAN is a use case project in the FI-PPP program and not a traditional research project, the methods for impacting scientific interest groups are wider than just writing scientific paper.

The long-term impact on the scientific community is mostly created through the dissemination activities that will take place during the project. The potential for after project impact on the scientific community has to be established already during FITMAN.

According to Task 10.3, FITMAN's main long-term impact objectives on the scientific community can be summarised as:

- New knowledge creation and knowledge dissemination
- Strengthening preparedness for future research in FI for manufacturing
- Scientific community development

The long-term new knowledge creation and knowledge dissemination can be achieved during the project, through publications and presentations of high quality. Strengthening preparedness for future FI research can be achieved by identification of research gaps and research needs together in collaboration with manufacturing end users in FITMAN. The acquired experience needs consolidation. And finally, scientific community development and increased innovation potential will happen through collaboration between scientific partners in FITMAN and with parallel FI-PPP projects (Phase II). More information in D10.3 Project impact assessment report.

In D9.2 an example of socio-economic impact of FITMAN in a manufacturing subsector is provided through the use case 7- *Construction Industry SME Industrial Trial in Digital*

*Factory* impact assessment of the technology take-up according to the methodology described above.

The full socio-economic impact assessment, to be delivered as part of D9.3, will contain a similar analysis in all manufacturing subsectors covered by FITMAN.

### **7.2.2 Social impact assessment of Phase III Proposals and Projects**

The methodological approach for measuring the social impact of Phase III Projects follows the steps of the proposed social impact assessment methodology presented in D9.2 and in brief described in Section 7.2.1.

In this framework, the present section focuses on providing more specific guidelines to Phase III stakeholders in order to apply the methodology. This way, for each step of the process, instructions on how to apply the requested actions are being provided, as follows:

#### Step 1: Stakeholders Clustering

What to do:

The stakeholders in each of the Phase III projects have to be identified and organised in clusters.

Questions to be answered:

- Who are the clients / consumers of the end products? Are they affected in any way?
- Are the employees affected in any way, so that they can be considered as stakeholders as well?
- Does the project affect the general public either directly or indirectly?

#### Step 2: Impact Axes' Identification

What to do:

Out of the four impact axes described in the methodology (Users as makers/co-creators of manufacturing products & services, Workplace Innovation, Extrovert Enterprise, Green Innovation Management), those which are directly or indirectly related to the project have to be selected.

Questions to be answered:

- Is there any kind of co-creation or of participation of externals in the development of products and services offered?
- Are there any innovations related to the work environment, the relationships with any externals, the HR management or the decision-making processes?
- Does the project contribute in society in any way related to the social responsibility of involved stakeholders?
- Is the project or any involved stakeholder related to environmental or energy efficient issues?

#### Step 3: Trials - Stakeholders - Impact Axes mapping

What to do:

For each project, the answers to the questions provided in Steps 1 & 2 have to be combined in order to map Stakeholders and Impact Axes.

Questions to be answered:

- Which Stakeholders are directly impacted and in what way?
- Exactly which Impact Axes affect the involved Stakeholders and in what way?



#### Step 4: Selection of Social Impact Indicators

What to do:

Select appropriate social impact indicators that strongly correlate with the expected social outcomes of each project, using the social impact indicators / metrics catalogue of IRIS (Impact Reporting and Investment Standards)<sup>48</sup>.

Questions to be answered:

- Which sectors, as defined in IRIS are relevant to the project?
- Which performance areas, as defined in IRIS are relevant to the project?
- Which metrics of the IRIS catalogue can be considered as appropriate social impact indicators for the project?

#### Step 5: Identification of Data Sources

What to do:

For each selected Social Impact Indicator identify the sources of data required in order to measure the indicator's value. If no data source can be identified for an indicator then it should be removed.

Questions to be answered:

- In what way can each selected indicator be measured?
- Is there direct access to the required data available?
- Which indicators can be measured by applying crowdsourcing techniques and in what way?
- Are there open (public) data available which can be used for measuring some of the indicators?

#### Step 6: Impact Assessment

What to do:

Analyse and report the social impact of the project on the basis of the values of the selected Social Impact Indicators.

Questions to be answered:

- The values of which indicators have been improved throughout the project?
- Are there any external reasons which may have affected these indicators' values?
- Which dimensions of the expected social impact of the project have been confirmed based on the selected indicators?

#### Step 7: Identification of Future Perspectives

What to do:

Identify what kind of data collection mechanisms shall be established in order to measure the social impact of the project after its end.

Questions to be answered:

- Which of the Social Impact Indicators can and is significant to be measured after the end of the project?
- What kind of permanent mechanism(s) can / should be established in order to collect - in the long term - all data required for calculating the values of those indicators?

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<sup>48</sup> <https://iris.thegiin.org/iris-catalog>



### 7.2.3 Economic impact assessment of Phase III Proposals and Projects

In terms of conducting an economic impact assessment of Phase III Proposals and Projects, there are two approaches:

1. Search for similar cases / technologies implemented in other sectors and analyse what their impact was as a predictor to gauge the potential impact.
2. To use a form of estimation modelling to predict what the future would be and compare this with the current situation.

For option 1, it is a matter of finding the information necessary to do the analysis. The source of information would strongly depend on the specific case and is therefore not further discussed here. However, it is worth noting that for the exemplar socio-economic impact assessment of the FITMAN trial performed in D9.2 (Vega, 2014), data from outside the project (EU statistics) was used to characterise the ‘as is’ situation.

For option 2, there are several possible techniques that can be applied, depending on the specific case; what is being modelled and what data is available. It is out of the scope of this deliverable to describe the techniques fully and how to use them, but we give an overview here. We can separate the techniques into two categories, ‘hard’ and ‘soft’, as they are referred to in Operations Research. Hard techniques can define pathways between the input data and the output data, i.e., developing an actual model, while soft techniques cannot.

Hard techniques include:

**Bayesian Network** (Ben-Gal, 2008): a model based on Bayes theorem of probability, which represents variables and their conditional dependencies via a Directed Acyclic Graph (DAG). This technique lends itself to specific problems where there is data available to extrapolate the probabilities of events occurring in the model.

**Petri Nets** (Rozenburg, 1998): while Bayesian Networks build DAG models, Petri Nets are bipartite graphs, which lends itself to modelling distributed systems. Petri Nets are underpinned by an exact mathematical definition, but also has a graphical notation for creating the models.

**System Dynamics** (Sterman, 2001): this is a simulation technique that incorporates things like time delays and feedback loops in the model, which makes it suitable for temporal analysis of a system. That is, analysing the behaviour of the system over time, especially useful for complex systems (non-linear).

**Discrete Event Simulation (DES)**: models a system (typically at a very low level) according to discrete sequences of events (fired regularly according to a system clock). One specific technique is agent-based simulation (Bonabeau, 2002), which models entities in the system as agents that can interact with each other and perform stochastic operations triggered by the events. This technique also lends itself well to analysing computational systems over time where there is stochastic variation (e.g., human interactions).

It is only possible to use hard techniques where there is (a significant amount of) data available. Just being able to model the system that is being analysed, whether a technical system or a value network of affected parties (which is used in D9.2), is not sufficient for hard techniques as they are driven by input data that is manipulated by the model to produce an output (which could be stochastic, as is the case for DES, for example).

In the absence of sufficient data, soft techniques can be used instead, such as:

**Delphi Method** (Dalkey & Helmer, 1963): this is an iterative forecasting method that relies on input from a panel of experts based on multiple rounds of questionnaires. After each round, the responses are aggregated and shared (all anonymous), and the experts can adjust

their answers in consecutive rounds. The aim is for the panel to ultimately converge on a particular answer.

**Cross Impact Analysis** (Gordon, 1994): related to the Delphi Method, this method also relies on expert input, but also seeks to explore hypotheses and identifying different points of agreement and disagreement, assigning probabilities of events based on the experts' input. Moreover, a key to the method is in identifying how related events impact on one another.

Both the Delphi Method and Cross Impact Analysis method make use of a panel of experts to arrive at a view of the potential future. Although the experts in the panel need not be co-located, such a panel may be difficult to establish if it is not possible to engage with all the key stakeholders (they may not be willing to). Also note that Cross Impact Analysis is a more intensive method if done correctly.

A part of the methodology described in D9.2 is doing *cost-benefit analysis* for the affected parties identified in the *value network*, which can be classed as either a soft or hard technique, depending on how you predict the benefits; by creating a mapping or not. However, the methodology in D9.2 is considered soft as no model is created.

For conducting a socio-economic impact assessment of new technology developed to extend the FITMAN trials (in new Phase III Projects) or new business scenarios (e.g., in a different domain), then the trial analysis in D9.2 would serve as a good baseline and the methodology could be extended as required with any of the techniques described above.

### 7.3 Methodology and Tools for Trials Expansion and Web Entrepreneurship

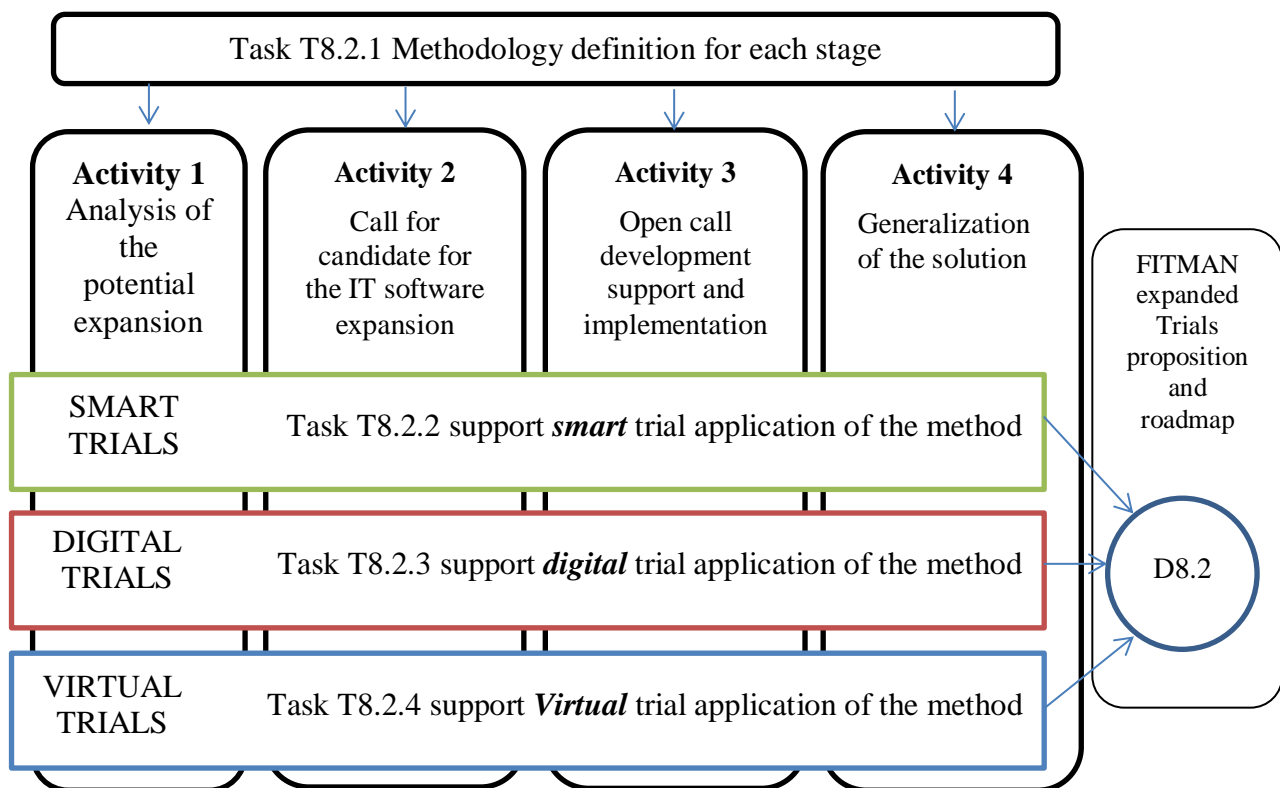
The expansion of the 10 Trials is a key element of FITMAN exploitation plan and concerns how to extend the business processes, stakeholders, enterprise systems, and user base to create a “Large Scale” trial derived from the “Low Scale” user base to create a “Large Scale” trial derived by the “Low Scale” trials currently under experimentation in FITMAN WP4-5-6.

The objective of task T8.2 will be to facilitate these expansions. A roadmap will be created to manage these evolutions. It will be necessary to create a sustainable evolution so a technical-economic assessment will be performed for each expansion solution.

So the task 8.2 Methodology and Tools for Trials Expansion aims:

- To provide and run a stable infrastructure for the trials in order to expand the core platform by defining new functionalities and the way to instantiate them in the trials.
- To involve additional SMEs and web-entrepreneurs as developers of highly innovative software solutions.

The project is finalizing the processes for this expansion. Four activities have been defined as shown in Figure 23. Figure 21



**Figure 23 Task T8.2 overview**

The results of each task will be compiled in the deliverable D8.2 FITMAN expanded trials proposition and roadmap.

Finally, a coordination action must be setup between the tasks in order to streamline the processes, share best practices, define milestones and check the progress of each task.

The following four subchapters detail each activity.

### 7.3.1 Activity 1: Analysis of the potential expansion

Based on an initial result of task T8.1 (comparative analysis of WP4-5-6 experimentations using method developed in WP2), each trial will be analyzed with the aim to find its expansion routes, according the following elements:

- new business processes
- new stakeholders
- new members of the value chain
- new IT systems
- new organizational changes

It will result in a list of “candidate trials” suitable for expansion. For each candidate trial, a socio-economic-technical analysis of the solution will be performed focused on **cost** versus **benefit**.

### 7.3.2 Activity 2: Call for candidate for the IT software expansion

Based on the result of activity 1, activity 2 must identify external candidates to support selected solutions expansion. The propositions coming from all the ten Trials representatives (manufacturing and IT) will be evaluated by the T8.2 partners.

Note: Candidates will be SMEs or web entrepreneurs, ideally located in a geographical area near the candidate trial.

### **7.3.3 Activity 3: open call development support and implementation**

Task T8.2 partners will facilitate the definition of the selected software expansions, agree with the Phase III Accelerators the best opportunities to follow and facilitate their participation to the Open Call by:

- Defining business requirements
- Support to access to FITMAN results
- Planning the development of the apps
- Envisage the future implementation in the trial (in close collaboration with FITMAN exploitation plan)
- ...

### **7.3.4 Activity 4: Generalization of the solution**

Provide a roadmap for their full adoption in the manufacturing industries. This is the task of FITMAN IT providers who could support the dissemination of the solutions, their adaptation to various environments and the definition of business models.

## 8 ASSESSMENT OF PHASE III SUPPORT IMPACT

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This section, which concerns the impact of FITMAN support to Phase III, has two parts. Firstly, the assessment of D8.5 is discussed, drawing on Google analytics data and data from a user survey. Secondly, the results of the two webinars run by FITMAN WP8 for Phase III are discussed.

### 8.1 Assessing D8.5

This section discusses the assessment of the D8.5 webpage, the first iteration of the Phase III Package. Two forms of assessment were conducted, a user survey and an analysis of web traffic.

#### 8.1.1 D8.5 User Survey

The D8.5 user survey was available online from 27 February - 11 March 2014. Registered users of the Package were contacted via email and asked to provide their feedback via the survey; in addition, the request for participation was sent to attendees of the first Phase III support webinar and disseminated via a notice on the Phase III Package website and FITMAN's social media streams.

The full survey can be found in Annex I: FITMAN Phase III Package Survey, but in summary it consisted of 15 questions concerning: how respondents heard about the survey; how they found the Phase III Package; motivation for visiting the Phase III package; clarity that information was available on the Phase III Package and that information was available for download on the Phase III Package; clarity of instructions for access to consultation documents (public versions of deliverables); clarity of content and SE licence terms; whether information was up-to-date or missing; comments on ways in which the information was helpful; comments on interactions with the FITMAN team; comments on using information for Phase III.

Only five people responded to this survey, yielding insufficient inputs for a quantitative analysis. Qualitative insights may be gleaned, however, and these follow. Note that respondents did not always answer every question, meaning that sometimes the following text reports on fewer than five responses to a question.

**How respondents heard about the survey:** All survey respondents received the request to participate because they were registered users of the Phase III Package.

**How they found the website:** One found the website via a web search, two via the FITMAN website, and one via participation in FP7 calls.

**Motivation for visiting website:** Three came to the website for Phase III information, one for Open Call information, one for a reason that was not specified.

**Clarity that information was available:** Four found it obvious that the information they used from the Phase III Package existed on the FITMAN website.

**Clarity that information was available for download:** Four found it clear that documents and specifications were available for download (one found this question not applicable).

**Clarity of instructions for access of consultation documents:** Two people found these instructions very clear, one found them somewhat clear, two did not use the instructions. The person who found the instructions somewhat clear suggested the instructions be improved: "Provide a wiki or guidelines to describe the content of documents."

**Clarity of website page content:** Two found website content very clear, three found it somewhat clear. One suggested that the clarity of content could be improved thus: “More details needed for what functionality is ready and what to be extended.”

**Clarity of SE licence terms:** of the 4 people who reported that they referred to these licence terms, 2 found them clear, 2 did not find them clear. Neither of the latter 2 people responded to the question asking how the clarity of the licence terms could be improved.

**Up-to-date information:** 3 said the information they access was up-to-date, 2 didn’t know.

**Missing information:** 3 didn’t know if information was missing, 1 said information was not missing, 1 said information was missing. This latter person, when asked what information was missing, said “Not clear enough the difference between basic/specific/extended functionalities”.

**Comments on in what ways the information was (un)helpful:** 4 respondents gave comments:

- Clear definition of the content. Information well distributed in helpful documents.
- Public deliverables
- There were plenty of documents, not easy to go through them all and understand their content.
- Particularly unhelpful for those users that wish to develop specific functionality for different applications

**Making queries to the FITMAN team:** 3 did not make queries to the FITMAN team; 2 did. The 2 who did both received timely, helpful responses, and had no other feedback to provide about the responses they received. The 3 who did not make queries gave different reasons for why they did not do this: 1 had no need, 1 didn’t want to disclose details to the FITMAN team, 1 said “Will in the future”. None used the option to indicate that they didn’t make queries because too much was unclear, or because they couldn’t find contact details.

**Using information for Phase III:** Respondents were asked, once they had the information they wanted, how easy they found it to use this information to support their participation in Phase III. 1 said “very difficult”, 1 said “somewhat difficult”, 3 said “somewhat easy”. None responded to the question asking why this was.

Respondents were asked how helpful the information was for supporting their participation in Phase III. 4 said “somewhat helpful”. 1 responded to the question asking why this was, saying: “Much effort needed to become aware what actually to expect from the existing enablers.”

**Other comments:** 1 respondent gave an additional comment: “To ensure the participants that the FITMAN enablers will be maintained and developed for a long period in the future.”

It can be seen that the survey respondents generally found the Phase III Package useful, with responses indicating that it was clear the Package and consultation documents were available. Negative feedback seemed focused on the SE licence terms. Overall, respondents commented on the clarity of content and helpfulness of documents, with one respondent noting that it was difficult to make sense of the documents as there were many of them. One respondent reported difficulties in understanding how to develop specific functionality for different applications, probably due to the FITMAN SEs being at an early stage of their life (and thus somewhat in flux) at the time of the survey. The respondents who made queries to the FITMAN team received timely, helpful responses. Finally, two of the five respondents found the information very or somewhat difficult to use in supporting their participation in Phase III, but did not specify why.



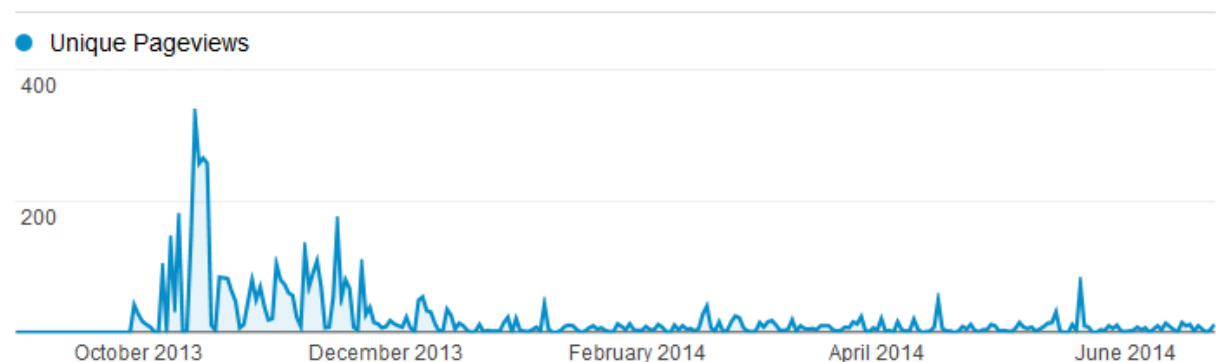
Although only five people responded to the survey, their inputs help drive decisions in how D8.6 is implemented. It is clear that information about Specific Enablers and their terms and conditions is important, and this information (along with information about the FITMAN Platforms) is fleshed out and clarified in D8.6. In addition, a fuller support process is not being implemented (see Section 9.2), which should not only make it easier to provide support at a greater scale but also make it easier to capture feedback as it arises. In addition to implementing the new support process, a second survey will be implemented in D8.6, planned to go live approximately when the Open Calls of the Phase III Accelerators are announced. It is hoped that by running the survey while Phase III participants are actively using the website, a greater response rate will be attained.

### 8.1.2 D8.5 Web Traffic

Google Analytics data grants insight into the ways in which the Phase III Package is used, and by whom. This section first presents an overview of traffic, considering peaks in activity and the most popular components of the Package. The impact of the two Phase III support webinars is discussed, before visitor origin (by country and by previous website) is considered. Unless otherwise specified, the date range for items discussed is September 2013 to June 2014, i.e. the lifetime of the Phase III Package website.

#### Overview

Figure 24 shows the number of unique page views of the Phase III Package. As can be seen, a series of peaks occur around October, November and December 2013, corresponding with the first Phase III webinar and the deadline for Phase III bids. The busiest single day was 15<sup>th</sup> October 2013, with 329 unique page views. October 16, 17 and 18 were also busy, with 257, 265 and 257 page views respectively. The week of the Phase III webinar also saw peaks, with 126 page views on 11<sup>th</sup> November and 109 on 14<sup>th</sup> November.



**Figure 24. Page views of the Phase III Package from September 2013 to June 2014**

One can also consider traffic to individual pages of the Phase III Package. Table 10 summarises the number of unique page views for the most-viewed components of the Phase III Package. As can be seen, information about GEs and SEs was highly sought-after, as were the consultation documents themselves. Unsurprisingly, overview pages and executive summaries about the Phase III Package were also popular.

Page	Unique page views
FI-WARE Generic Enablers Selection for FITMAN [D1.3 summary]	222
Consultation documents for Phase III participants [document access page]	220
Use Case Scenarios and Business Requirements [D1.1 summary]	173



Overview of FITMAN and the D8.5 website	163
Executive summary of the Phase III Package	160
FITMAN Verification and Validation Method and Criteria [D2.1 summary]	131
Overview of FITMAN and its Trial Expansion Methodology	127
Checklist of Business Models	125
Terms and Conditions of the FITMAN Specific Enablers	105
GEs and their Use Cases in Manufacturing	101

**Table 10 Highly-viewed pages in the Phase III Package from September 2013 - June 2014**

### Impact of Phase III support webinars

The impact of the first Phase III webinar is shown in Figure 25, which shows Phase III Package page views in November 2013. As can be seen, a peak in activity occurs around the time of the first webinar (held 13 November) and shortly thereafter, signifying increased activity in response to the webinar. The busiest day was 19<sup>th</sup> November, which saw 165 unique page views.

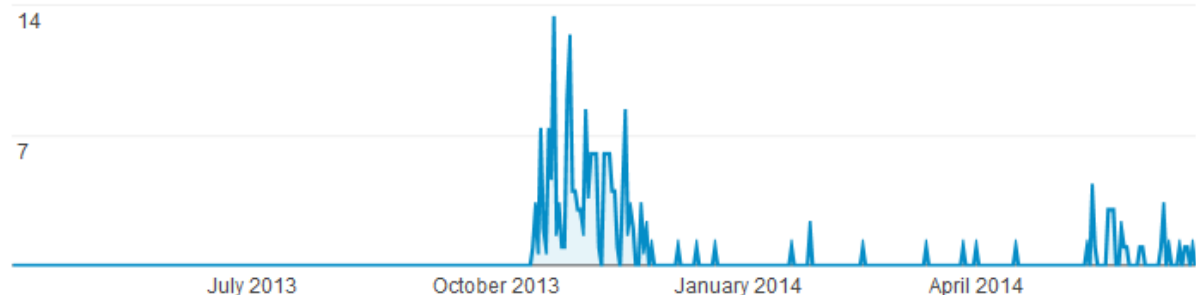
Unique page views for /phase-iii-package



**Figure 25. Phase III Package page views in November 2013**

Similarly, Figure 26 shows activity in terms of views of the news page about FITMAN support to Phase III<sup>49</sup>: peaks exist in November 2013 and May 2014, corresponding with the two webinars.

Unique Pageviews



**Figure 26. Page views for the news item on FITMAN support in Phase III**

One can also consider the number of page views and session durations of parts of the Phase III Package during the important time period of November 2013: Table 11 provides data on this topic. As can be seen, the consultation documents were the primary focus of Phase III participants, with notable focus on information about the Phase III Package (executive summary, the mapping between FITMAN deliverables and sections of the Package, and its

<sup>49</sup> <http://www.fitman-fi.eu/news/fitman-support-in-phase-iii>

introduction), as well as information about GEs, SEs, and particular deliverables (notably the summaries of D1.1, D1.3 and D2.1).

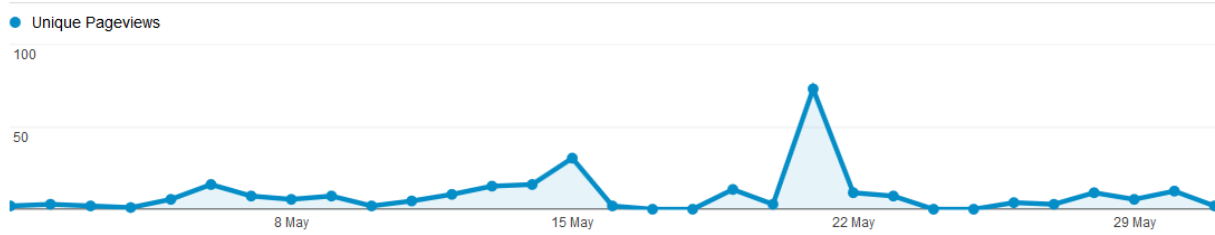
It can be seen that visitors spent notably longer periods of time on the pages about the mapping between FITMAN deliverables and sections of the package (average session duration of 12 minutes 19 seconds) and the FITMAN architecture and trials information (average session duration of 11 minutes 25 seconds). This focus on understanding the package and delving into the outputs of FITMAN WP1 and WP3 is not surprising.

Page	Unique page views	Average session duration
Consultation documents for Phase III participants	87	00:07:22
Executive Summary of the Phase III Package	76	00:04:47
Overview of FITMAN and its Trial Expansion Methodology	75	00:04:23
FI-WARE Generic Enablers Selection for FITMAN [D1.3 summary]	66	00:03:47
Use Case Scenarios and Business Requirements [D1.1 summary]	52	00:00:01
The mapping between FITMAN deliverables and sections of this package	50	00:12:19
Introducing the Phase III Package	47	00:04:16
Terms and Conditions of the FITMAN Specific Enablers	44	00:03:06
FITMAN Architecture and Trials [overview of summaries of deliverables from WP1 and WP3]	43	00:11:25
FITMAN Verification and Validation Method and Criteria [D2.1 summary]	37	00:04:27

**Table 11 Highly-viewed pages in the Phase III Package during November 2013**

May 2014 is another important time for the Phase III Package, as 13<sup>th</sup> May 2014 brought the second Phase III support webinar. This webinar was by invitation only, and targeted leaders of the newly-selected Phase III accelerators. Figure 27 shows page views of the Package during May 2014: notable spikes occur on 15 May and 21 May, which see unique page views by 31 and 73 people respectively.

Unique page views for /phase-iii-package



**Figure 27 Timeline: page views containing /phase-iii-package date range: May 2014**

Table 12 shows the number of page views and average session duration for the most popular components of the Phase III Package during May 2014. The structure of the website means that some pages appear twice in the list: effectively, the consultation documents page had 19 views (12 + 7) while the Specific Enablers page had 17 views (9 + 8). Once again, we see a focus on GEs and SEs, but also a focus on business models and a shift away from outputs of

WP1 and WP3. This change in focus is consistent with the likelihood that most Phase III Package activity in May 2014 is from Accelerators trying to understand how to support participants who respond to their open calls, rather than trying to understand technical outputs of FITMAN. As can be seen, the consultation documents page experienced a particularly high average session duration of over 17 minutes: given that this is the primary resource in the Package, this is no surprise.

Page	Unique page views	Average session duration
Phase III Package homepage	34	00:04:58
FI-WARE Generic Enablers Selection for FITMAN	29	00:01:28
Checklist of Business Models	15	00:00:03
Consultation documents for Phase III participants	12	00:17:26
Use Case Scenarios and Business Requirements [D1.1 summary]	9	00:00:00
The FITMAN Specific Enablers	9	00:00:00
Checklist of Legal Issues	8	00:00:08
Terms and Conditions of the FITMAN Specific Enablers	8	00:02:29
Consultation documents for Phase III participants	7	00:00:00
Information for Phase III participants [overview page linking to deliverable summaries, checklists etc.]	6	00:00:00

**Table 12. Highly-viewed pages in the Phase III Package during May 2014**

### Origin of visitors to the Phase III Package

It is also possible to understand traffic on the Phase III Package by considering where visitors come from. Table 13 shows the top ten countries from which traffic came to the website, among which the UK, Italy and Spain feature most highly (with 13, 11 and 10 percent of sessions respectively).

Country	Percentage of Sessions
United Kingdom	13
Italy	11
Spain	10
Germany	9
Greece	8
France	7
United States	6
Belgium	5
Portugal	3
India	3
Other countries	25

**Table 13 Top ten countries to visit the Phase III Package, from September 2013 to June 2014.**

The sources from which visitors to the Package originate are also of relevance, and the top sources are shown in Table 14. Clearly, Google search is a top provider of traffic. The second

most popular way for people to arrive at the site is to type “fitman.eu/phase-iii-package” directly into a browser’s URL bar: this shows that the publicity around the Phase III Package worked well, with people remembering and using the URL regularly. Other sources of traffic include social media: t.co is a URL shortener commonly used on Twitter, while LinkedIn and Facebook are also in the top ten sources leading to the Package. The FI-PPP website is unsurprisingly a top source of traffic, with the remaining sources including a web solutions provider (draftitt.com), the IEEE Communications Society (comsoc.org) and the Horizon Consulting Network (horizon-research.ro).

Source	Unique Page views
google	2,174
(direct)	1,066
t.co	75
linkedin.com	49
fi-ppp.eu	36
duckduckgo.com	28
facebook.com	27
draftitt.com	26
comsoc.org	14
horizon-research.ro	12

**Table 14. Top ten sources via which people arrive at the Phase III Package.**

### Summary

The Phase III Package has seen heavy usage during its life time, with expected peaks around November 2013 and May 2014. The most popular topics changed over time, from a focus on technical outputs in autumn 2013 to an increased focus on business topics in spring 2014. Long visit durations indicated particular interest in understanding the relationship between FITMAN deliverables and the Package and FITMAN architecture and trials outputs (in autumn 2013) and in consultation documents (in May 2014). Visitors came from a range of EU and other countries, with search engines and social media often being the source of traffic. Notably, much traffic came directly (from people typing the URL into their browsers), indicating successful publicity about the Package.

### 8.1.3 Conclusions about D8.5

By combining a user survey for qualitative feedback with quantitative data from Google Analytics, it is possible to gain a broad set of insights into the impact of the Phase III Package.

Survey respondents were generally positive, commenting on the clarity and helpfulness of the Package and of FITMAN responses to specific queries. Respondents noted that more clarity and depth could be provided about Specific Enablers, and it is likely that this feedback arose due to the early nature of the Specific Enablers at the time of the survey. The feedback has implications for the implementation of D8.6, as described in the conclusions of Section 8.1.1.

Meanwhile, Google Analytics revealed heavy traffic for the Phase III Package, particularly at the times of Phase III deadlines and support webinars from FITMAN. Visitors came from a range of countries and web sources, with a significant proportion typing the URL directly into their browser, indicating the success of publicity about the Package. An evolution from a

technological to a business focus was observed in the main topics of interest, as described in the conclusions of Section 8.1.2.

Overall, the results from the user survey and web traffic help us to understand both strengths and weakness of D8.5 and priorities for D8.6.

## 8.2 Results of Webinars for Phase III

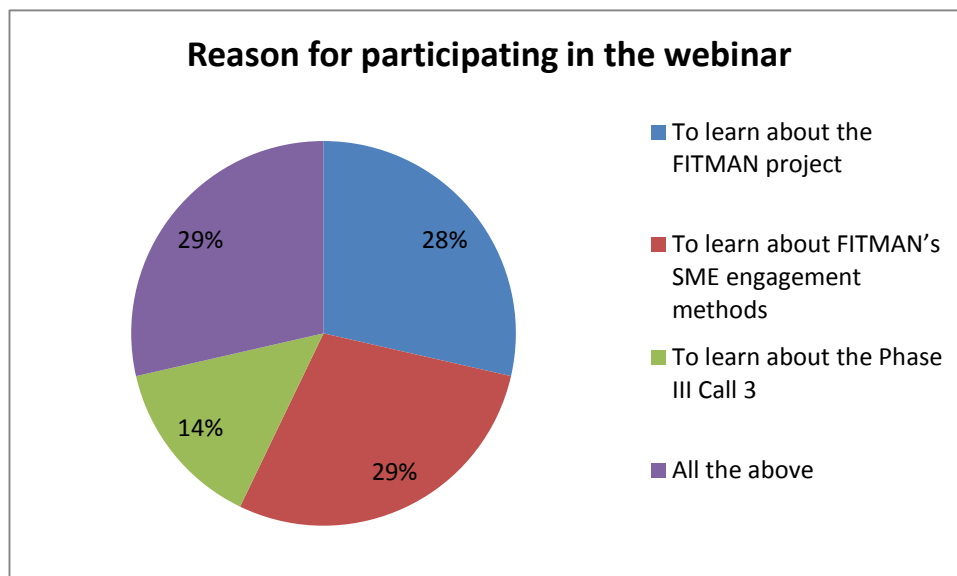
WP8 partners ran two webinars to disseminate information about FITMAN support to Phase III. The first, in November 2013, was public and open to anyone interested in participating in Phase III. The second, in May 2014, was invite-only and provided specifically for the leaders of the 16 successful Phase III Accelerators.

Details about the process for running the webinars (including the email invitations sent out) can be found in FITMAN D8.4 section 3.2; by contrast, this section of FITMAN D8.6 reports on the results of the webinars, including the attendance, web traffic, and dialogue with attendees.

### 8.2.1 First webinar: 13<sup>th</sup> November 2013

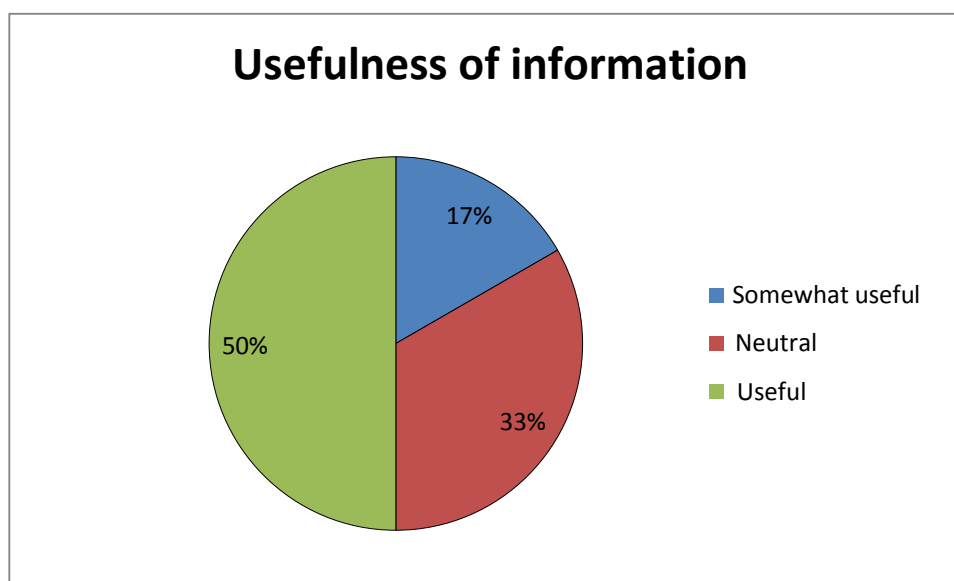
The first webinar had a total of 47 participants, although 12 of these were FITMAN partners who dialled in to either present material or to be available to answer questions about their parts of the project. After the webinar, the slides were downloaded from the FITMAN website 8 times and viewed on Slideshare 427 times. Annex I: Questions and Answers in the November 2013 Webinar details these questions.

To ascertain the impact of the webinar and inform decisions when running future webinars, participants were sent a questionnaire. The questionnaire was sent to 20 participants (the participants who provided email addresses), although 2 of the email addresses were invalid, meaning 18 people received the questionnaire. 6 responses were received, with the main results are illustrated in the graphs below.



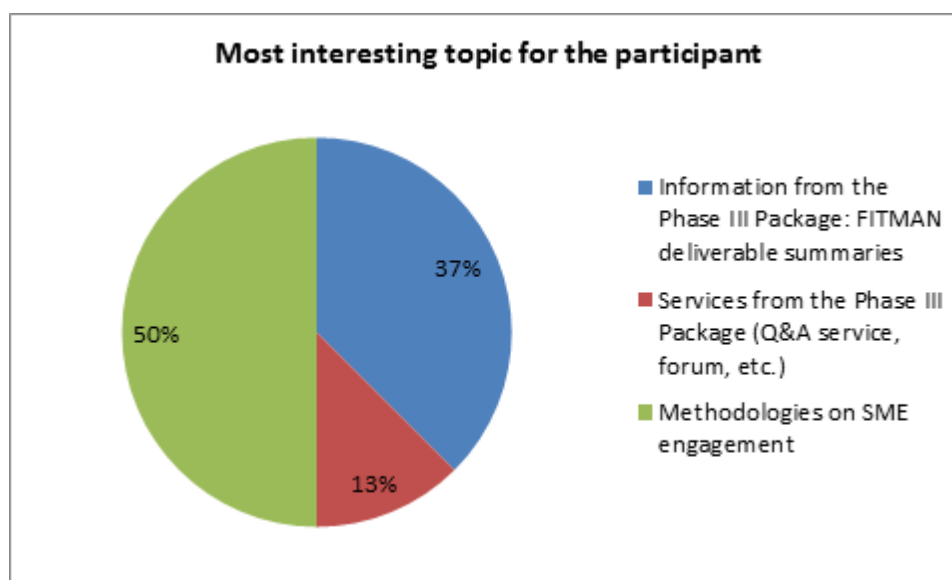
**Figure 28: Reasons for participating in the webinar**

As illustrated in Figure 28, respondents rated almost equally each of the suggested reasons for participating in the webinar.



**Figure 29: Usefulness of information**

With respect to usefulness of information presented in the webinar, four respondents valued it as useful to some extent, with the remainder valuing it as neutral (Figure 29).

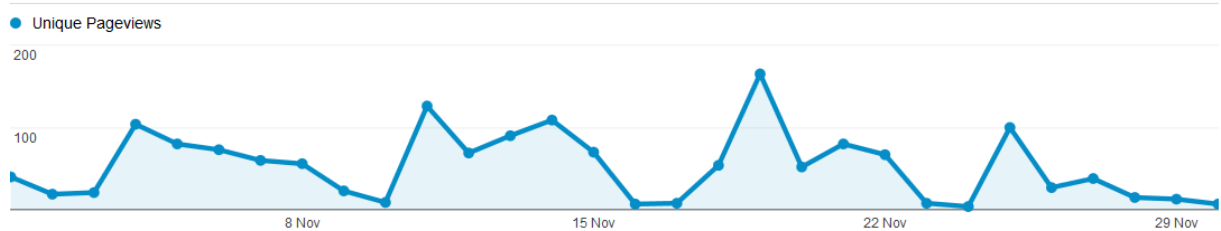


**Figure 30: Most interesting topic**

As Figure 30 illustrates, “Methodologies on SME engagement” was valued as the most interesting topic for three respondents, followed by the information on FITMAN deliverable summaries.

In addition, five respondents answered that they did visit the FITMAN website after the webinar in order to retrieve more information, corroborated by the peak in traffic shown in Figure 31 (see Section 8.1 for more detail on website traffic). Three looked for information about the Phase III Package on the FITMAN deliverable summaries and two looked for information about SME engagement methodologies. One reported looking for information about the FITMAN Open Call and Specific Enablers.

Unique page views for /phase-iii-package

**Figure 31. Page views of the Phase III Package in November 2013**

Four of the respondents found out about the FITMAN webinar via the e-mail invitation that was sent to them by the FITMAN team: one was informed by the FI-PPP website and from the FITMAN account on Twitter.

Last but not least, all respondents replied positively on whether their organisation would be interested in ICT for manufacturing projects within FI-PPP Call 3 framework.

### 8.2.2 Second webinar: 13<sup>th</sup> May 2014

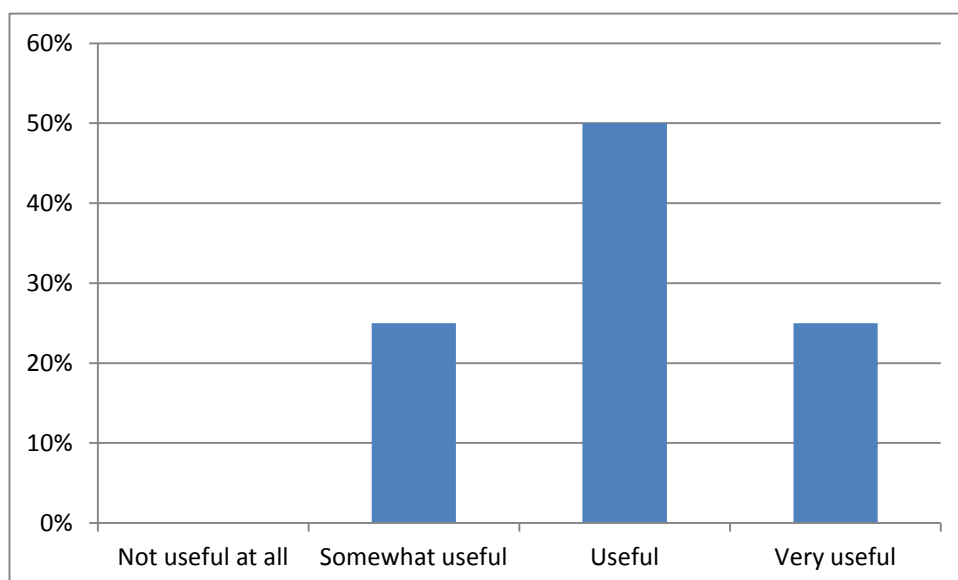
The second webinar was attended by seven FITMAN partners (two presenters, five present to answer questions about their parts of FITMAN) and eleven external participants, representing the following of the Phase III Accelerators: CEED, CREATI-FI, FABULOUS, FINISH, SOUL-FI and IMPACT. The targeted, small audience of this webinar meant that its slides were not made available on Slideshare after the webinar, but only on the FITMAN website. The slides were downloaded 8 times from the FITMAN website.

As with the first webinar, the discussion session was productive, including questions about the usage of enablers, training for SMEs and long-term availability of technologies. Annex IV: Questions and Answers in the May 2014 Webinar reports this topic in more depth.

The questionnaire was sent to 10 participants and 4 responses were received back, providing a 40% response rate. The main results follow:

Respondents were representing 4 different Phase III Projects, two of them having a particular interest for FITMAN in terms of ICT for manufacturing.

With respect to the usefulness of information presented in the webinar, as shown in Figure 32 all respondents rated the information useful to various extents.

**Figure 32: Usefulness of information presented in the seminar**



As illustrated in Figure 33, among the 4 topics presented in the webinar, the respondents were mostly interested in information related to the Phase III Package: FITMAN deliverable summaries and additional information on SE terms, checklists etc.

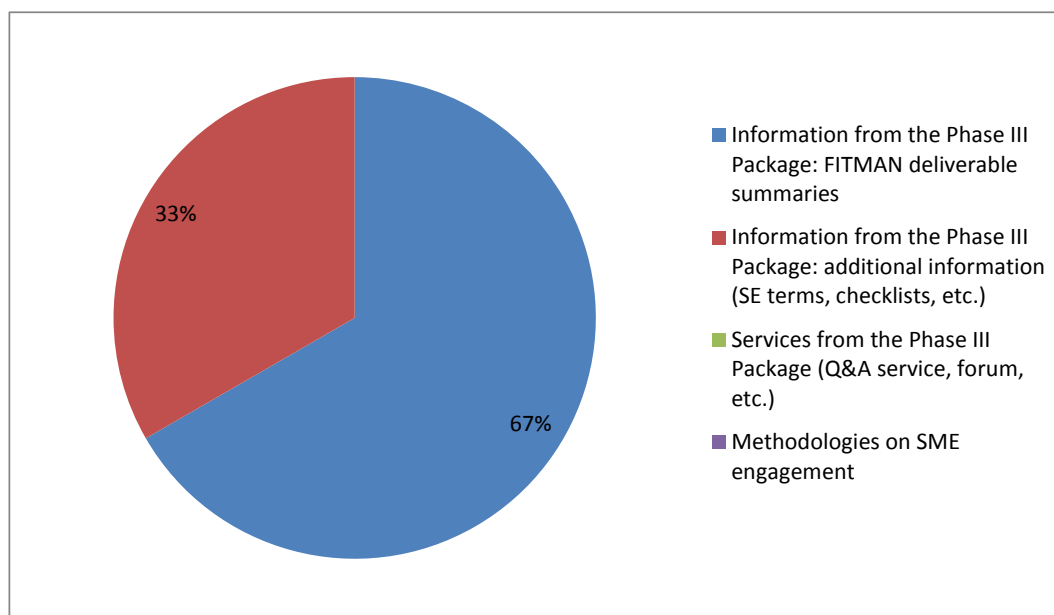


Figure 33: Most interesting topics

75% of the respondents reported visiting the FITMAN website after the webinar in order to retrieve more information, corroborated by the surge in website traffic shown in Figure 34 (see Section 8.1 for more detail on website traffic). The majority reported looking for information related to Phase III Package additional information, such as SE terms, checklists etc.

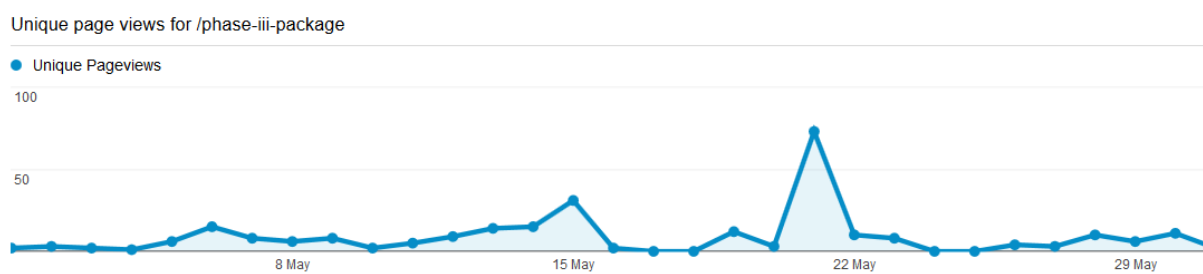


Figure 34. Page views of the Phase III Package in May 2014

All respondents answered positively whether the webinar helped them clarify in which way their Phase III project might collaborate with FITMAN. In the question whether it is possible that their project collaborate with FITMAN, 50% of the respondents were positive, while the rest answered that they do not know. Last but not least, all respondents would like to see further actions organised by FITMAN in the future.

In the extra comments received, one respondent suggested to provide information on FITMAN website in a clear way in order to help “*newcomers who want to consume information and make (business shortlisting) decisions quickly.*”

### 8.2.3 Webinars Conclusions

It can be seen from responses to questionnaires that the two webinars were largely successful. The second webinar achieved more positive responses (all respondents found it useful, compared to 67% of respondents from the first webinar), perhaps because the audience was

much more known (closed invite) and thus easier to present to. The first webinar saw people interested in many topics, from FITMAN in general to FITMAN SME engagement methods and Phase III, although participants found SME engagement of particular interest. By contrast, the second webinar showed a strong interest (67%) in deliverables in the Phase III Package, with all other interest focused on additional information in the Phase III Package. This reflects the different audiences, with the November 2013 audience probably composed of people preparing to bid to run accelerators, and the May 2014 audience certainly composed of people now preparing to launch accelerators.

The majority of participants in both webinars visited the FITMAN website afterwards (75% from the first webinar and 83% from the second), looking for a variety of information from the Phase III Package and considering SME engagement.

Both sets of respondents were positive about the idea of future FITMAN activities such as further webinars.

## 9 UPDATES MADE TO D8.5

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This section reports on changes made to D8.5 between M6 of FITMAN and the time of writing (M15). These consist of usability improvements made to the Phase III Package website and development of the WP8 support process.

### 9.1 Usability Improvements

A usability analysis conducted by I-VLab highlighted potential areas of improvement on the Phase III Package website. Based on this and an additional analysis conducted internally, IT Innovation proceeded to make various improvements to the website:

Firstly, in November 2013 WP8 partners who had provided deliverable summaries were asked to make changes to those summaries to make them more accessible to the reader. Changes were to:

- Reduce the length of the text where appropriate, aiming at a maximum length of two pages per summary. This is because great depth is available to the interested reader by accessing the associated consultation document; the purpose of the summaries is only to provide an overview of what is available.
- Expand the opening text targeted at Phase III participants if possible. This text concerns describing the way in which the deliverable being described is relevant to Phase III, and how the Phase III participant might use the deliverable.
- Adding images and diagrams if possible and appropriate.

Based on the improved deliverable summaries, it was possible to add a new page to the Phase III Package, entitled “Phase III Package offering”<sup>50</sup>. This page summarised the opening text of each deliverable summary, providing a single point at which Phase III participants could access a very high-level overview of FITMAN deliverables.

The front page was augmented with more links (so that visitors could choose not to use the menus if preferred), search functionality, and a clarification about what the FI-PPP and Phase III are.

An edit was made to the ‘overview’ pages, which are parents to other pages. For example, “Methodologies and Tools” links to pages about business and technical indicators, verification and validation, and so on. The changes made were to make these pages include previews but not the entirety of their child pages, thus avoiding overwhelming the reader with a great deal of information.

The forum was removed because it was not being well used and we anticipate that our support process will fulfil the goals of the forum (see Section 9.2 for more on the support process).

Finally, to aid the brand and visual impact of the package, a banner was created (Figure 35 in Section 9.2).

### 9.2 Support Process

Providing support to the FI-PPP Phase III is one of the key foci of WP8 in FITMAN. Initially the support was given to potential applicants to FI-PPP Phase III via D8.5 and the associated Phase III package on the FITMAN website<sup>51</sup>. This section describes the process put in place

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<sup>50</sup> <http://www.fitman-fi.eu/phase-iii-package/overview-of-fitman-and-the-d8.5-website/the-phase-iii-package-offering>

<sup>51</sup> <http://www.fitman-fi.eu/phase-iii-package>

for supporting Phase III consortia as well as the partners in the use case expansions in the Open Calls that the consortia will run.



Figure 35: FITMAN support banner.

The support offered by FITMAN in Phase III starts with *pre-sales* support, which is typically non-technical. This aspect of the support is a continuation of the initial support given to Phase III applicants, expected to be most active in the run-up to and beginning of Phase III to support the Phase III consortia. The other aspect of support in FITMAN is *technical*, which is expected to increase when Phase III Open Call winners start. More information on the non-technical and technical FITMAN assets is given in Annex VI: FITMAN Assets to Support.

In FITMAN, we see that the two different lines of support need to deal with different types of support queries, some of which need to be handled differently. For the non-technical support we need to differentiate based on confidentiality, whilst for the technical support we need to differentiate based on for distributed management and scalability. There is more on the types of queries and available tools in Section 9.2.1, followed by the specific process for pre-sales and technical support taken in FITMAN in Sections 9.2.2 and 9.2.3.

### 9.2.1 Support queries and technologies

There are different kinds of queries we can expect in FITMAN. Some can be classified as pre-sales queries, and others technical. However, within each category, we can utilise a tiered structure to determine who may need to be involved to address the query, dependent on the level of expertise required. An overview with examples of queries for the two support categories and two example tiers is given below in Table 15. Sections 9.2.2 and 9.2.3 will go into further details.

Table 15: FITMAN support categories with example queries for different tiers.

Support category	Tier	Example queries
Pre-sales	Tier 1	What does FITMAN have to offer? What are the licences of SE ...?
	Tier 2	How would I use SE ... in my business scenario? How do I go about with using the verification and validation method?
Technical	Tier 1	I can't download SE ... I can't access SE ...
	Tier 2	How do I configure SE ... to do X? I can't get SE ... to do Y! I found a bug with SE ...

There is a diverse range of technologies that can be used for support. Some technologies allow some *automation* in the support process, which can greatly help to reduce the Mean

Time To Repair (MTTR) that is a typical aim to ensure positive customer relations. Other technologies facilitate *self-help*, which can reduce the number of support queries and is an important part of support alongside with technologies that allow people to raise issues and receive support. Table 16 gives an overview of potential support technologies that could be used in FITMAN.

**Table 16: Possible technologies for support in FITMAN.**

Technology/Type	Purpose	Comments
Website	Self-help	Already used in FITMAN: p3 package and SE catalogue.
Forum	Self-help and support queries	Already used in FITMAN: SE catalogue.
Email	Support queries (confidential)	Already got P3 package email set up from D8.5.
Trouble ticket system	Automatic management and tracking of support tickets	Could be combined with email, i.e., to automatically create support tickets that can be more easily tracked and managed. Also, can form a knowledge base of known issues and resolutions.
Issue tracker system	Track software issues	Could be used for software and infrastructure issues, for 2 <sup>nd</sup> tier FITMAN technical support team, for example.
System health checking	Pro-active support	Could be used if FITMAN have SEs deployed for people to use in an <i>ad hoc</i> manner (on FI-Lab for example).
System/software logging	Pre-emptive support	To ensure SEs provide sufficient logging so when issues arise, people could provide log files to help resolve the problems.
Telephone	Live discussion (confidential)	Unlikely a type of support to advertise due to telephone costs and not being able to have somebody present at the end of a phone line during complete business hours due to other work responsibilities. However, we consider that telephone can be used to discuss issues as part of pre-sales following on from initial email conversation.
Chat	Live discussion	Could be chat function on website, or IRC, for example. The former is likely to only be for 1 <sup>st</sup> tier support, whilst the latter could be for 2 <sup>nd</sup> tier technical support. However, does not scale well, and has the same issues as telephone.
Remote desktop	Live assisted support	Could be used as a tool when addressing a technical support

Technology/Type	Purpose	Comments
		issue.
Training	Educate, awareness creation, increase uptake of assets.	E.g., webinars and attendance at events, which FITMAN has already been doing.

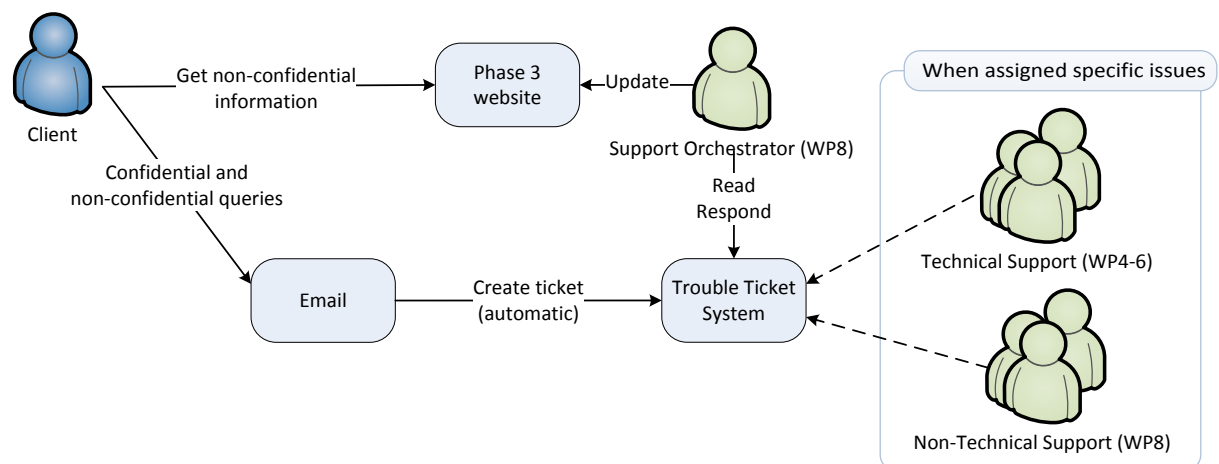
The following sections further discuss the process and selected tools for pre-sales and technical support in FITMAN.

### 9.2.2 Pre-sales support process

The pre-sales support in FITMAN is envisaged to mainly be a WP8 responsibility (non-technical), but some technical input is also envisaged (WP4-6). This support needs to cover queries about what FITMAN may have to offer to a client in general, where to get more information about something pertaining to FITMAN and more specific queries about non-technical assets in FITMAN such as how to use the verification and validation method.

One important requirement to consider for the pre-sales support is to provide a confidential channel for people to communicate with FITMAN. The channel needs to be confidential in the sense that the wider public should not be able to access it (e.g., forum) and it should only be accessible to a restricted audience in FITMAN as well.

An overview of the (envisaged) pre-sales support process is given below in Figure 36. Two channels for clients to seek support are depicted: the phase 3 package website and email.



**Figure 36: FITMAN pre-sales support process.**

A Support Orchestrator is depicted in Figure 36 (1<sup>st</sup> tier), who should be a person who can deal with confidential enquiries (as well as the website). This is a person who needs to know a bit about everything in FITMAN. When needed, this person should make use of 2<sup>nd</sup> tier support, whether technical or non-technical. For this, the OTRS Trouble Ticket System (TTS) is adopted by FITMAN to be used to manage the support tickets easily.

<http://otrs-fitman.atosresearch.eu/otrs/index.pl>

Note that the OTRS TTS provides automation in the creation of support tickets when somebody emails support. The OTRS system has been set up to allow for the confidential tiering briefly discussed earlier, putting new support tickets into a confidential queue that only users with the role ‘Support Orchestrator’ can view. When needed, tickets can be moved to a non-confidential queue and assigned to other support ‘agents’. Note also that by using the

TTS, the clients will always deal with one support identity, as emails will always be sent with the same FITMAN support address.

The pre-sales support can be structured with three tiers:

- Tier 1: Front-line support for general queries via email, managed via the OTRS TTS. This may also include follow-up discussions via telephone.
- Tier 2: General technical queries about SEs, non-technical questions about applying methods like verification and validation. This also via email, managed via the OTRS TTS.
- Tier 3: Confidential queries that may need to be escalated to project management. To be dealt with via email via the OTRS TTS.

To close the loop, and maximise the self-help element of the support, it is important that the Support Orchestrator ensures that the website is updated. The updates may be delegated to 2<sup>nd</sup> tier people if required.

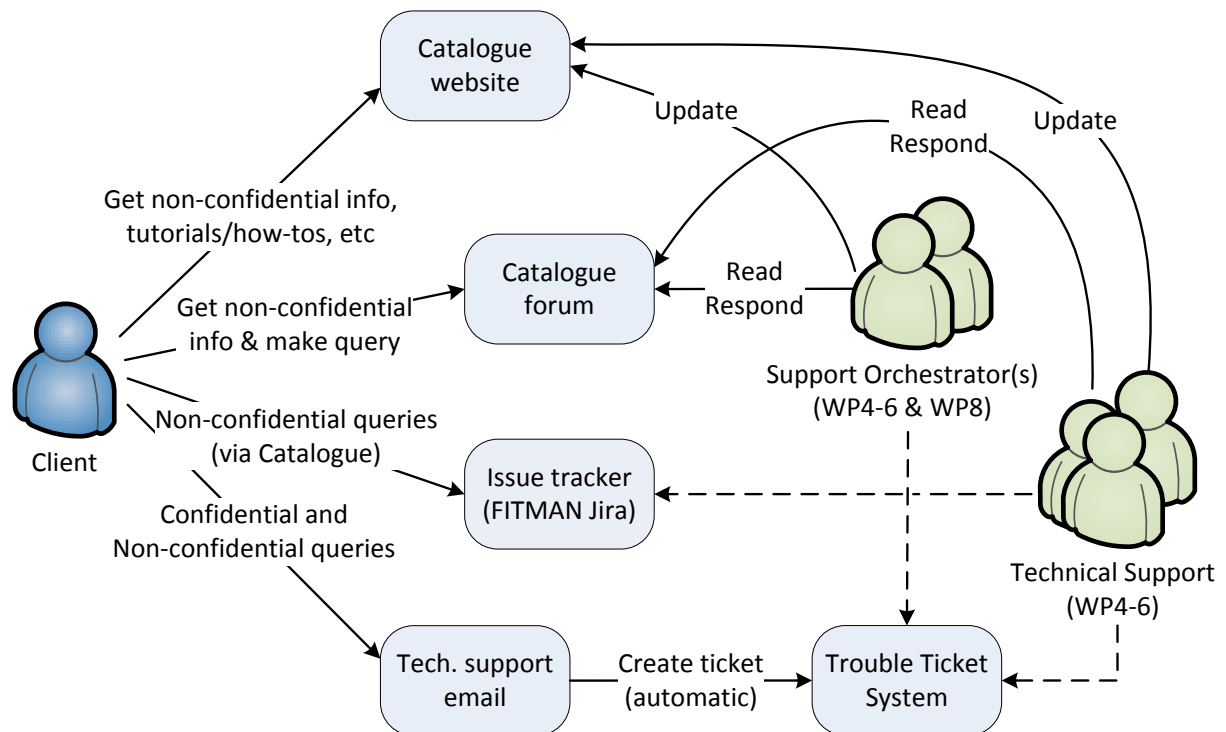
### 9.2.3 Technical support process

The technical support in FITMAN covers each of the SEs developed in the project. We expect to get more technical support queries than for pre-sales queries, due to there being more users who are likely to ask technical questions. That is, pre-sales queries are expected mainly from Phase III consortia, not the projects in the Open Calls, which will be more numerous. Therefore, the emphasis for technical support is on having a tiered process that scales well and promotes openness / self-help where possible (e.g., directing queries to a forum).

While confidentiality is an issue we need to deal with carefully in pre-sales support, as discussed above, it is less of an issue for technical support. While a client may want to avoid using a public forum to ask questions in case they do not want other organisations know what they are working on, visibility of the support tickets internally to FITMAN is not an issue, i.e., everybody in FITMAN providing technical support can view all technical support tickets.

Figure 37, below, gives an overview of the technical support process in FITMAN.





**Figure 37: FITMAN technical support process (not depicted: potential use of telephone support).**

Compared with pre-sales support, technical support uses two additional tools: the forum and issue tracker. A key aim is to encourage people to seek support via self-help and collaborative channels first, i.e., the catalogue website and the forum. The additional benefits of the forum are that people can see solutions to questions that people have already asked and it is a place where non-FITMAN partners who have built up enough expertise can help answer questions. However, email support is still available, but aimed for issues that the client feels are too sensitive to be publicly visible.

The catalogue (website) and issue tracker are implemented like in FI-WARE and XIFI, to help provide users across the FI-PPP with a uniform way of getting support. The issue tracker is integrated with the catalogue pages, where people can provide feedback / create a bug entry via the catalogue itself, rather than having to delve into using the issue tracker system directly themselves.

The TTS used for technical support is the same as for pre-sales support, as discussed above. A queue for technical support tickets is used and a ‘Technical Support’ role is used for agents performing this task.

The technical support can be structured with four tiers:

- Tier 1: First-line support, dealing with general technical queries.
- Tier 2: More in-depth technical support, likely the developer(s) of a specific SE.
- Tier 3: Could be R&D for supporting unknown problems. In practice, this may be the same people as in tier 2.
- Tier 4: For anything that goes beyond the FITMAN consortium/assets, e.g., infrastructure issues, operating system issues, etc. For example, FI-Lab.

As with pre-sales support, to close the loop and maximise the self-help element of the support, it is important that the Support Orchestrator(s) ensures that the relevant websites are updated. The updates may be delegated to 2<sup>nd</sup> tier people if required, which is likely for technical documentation for SEs.

## 10 CONCLUSIONS

The FI-PPP is a large, novel, programme, within which FITMAN is a Phase II use case project demonstrating the use of FI-PPP technologies in 10 manufacturing case studies (trials), as well as providing support to Phase III. Previously, the support has been in the form of providing information to the potential bidders to Phase III (in D8.5), covering a broad range of both technical and non-technical information. This has been further extended in this deliverable, giving a comprehensive list of FITMAN assets available to the 16 Phase III accelerators and to future project partners in the accelerators' Open Calls. An overview of key assets is given below in Table 17 with an indication of which are of interest to the Phase III accelerators and SMEs and web entrepreneurs, with a breakdown of non-technical assets sorted by Work Package in Annex VI: FITMAN Assets to Support.

**Table 17: FITMAN assets overview.**

<b>FITMAN assets</b>	<b>Phase III accelerators</b>	<b>SME &amp; web entrepreneurs</b>
Use case scenarios and business requirements (D8.5 section 4.1)	✓	
FI-PPP capacity building analysis (D8.5 section 4.6, D8.6 section 2.4)	✓	
Verification and validation method (D8.5 section 3.1 - 3.4)	✓	✓
Methodologies for SME engagement and technology awareness (D8.5 section 3.5)	✓	
Business and technical indicators (D8.5 section 3.2, D8.6 section 3.2, 4.2 and 5.2)	✓	
Methodology for best practices in SME engagement (D8.5 section 7)	✓	
Lessons learned from FI-PPP engagement (D8.6 section 7.1)	✓	✓
Open Call specifications (D8.5 section 4.9)	✓	
Trials business cases (D8.5 section 4.8)	✓	✓
Socio-economic impact assessment methodology (D8.6 section 7.2)	✓	✓
FITMAN architecture (D8.5 section 4, D8.6 section 2)		✓
FITMAN Platforms and SEs for manufacturing (D8.5 section 5, D8.6 sections 3 - 6)		✓
Service/application development support (D8.5 section 3.5)		✓
Checklists of legal issues and business models (D8.5 section 6)		✓

This deliverable has described FITMAN outputs from M6 – M15 of the project, including updates to materials from WP1 (FITMAN Baseline System) and fresh materials from WP3 (FITMAN Experimentation Sites), WP4, 5, 6 (FITMAN Smart, Digital and Virtual Factory Trials), and WP9 (Socio-economic Impact). Terms and conditions for Specific Enablers and Platforms have been included, as have lessons learned regarding involvement in the FI-PPP and the methodology and tools for trials expansion and web entrepreneurship. Finally, concerning the previous version of this deliverable, this report has documented assessment of Phase III support impact and updates made to D8.5.

In sum, this package encompasses material of relevance to newcomers to the FI-PPP, Phase III intermediary bidders, and Phase III trial bidders; the information includes technical and non-technical FITMAN outputs, and additional information about areas including business models, legal issues and SME engagement.

Although this package is specifically targeted to participants of Phase III of the FI-PPP, it is of relevance beyond that context. For example, people bidding in response to other Factories of the Future calls will find it an invaluable resource for better understanding FITMAN's goals and how their proposals could build on FITMAN efforts.

The website component of this deliverable will be continually maintained during the course of the project. Interested readers can keep up to date via the following channels:

- Website: <http://www.fitman-fi.eu/phase-iii-package>
- Support email: [fitman-phase-iii-info@txtgroup.com](mailto:fitman-phase-iii-info@txtgroup.com)
- Twitter: <https://twitter.com/FitmanFI>
- LinkedIn: <http://www.linkedin.com/groups?about=&gid=4986259>

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## ANNEX I: FITMAN PHASE III PACKAGE SURVEY

The Phase III Package survey had 15 main questions, with a number of conditional questions appearing if certain answers were given. For example, if a respondent said “Other” when asked how they found the survey, an additional question would ask “How did you hear about the survey?”

Some questions allowed respondents to type open-ended answers while others had a list of options for responses. The list below denotes sets of options for responses as an indented list under a given question. Text in square brackets denotes the condition for an additional question to be shown.

1. How did you find this survey?
  - a. Email sent to registered users of the package
  - b. Email sent to people who attended the FITMAN WP8 webinar
  - c. Notice on D8.5 website
  - d. Twitter
  - e. LinkedIn
  - f. Other
    - i. How did you hear about the survey?
2. How did you find out about the FITMAN Phase III package?
3. Why did you visit the FITMAN website?
  - a. To find Phase III Package information
  - b. To find other information
    - i. What information were you seeking on the FITMAN website?
  - c. For another reason
    - i. For what reason did you visit the FITMAN website?
4. Was it obvious to you that the information you used from the FITMAN Phase III Package existed on the FITMAN website?
  - a. Yes
  - b. No
  - c. Not applicable (I wasn't looking for this information)
5. Was it clear that documents and specifications were available for download?
  - a. Yes
  - b. No
  - c. Not applicable (I wasn't looking for this information)
6. How clear were the instructions to access the consultation documents of the Phase III Package?
  - a. Very unclear
  - b. Somewhat unclear
  - c. Somewhat clear
  - d. Very clear
  - e. Not applicable (I didn't use the instructions)

[If answer a - c is given] How could the instructions have been improved?
7. How clear was the content of the website pages?
  - a. Very unclear
  - b. Somewhat unclear
  - c. Somewhat clear
  - d. Very clear

[If answer a - c is given] How could the clarity of the content have been improved?
8. If you referred to them, were the licence terms of Specific Enablers clear?

- a. Yes
- b. No
- c. Not applicable (did not refer to them)

[If answer b is given] How could the clarity of the licence terms have been improved?

9. Was the information up-to-date when you accessed it?

- a. Yes
- b. No
- c. Don't know

[If answer b is given] What updates were missing from the information?

10. Was any information missing?

- a. Yes
- b. No
- c. Don't know

[If answer b is given] What information was missing?

11. In what ways was the information particularly helpful or unhelpful?

12. Did you make queries to the FITMAN team about the information?

- a. Yes
- b. No

[If answer a is given] Was the response you received timely?

- a. Yes
- b. No

[If answer b is given] How long did the FITMAN team take to respond to your query? How rapidly did you expect a response?

[If answer a is given] Was the response you received helpful?

- a. Yes
- b. No

[If answer b is given] In what way was the response you received unhelpful?

How could it have been improved?

[If answer a is given] Do you have any other feedback about the response you received from the FITMAN team?

[If answer b is given] Why not?

- i. No need (the information provided was clear)
- ii. Too much was unclear
- iii. Didn't want to disclose details to the FITMAN team
- iv. Couldn't find contact details to get in touch
- v. Other

[if answer v is given] Why didn't you make a query?

13. Once you had the information you wanted, how easy it was to use this information to support your participation in Phase III?

- a. Very easy
- b. Somewhat easy
- c. Somewhat difficult
- d. Very difficult

[For any answer given] Why is this?

14. Once you had the information you wanted, how helpful was the information for supporting your participation in Phase III?
  - a. Very helpful
  - b. Somewhat helpful
  - c. Somewhat unhelpful
  - d. Very unhelpful

[For any answer given] Why is this?
15. If you have any other comments or suggestions on the Phase III Package or for FITMAN overall, please let us know. Your responses will be treated as confidential.



## ANNEX II: QUESTIONS AND ANSWERS IN THE NOVEMBER 2013 WEBINAR

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The following questions were received.

**1) How many SMEs is FITMAN targeting?**

Key performance indicators (KPIs) are not yet defined but basically any and all SMEs working in ICT for manufacturing are targeted.

**2) Where can the methodologies presented during the webinar be found?**

The methodologies presented during the webinar are developed in Deliverable 8.3. More information can be found at: <http://www.fitman-fi.eu/phase-iii-package/information-for-phase-iii-bidders/methodologies-and-tools/fitman-smes-innovation-preparation-first>

**3) When is the FI-PPP Phase III Call 3 deadline?**

The FI-PPP Phase III deadline for consortia is the 10<sup>th</sup> of December. Successful consortia will issue information on their Open Calls later next year (after May 2014). (Further information available at: <http://ec.europa.eu/digital-agenda/en/fi-ppp-phase-3>)

**4) Is there a limit on consortia participants?**

That will depend on the size of the budget submitted, but the partners might be maximum 6. Since at least three countries must be represented in each consortium, at least three participants are needed.

**5) How much funding is there for Phase III?**

In total, 100M Euros is available, to be distributed between up to 20 consortia.

**6) Should SMEs be included in Phase III?**

The Phase III call for consortia aims at intermediaries who will target SMEs in their Open Calls next year, although this does not preclude SMEs from participating in a bid to engage as a consortium. SMEs will be engaged through the Open Calls that the successful consortia will launch later next year. Those bidding to run a consortium should demonstrate capacity on running Open Calls, and financial robustness. (Further information available at: <http://ec.europa.eu/digital-agenda/en/fi-ppp-phase-3>)

**7) Various questions on FITMAN Open Call were received.**

There is a difference between Phase III of the FI-PPP and the FITMAN Open Call. The latter requires the participation of new partners to carry out certain tasks within the FITMAN project. The former aims at supporting projects which will build on and expand the core platform of projects of Phase I and II and involve SMEs and web entrepreneurs through Open Calls.

All information on FITMAN Open Call can be found at: <http://www.fitman-fi.eu/open-call-1>

The following email can be used for addressing questions: [FITMANOpenCall@txtgroup.com](mailto:FITMANOpenCall@txtgroup.com)

**8) Is a copy of these slides available?**

The slides are available online at <http://www.fitman-fi.eu/news/fitman-phase-iii-webinar>

**ANNEX III: M8 WEBINAR - QUESTIONNAIRE****Survey on FITMAN Phase III webinar****1. What was the main reason for your participation in the webinar?**

- ☐ To learn about the FITMAN project
- ☐ To learn about FITMAN's SME engagement methods
- ☐ To learn about FITMAN's Phase III Package
- ☐ To learn about the Phase III Call 3
- ☐ All the above
- ☐ Other (please specify)

**2. How useful did you find the information presented at the webinar?**

Not important

Little important

Neutral

Important

Very important

☐☐☐☐☐**3. What was the most interesting topic for you?**

- ☐ Information from the Phase III Package: FITMAN deliverable summaries
- ☐ Information from the Phase III Package: additional information (SE terms, checklists, etc.)
- ☐ Services from the Phase III Package (Q&A service, forum, etc.)
- ☐ Methodologies on SME engagement

**4. Did you visit the FITMAN website to retrieve more information after the webinar?**

- ☐ Yes
- ☐ No

**5. If yes, what kind of information did you look for?**

- ☐ Information from the Phase III Package: FITMAN deliverable summaries
- ☐ Information from the Phase III Package: additional information (SE terms, checklists, etc.)
- ☐ Services from the Phase III Package (Q&A service, forum, etc.)
- ☐ Methodologies on SME engagement
- ☐ Other (please specify)

**6. How did you find out about the FITMAN Phase III Webinar?**

- ☐ FITMAN portal
- ☐ FI-PPP website
- ☐ FITMAN Account on Facebook
- ☐ FITMAN Account on Twitter
- ☐ FITMAN Account on LinkedIn
- ☐ FITMAN invitation email
- ☐ Other (please specify)

**7. Would your organisation be interested in ICT for manufacturing projects within the FI-PPP Call 3 framework?**

- ☐ Yes
- ☐ No

Done

## ANNEX IV: QUESTIONS AND ANSWERS IN THE MAY 2014 WEBINAR

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Questions were asked using the instant messaging functionality. The presenters and other FITMAN partners on the line responded verbally to questions. Note that confidential or otherwise sensitive information have been removed from the following text.

**1) Have you made use of any enablers already? What was your experience and/or general impression? (in terms of readiness, features, stability, and so on)**

Some of the specific enablers have been tested by non-trial partners, but really the trial partners (who have been using the enablers more extensively) will have deeper insights into their readiness, stability etc. No trial partner was present for the webinar.

**2) Do you intend to offer training for SMEs on specific FI-WARE technology?**

Such training is not planned: FITMAN has resources to support Phase III participants regarding FITMAN outputs, but not regarding FI-WARE outputs.

**3) Will FITMAN technologies be available after 2015?**

Where possible, FITMAN technologies will be released as open source software. In addition, FITMAN support will be available to Phase III participants while the FITMAN project is active (FITMAN is scheduled to end on 31 March 2015). FITMAN SEs are all released under OS licences and will be available to all well beyond the end of the FI-PPP. Training and Support for FITMAN SEs is guaranteed as well, free of charge within the end of the FITMAN project, at FRAND conditions after the end of the FITMAN project for FI PPP members and sub-grantees, at Commercial conditions in all other cases.

**4) Would you have case studies on the use of specific and generic enablers?**

FITMAN has ten use case trials assessing and using all FITMAN SEs and a number of GEs.

**Additional note (not discussed in the webinar):** the M15 update to the Phase III Package will include public versions of FITMAN deliverables, including videos showing the adoption of SEs and GEs in FITMAN Trials.

**5) Can you publish a summary of the generic/specific enablers in a way that summarises each one of them in an “elevator pitch”?**

The participants were thanked for the suggestion, which will be considered. SE information is available via the FITMAN catalogue, online at <http://catalogue.fitman.atosresearch.eu/>

**6) Will most of FITMAN SEs be open source?**

FITMAN intends to release its Specific Enablers under open source licences.

**7) Will there be a "hotdesk" that start-ups can approach during Accelerators' Open Calls?**

A trouble ticket system will be launched to deal with inquiries from Phase III participants who wish to make use of FITMAN outputs.

**8) Webinar participants initiated a discussion about the end of Phase II project support to Phase III in March 2015 and whether Phase II projects should be extended to provide further support to Phase III Accelerators. One accelerator was planning to start funding projects from March 2015, but FITMAN ending at that time would mean it needs to fund projects earlier than this date.**

The FITMAN team is aware of this matter. Unfortunately the issue applies for all Phase II projects.

**9) Can the SME engagement methodologies be found in D8.3?**

They can. D8.3 can be accessed upon registration in the FITMAN portal.

**ANNEX V: M14 WEBINAR - QUESTIONNAIRE**

- 1) Which Phase III project do you represent? [drop-down list of 16 accelerators]  
 2) How useful did you find the information presented in the webinar?

Not useful at all	Somewhat useful	Useful	Very useful

- 3) How could it have been more useful?  
 4) What was the most interesting topic?

a	Information from the Phase III Package: FITMAN deliverable summaries
b	Information from the Phase III Package: additional information (SE terms, checklists, etc.)
c	Services from the Phase III Package (Q&A service, forum, etc.)
d	Methodologies on SME engagement

- 5) Did you visit the FITMAN website to retrieve more information after the webinar?

Yes	
No	

- 6) If yes, what kind of information did you look for?

a	Information from the Phase III Package: FITMAN deliverable summaries
b	Information from the Phase III Package: additional information (SE terms, checklists, etc.)
c	Services from the Phase III Package (Q&A service, forum, etc.)
d	Methodologies on SME engagement
e	Other (please specify)

- 7) Did the webinar clarify the ways in FITMAN might support your Phase III project?

Yes	
No	

- 8) How could we have done better at clarifying the ways in which FITMAN might support your Phase III project?

- 9) Is it possible that your Phase III project may collaborate with FITMAN?

Yes	
No	

- 10) Would you like to see further actions organised by FITMAN in the future?

Yes	
No	

- 11) If you have any further comments or suggestions, please provide them.

## ANNEX VI: FITMAN ASSETS TO SUPPORT

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There are many non-technical and technical FITMAN assets to support. For the non-technical assets, they are listed below according to the specific WP they stem from.

### Non-technical assets from WP1

- Use Case Scenarios and Business Requirements
- FI-PPP Capacity Building Analysis

### Non-technical assets from WP2

- FITMAN Verification & Validation Method and Criteria
- FITMAN Business and Technical Indicators
- FITMAN Verification & Validation Generic Assessment Package
- FITMAN V&V Assessment Package Instantiations per Trial
- FITMAN SMEs Innovation Preparation First

### Non-technical assets from WP3

- FITMAN Trials Business Cases
- Trials Competencies / Capability Gaps and Open Call Specifications

### Non-technical assets from WP8 (D8.3)

- Methodologies for identifying best practices and lessons learned
- Methodology for creating technology awareness
- Support for SME service and application development
- Methodology for proactive communication of achievements and innovations generated by SMEs in Phase III

### Non-technical assets from WP8 (D8.5)

- Checklist of Legal Issues
- Checklist of Business Models
- External Resources
- Intermediaries' Best Practices for Phase III
- Lessons learned regarding involvement in the FI-PPP

### Non-technical assets from WP9

- Method for socio-economic impact assessment of FITMAN trials

### Technical assets - Specialised Enablers (SEs)

- Collaborative Asset Management
- Collaborative Business Process Management
- Data Interoperability Platform Services
- Metadata and Ontologies Semantic Matching
- Secure Event Management
- Shopfloor Data Collection
- Supply Chain & Business Ecosystem Apps
- Unstructured and Social Data Analytics