Ecosystem for COllaborative Manufacturing PrOceSses – Intra- and Interfactory Integration and AutomaTION
(Grant Agreement No 723145)

D8.7 Evaluation Framework

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Paolo Vergori (ISMB)	2017-12-21	Methodology is sound and document is well written. Conclusions are concise. Accepted with minor modifications required.
Farshid Tavakolizadeh (FIT-UC^2)	2017-12-20	Minor modifications

Index:

1 Executive Summary

To ensure that the project has a solid successful implementation of creative solutions, this deliverable provides a strong Evaluation Framework that will serve as a baseline for D8.8 Final Evaluation Report of the COMPOSITION Integrated Information Management System (IIMS) platform in M36.

This has been performed by assigning each use case with all relevant KPI's from the DoA. Keeping these KPIs in mind, the relevant questions to be asked, methods to evaluate and measures of success for each use case have been defined. This will be used as a baseline when gathering information, analysing results and reporting findings for the Final Evaluation Report of the COMPOSITION IIMS platform.

2 Abbreviations and Acronyms

Table 1: Abbreviations and acronyms used in the deliverable

Acronym	Definition
IIMS	Integrated Information Management System
DoA	Description of Action
KPI	Key Performance Indicator
SME	Small to Medium-sized Enterprises

3 Introduction

An evaluation framework will be developed to serve as a baseline for how, when and by whom validation is going to take place and will include definition of appropriate metrics and guidelines (e.g. usability testing questionnaires, observations, etc.) for validation, refinement of the initially defined success criteria, and measurement metrics. The framework will be developed by IN-JET with assistance from BSL, KLE and NXW and documented in D8.7. [Quote from DoA: Subtask 8.4.1: Establishment of an evaluation framework]

3.1 Purpose, context and scope of this deliverable

The purpose of this deliverable is to provide a Framework to achieve COMPOSITION Technical Objective 3.1: implement, demonstrate and validate the COMPOSITION operating system in two multi-sided pilots. As proof-of-concept, the COMPOSITION IIMS will be implemented, demonstrated and validated in two multi-sided pilots that show the modularity, scalability and re-configurability of the platform across multiple application domains. The first pilot in the biomedical device domain focuses on the integrated information management system in a multi-sided manufacturing process within one company. The second pilot concentrates on the interaction between different companies using the COMPOSITION ecosystem with the agent-based marketplace for collaboration, optimising logistics and other inter-factory processes.

3.2 Content and structure of this deliverable

Section 4 describes the aim of the Evaluation Frameworks and outlines the six steps involved in effective evaluation. Section 5 then progresses into performing the first three steps of the “Six Steps to Effective Evaluation” (Glenaffric, 2007). This deliverable has been structured around these first three steps. This is performed by describing our stakeholders and their involvement in the project (Section 5.1), outlining the projects user-driven requirements and performance related KPIs and how they will be evaluated (Section 5.2), and designing the evaluation (Section 5.3). The final three steps of the “Six Steps to Effective Evaluation” will be performed in D8.8 Final Evaluation Report of the COMPOSITION IIMS platform in M36.

4 Evaluation Framework

4.1 Evaluation Subject

The evaluation subject aligns with COMPOSITION Strategic Objective 3: Demonstrate and validate reference implementations of the full COMPOSITION ecosystem in real value and supply chains to foster take-up and re-use at European level.

The COMPOSITION platform and components will be validated against a full set of user-driven requirements and performance related KPIs. The impact on business ecosystems and competitiveness of enterprises will be evaluated. Furthermore, its market impact related to vendor relationships and involvement of especially SMEs will be assessed.

4.2 Evaluation Methodology

The COMPOSITION evaluation plan will be adapted from “Six Steps to Effective Evaluation” by Glenaffric (Glenaffric, 2007), with the present Framework embracing the first three steps.

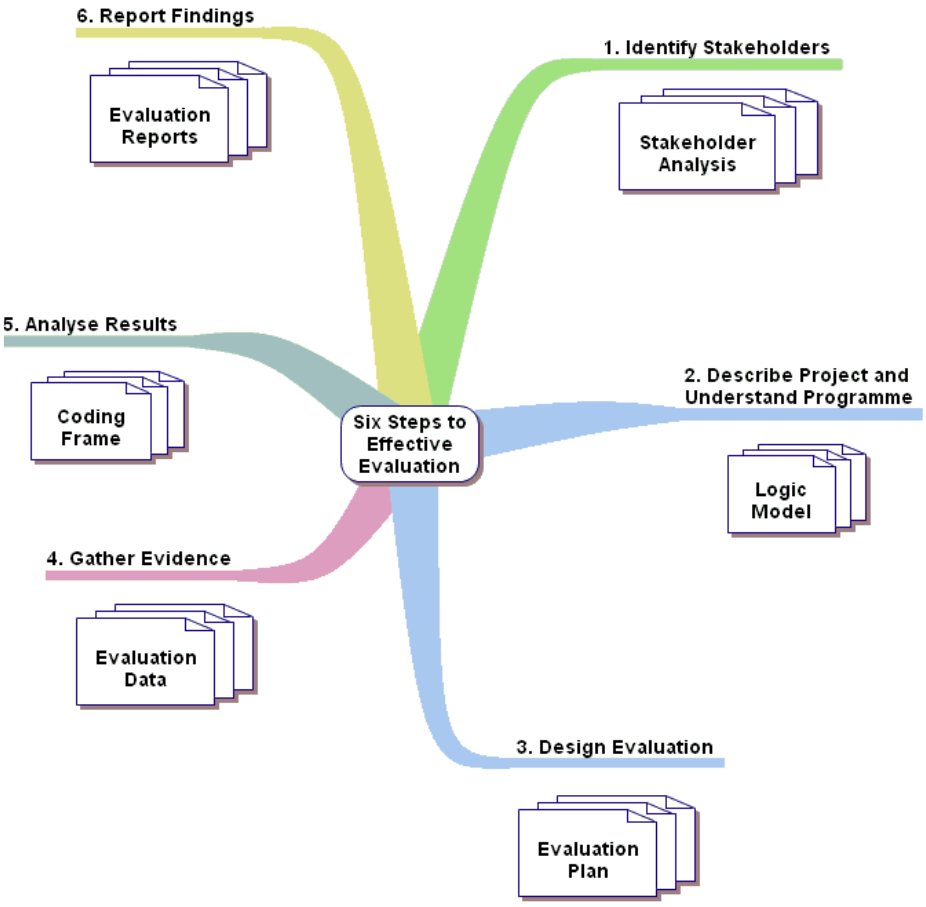

Figure 1: The Six Step approach to effective evaluation (Glenaffric, 2007)

- **Step 1** – Identify Stakeholders
- **Step 2** – Describe Project and Understand Programme
- **Step 3** – Design Evaluation
- **Step 4** – Gather Evidence
- **Step 5** – Analyse Results
- **Step 6** – Report Findings

5 Evaluation Activities in COMPOSITION

5.1 Stakeholders (BSL)

Five use case pilots will be implemented to demonstrate and evaluate the COMPOSITION eco-system based on two different approaches: Value-Chain/Intra-Factory approach and Supply Chain/Inter-Factory approach. Two pilots, Boston Scientific Ltd and Kleeman Hellas, will focus on the Value-Chain/Intra-Factory approach. Four pilots, Kleemann, ELDIA, ATLANTIS and NXW, will focus on the Supply Chain/Inter-Factory approach. Section 5.1.1 to Section 5.1.5 describes the five pilot parties and their involvement in COMPOSITION.

5.1.1 Boston Scientific Ltd, Ireland

Boston Scientific is one of the largest medical device companies in the world with over 23,000 employees worldwide. Boston Scientific Limited (BSL) in Clonmel, Ireland is the largest in terms of Value of Production in the Boston Scientific network of plants. BSL will run the Value Chain/Intra-factory pilot in the COMPOSITION project.

BSL manufactures Pulse Generators (Pacemakers, Implantable Cardiac Defibrillators). Currently the manufacturing process is a 'non-intelligent' fragmented process. Manufacturing is performed in production steps which have little or no upstream/downstream communication other than Manufacturing Execution system (MES) traceability. This verifies completion of the previous process step through review of traceable information, and some localized intelligent systems which can determine that the correct product recipe is active and that the equipment set is at production status. Real-time monitoring of equipment sets is not possible; equipment sets do not perform autonomous decision making and there is no communication between equipment sets or the ability to identify trends/processing issues which may impact downstream processes. Reporting of process yield/ equipment metrics is performed offline using software systems which extract and correlate the data from BSL's MES system.

The future state of the manufacturing processed is envisaged to be a fully integrated intelligent framework which uses an over-riding software management system to allow real-time monitoring of equipment performance/ process performance and has the ability to make autonomous decisions (stop production on identification of trends/ alert when equipment or process goes into alarm state). The future manufacturing line will utilize intelligent software management systems to monitor required metrics, determine build sequence per build plan, recognise incoming product and perform seamless changeover of production recipes and provide a visualization of agreed and required performance metrics.

The BSL pilot will implement specific elements of the COMPOSITION solution to realise the future Front End solution for implantable Printed Circuit Board Assembly (PCBAs)

5.1.2 Kleemann Hellas, Greece

Kleemann operates both in the manufacturing and the trading of complete lift systems field. The head offices are based in Kilkis, Northern Greece, with offices and subsidiaries in 15 territories serving more than 100 countries worldwide.

The range of products includes domestic and commercial lift systems, including car parking and multi-storey building lift systems.

For the Value Chain/Intra-Factory Pilot, two departments will be involved; the maintenance department will be responsible for UC-KLE 1 and UC-KLE 3 and the piston-cylinder unit will be responsible for UC-KLE 2. For the Supply Chain/Inter-factory Pilot, which will be deployed at the Kleemann plant in Kilkis and part of it jointly at ELDIA's recycling facilities in Thessaloniki, two departments from the Greek plant will be involved; the maintenance department and the purchasing department will be responsible for UC-KLE 4. The purchasing department will also be responsible for UC-KLE 7.

5.1.3 ELDIA, Greece

ELDIA is the largest waste management company in Northern Greece and one of the leading dealers of recycled materials in Greece. ELDIA offers services providing solutions to solid waste management and disposal issues of industrial and commercial enterprises, local government, or organizations of the broader public sector. ELDIA undertakes the screening of all commercial and industrial waste in order to recover materials (paper, wood, plastics, metal, pallets, and glass) and promote the recycling industries.

The principle under which ELDIA operates and handles waste is in line with what COMPOSITION will apply at the latest stages of the ecosystem development. The ELDIA pilot aims to remove all reusable material from the waste stream and to reduce the amount of waste that is disposed of at the Sanitary Landfill.

Parts of the Supply Chain/Inter-factory Pilot will be deployed jointly at the Kleemann plant in Kilkis and at ELDIA's recycling facilities in Thessaloniki.

5.1.4 ATLANTIS, Greece

ATLANTIS Engineering is an SME whose main activities include the support of daily production activities in different factories with simple and advanced manufacturing systems, the organisation and computerisation of maintenance departments, the customised maintenance consulting and training, and asset life cycle optimisation.

ATLANTIS has long standing experience in the industrial manufacturing domain. The expertise of the company is mainly in the decision support for the management and optimisation of production activities and assets' life-cycle, in the design, interconnection and implementation of models and protocols for the manufacturing sector, and in the streamlining of the various maintenance related processes (predictive, condition-based, and reactive).

Parts of the Supply Chain/Inter-factory Pilot will be deployed by ATLANTIS for software upgrade and deployment.

5.1.5 Nextworks, Italy

Nextworks, located in Pisa, Italy, is a dynamic SME that operates in the IT and Telecommunications sectors. Nextworks has long-term experience and proved skills in the frameworks of IoT, wireless, access and transport networks, digital video encoding and transport, control and automation, design and development of complex software systems on both traditional and embedded platforms.

Nextworks' role is two-fold: as a pilot in the Supply Chain / intra-factory domain, and as technology and service provider in both the value chain and the supply chain use cases, specifically for factory premises and production line monitoring and management. These services will be provided based on information collected both from the field (production line and BMS), and where possible from other stakeholders' ERP systems. Decisional processes inside the production line will also be supported, enhancing their functionality using professional analysis tools offered by the COMPOSITION marketplace.

5.2 Developing the Evaluation Framework

This section describes how the overall framework for the evaluation of the COMPOSITION IIMS platform. Evaluation activities for all use cases of the project will take place. In order to achieve this, the evaluation will include the following steps (Glenaffric, 2007):

5.2.1 Categorization

Each pilot partner will individually evaluate each of their use cases. The categorization will therefore include the following categories:

- UC-BSL-2 Predictive Maintenance
- UC-BSL-5 Equipment Monitoring and Line Visualisation
- UC-BSL-3 Component Tracking
- UC-BSL-7 Automatic Long Term Tracking of High Value Equipment
- UC-BSL-4 Automatic Solder Paste Touch Up
- UC-KLE-2 Delayed Process Step
- UC-KLE-1 Maintenance Decision Support
- UC-KLE-3 Scrap Metal and Recyclable Waste Transportation
- UC-KLE-4 Scrap Metal and Recyclable Material Management
- UC-KLE-7 Ordering Raw Materials
- UC-ELDIA-1 Fill-level Notification
- UC-ATL-1 Selling Software/Consultancy
- UC-ATL-2 Searching for Solutions
- UC-ATL-3 Searching Recommended Solutions
- UC-NXW-1 Decision Support over Marketplace

5.2.2 Factors to evaluate

In order to measure the impact of the project a set of well-defined quantifiable KPI's have been defined. These KPI's were established with relevant, quantitative and measurable impacts. The DoA outlined the following KPIs.

Generalised KPIs for the project's impact to productivity increase

- Overall reduction in down-time from failures & bottlenecks 15%
- Cost savings for process monitoring 25%
- Reduction of amount of non-critical spare parts availability 10%
- Reduction in cycle-times from process monitoring & behaviour 10%
- Better interaction with the suppliers, recycling companies 10%
- Cost improvements from improved process monitoring 25%
- Improvement in manufacturing quality 5%
- Reduction of order-to-delivery time and shipping costs 10%
- Reduction in scrap and repair costs 50%

Generalised KPIs for reductions in the effort for integration or reconfiguration

- Total reduction in the efforts for integration or reconfiguration 30%
- Improvement of non-effective procedures with decentralisation 20%
- Reduction in time for optimisation of products/services 10%

Generalised KPIs for improved reaction to market changes

- Improvement in time-to-market ability 15%

Each use case will be evaluated using the relevant KPI's from the list above.

5.2.3 Questions to Address

In order to evaluate if these KPI's have been met one or more questions will be asked (the five E's). These questions will aid in the determination of whether the specific aim/objective of each use case has been achieved:

1. Efficacy – Does the use case work?
2. Efficiency – Is the use case achieved in the most effective way?
3. Elegance – Is the use case implemented in an aesthetically pleasing manner?
4. Effectiveness – Does it achieve its long term goals?
5. Ethicality – Is it the moral thing to do?

5.2.4 Method

Quantitative and qualitative data will be gathered through a combination of questionnaires, interviews, telco's and workshops.

5.2.5 Measure of Success

The information gathered will then be used as indication of weather each use case has achieved its goals and therefore whether the project as a whole was a success.

5.2.6 Timing

This section will outline who is involved in each specific objective. It will also estimate when each objective will be achieved. The predicted time will be based on estimations only and may change as the project progresses. The aim of this section is to try to ensure all objectives are met before the end of the project.

5.2.7 How to report

This section outlines where the results and data will be represented, analysed and documented. Deliverable 8.8 will include all results from the concluding validation and evaluation with the final pilot trials. This deliverable will then compare the results derived from the two pilots and combine results in a common pilot evaluation report.

5.3 Evaluation Framework

User Case	Factor to evaluate (Relevant KPI's)	Question to Address	Method(s)	Measure of Success	Timing	How to report
UC-BSL-2 Predictive Maintenance	1. Overall reduction in down-time from failures & bottlenecks 2. Cost savings for process monitoring 3. Reduction in cycle-times from process monitoring & behaviour 4. Reduction in scrap and repair costs 5. Total reduction in the efforts for integration or reconfiguration 6. Reduction in time for optimisation of products/services	*Efficacy* Are all motor breakdowns successfully detected before motor stops working? *Efficiency* Is there a reduction in the number of breakdowns? Are the right people getting the right message in time? Are the relevant people reacting to messages? Are they performing repair in an effective manner in order to reduce downtime? *Elegance* Does the method of communication to relevant workers work well? Do people get messages in time? Do they react in time? Does the process flow smoothly? *Effectiveness* Is there a reduction in maintenance costs due to early detection of breakdowns? Is there a reduction is scrap associated with oven failure? *Ethicality* Are all involved personal happy with use case?	*Primary: Questionnaire* Questionnaire pre-installation of system enquiring about • Production time • Downtime associated with oven failure • Cost of maintenance • Cost of scrap associate with oven failure Re-circulate the same questionnaire following the introduction of use case • Has production time improved? • Is it now easier/quicker for the appropriate person to perform repairs? • How much the system reduced maintenance costs? • Does the introduction of the system reduce the scrap associated with oven failure? *Secondary: Workshop/Interview* Workshop with potential participants (e.g. technicians, process owners) to identify differences of interests among employees	1. Reduction in downtime associated with motor failure 2. Difference in cost of maintenance 3. Change in production time due to less motor/oven failures 4. Difference in cost of scrap associated with oven failure 5. Reduction in time to get the motors repaired/get the repair job done 6. Reduction in time to get the motors repaired	*Estimated delivery:* M36 *Involved Partners:* • BSL • Tyndall • NXW • FIT	D8.8 Final Evaluation

UC-BSL-5 Equipment Monitoring and Line Visualisation	1. Overall reduction in down-time from failures & bottlenecks 2. Reduction in cycle-times from process monitoring & behaviour 3. Cost improvements from improved process monitoring 4. Reduction in scrap and repair costs 5. Total reduction in the efforts for integration or reconfiguration 6. Reduction in time for optimisation of products/services	*Efficacy* Does the line visualisation give a good/accurate overview of the line? Is there a reduction in downtime due to early detection of equipment status change? Do relevant personnel get appropriate notifications when equipment status changes? Is the equipment status of each piece of equipment accurately displayed? Is the status in real time? *Efficiency* Do relevant personnel get appropriate notifications when equipment status changes? Is there a reduction in cost associated with scrap due to equipment issues? *Elegance* Is the line visualisation display aesthetically pleasing? *Effectiveness* Could this use case be rolled out on all lines through factory? *Ethicality* Are all involved personal/workers happy with the use case?	*Primary: Questionnaire* Questionnaire pre installation of system enquiring about • Production time • Downtime • Cost of maintenance • Cost of scrap Re-circulate the same questionnaire following the introduction of the predictive maintenance. • Has production time improved? • Has downtime improved? Is it easier/quicker for appropriate person to perform repairs? Is downtime prevented by more attentive monitoring of line due to improved visualisation? • How much the system reduced maintenance costs? • Does the introduction of the system reduce the cost of scrap due to quicker reaction times? *Secondary: Workshop/Interview* Workshop with potential participants (e.g. area supervisors, product builders, process owners) to identify differences of interests among employees	1. Reduction in downtime associated with early detection of equipment status change 2. Change in product production time due to quicker reaction to tower lights 3. Difference in cost of maintenance/ production 4. Difference in scrap associated with equipment downtime/ downtime associated with delayed reaction 5. Reduction in time associated with getting someone to repair problem 6. Reduction in time associated	*Estimated delivery:* M36 *Involved Partners:* • BSL • NXW	D8.8 Final Evaluation

				with getting someone to repair problem		
UC-BSL-3 **&** **UC-BSL-7** Component Tracking & Automatic long term tracking of high value equipment	1. Cost improvements from improved process monitoring 2. Total reduction in the efforts for integration or reconfiguration 3. Reduction in time for optimisation of products/services	*Efficacy* Can all pieces of equipment, which have been removed from the normal production path, be easily accessed on demand? *Efficiency* Is there a reduction in downtime due to less lost equipment? *Elegance* Does the method of communication to relevant workers work well? Is it displayed / recorded on the visualisation screen in an appropriate manner? *Effectiveness* Is there a reduction in missing components? Is there a reduction in time/cost associated with lost equipment? *Ethicality* Are all involved personal/workers happy with the use case?	*Primary: Questionnaire* Questionnaire pre installation of system enquiring about • Cost associated with lost equipment / material • Downtime associated with missing equipment Re-circulate the same questionnaire following the introduction of the predictive maintenance. • Has the introduction of the system reduced cost associated with lost equipment? • Has production time improved? Has downtime improved? Is it easier/quicker to find missing equipment? Is it more or less work to tag the equipment? *Secondary: Workshop/Interview* Workshop with potential participants (e.g. product builders) to identify differences of interests among employees	1. Difference in cost associated with reduction in lost material/ equipment 2. Reduction in time associated with searching for lost material/ equipment 3. Reduction in labour hours searching for missing equipment	*Estimated delivery:* M36 *Involved Partners:* • BSL • Tyndall	D8.8 Final Evaluation
UC-BSL-4 Automatic Solder Paste	1. Cost savings for process monitoring 2. Reduction in	*Efficacy* Can dispense system automatically dispense paste on correct pad as identified by SPI?	*Secondary: Workshop/Interview* Workshop with potential participants to identify differences	1. Reduction in time associated with manual	*Estimated delivery:* M36	D8.8 Final Evaluation

Touch Up	cycle-times from process monitoring & behaviour 3. Improvement in manufacturing quality 4. Total reduction in the efforts for integration or reconfiguration / Reduction in time for optimisation of products/services	*Efficiency* Is there a reduction in cycle time due to less rework? *Elegance* Does this process reduce/get rid of the need for manual labour? *Effectiveness* Does it top up the pad effectively every time? Does it reduce manual hours / cycle time? *Ethicality* Are all involved personal/workers happy with the use case?	of interests among employees. • Would they prefer to do the top up themselves? • Do they think it would save time?	work hours 2. Reduction in cycle time 3. Reduction in false rework time 4. Reduction in time spent on rework – moving the PCBA of the line, topping it up and putting it back into production - machine will automatically do this at a much quicker speed	*Involved Partners:* • BSL	
UC-KLE-2 Delayed Process Step	1.Reduction of bottlenecks 2. Cost savings from process monitoring 3.Increase of productivity in production lines	*Efficacy* Are all bottlenecks successfully detected in the specific workstations? *Efficiency* Is there a reduction in the number of bottlenecks? Are the right people getting the right message in time? Are the relevant people reacting to messages?	*Secondary: Workshop/Interview* Workshop with production manager and production supervisor to identify critical issues regarding the operation of the system. • Do they think the identification of bottlenecks by COMPOSITION saves time and optimises the production? • Keep track of internal customer satisfaction.	1. Reduction of bottlenecks 2. Reduction of bottleneck costs associated with productivity	*Estimated delivery:* M36 *Involved Partners:* • KLE	D8.8 Final Evaluation

		Are they performing changes in the production programme in an effective manner in order to reduce bottlenecks? *Elegance* Does the method of communication to the production manager and production supervisor work well? Do people get messages in time? Do they react in time? Does the process flow smoothly? *Effectiveness* Is there a reduction in bottleneck costs due to the effective process monitoring? Are there any improvements in the productivity measures? *Ethicality* Are all involved personnel happy with the use case?	• Keep track of cost savings. • Keep track of productivity data.			
UC-KLE-1 Maintenance Decision Support	1. Overall reduction in down-time from failures 2. Cost savings from improved process monitoring 3. Reduction in cycle-times from process monitoring 4. Reduction in scrap and repair costs	*Efficacy* Are all machine breakdowns successfully detected before the machine stops working? *Efficiency* Is there a reduction in the number of breakdowns? Are the right people getting the right message in time? Are the relevant people reacting to messages? Are they performing all necessary actions in an	*Primary: Questionnaire* Questionnaire pre-installation of system enquiring about • Production time • Downtime associated with polishing machine failure • Cost of maintenance • Cost of scrap associate with the polishing machine failures Re-circulate the same	1. Reduction in downtimes associated with motor failure 2. Reduction of maintenance costs 3. Change in production time due to less machine	*Estimated delivery:* M36 *Involved Partners:* • KLE	D8.8 Final Evaluation

	5. Improvement in manufacturing quality	effective manner in order to reduce downtimes? *Elegance* Does the method of communication to relevant employees work well? Do people get messages in time? Do they react in time? Does the process flow smoothly? *Effectiveness* Is there a reduction in maintenance costs due to early detection of breakdowns? Is there a reduction in scrap associated with the polishing machine failure? Are there any improvements in manufacturing quality? *Ethicality* Are all involved personnel happy with the use case?	questionnaire following the introduction of use case • Has the production time improved? • Is it now easier/quicker for the technician to perform repairs? • How much does COMPOSITION reduce maintenance costs? • Does the introduction of the system reduce the scrap associated with the polishing machine failure? *Secondary: Workshop/Interview* • Workshop with potential participants (e.g. technicians, maintenance manager and maintenance planner) to identify issues related to the system. • Keep track of internal customer satisfaction. • Keep track of cost savings. • Keep track of manufacturing quality.	failures 4. Reduction of cycle times 5. Reduction in Mean time to repair 6. Increase equipment availability		
UC-KLE-3 Scrap Metal and Recyclable Waste Transportation	1.Minimization of total distance from bins to container (optimal route for collecting bins) 2. Improvements in containers' fill level	*Efficacy* Is the optimal route successfully detected before the fill levels reach the given thresholds? *Efficiency* Is there a reduction in the number of	*Secondary: Workshop/Interview* • Workshop with potential participants (e.g. maintenance manager and maintenance planner, company forklift driver) to identify differences of interests among employees.	1.Cost improvements from improved process monitoring 2.Reduction of transportation	*Estimated delivery:* M36 *Involved Partners:* • KLE	D8.8 Final Evaluation

	management	breakdowns? Are the right people getting the right message in time? Are the relevant people reacting to messages? Do they re-schedule their programme in an effective manner in order to reduce the total distance? *Elegance* Does the method of communication to relevant employees work well? Do people get messages in time? Do they react in time? Does the process flow smoothly? *Effectiveness* Is there a reduction in total distance from bins to container due to early detection of fill levels? Is there a reduction in scrap associated with the polishing machine failure? Are there any improvements in the management of the containers' and bins' fill level? *Ethicality* Are all involved personnel happy with the use case?	• Keep track of internal customer satisfaction. • Keep track of cost savings.	costs due to the better management of containers' and bins' fill level		
UC-KLE-4 Scrap metal collection and bidding process	1.Minimization of costs from the optimization of both the scrap metal collection and the bidding process 2. Improvements in	*Efficacy* Are the best offers successfully detected based on the specific defined collection and bidding criteria?	*Secondary: Workshop/Interview* • Workshop with potential participants from waste management companies' and KLEEMANN to identify issues regarding the operation of	1.Reduction of collection time and shipping costs 2. Reduction in time spent to select the best	*Estimated delivery:* M36 *Involved Partners:*	D8.8 Final Evaluation

	receiving fast, efficient and high-quality services 3. Reduction in lead times 4. Improvements in the interaction with recycling companies	*Efficiency* Is there a reduction in lead times? Are the right people getting the right message in time? Are the relevant people reacting to messages? Are they analysing the proposed offers in an effective manner in order to accept the most efficient and high quality one? *Elegance* Does the method of communication to relevant employees work well? Do people get messages in time? Do they react in time? Does the process flow smoothly? *Effectiveness* Is there a reduction in total costs due to the optimization of scrap metal collection and bidding process? Is there a reduction of time/effort spent per bidding by the relevant departments? Is there a reduction in the collection times? *Ethicality* Are all involved personnel happy with the use case? Do the not-selected customers feel bothered or overwhelmed?	COMPOSITION. • Keep track of internal and external customer satisfaction. • Keep track of cost savings. • Keep track of lead times.	offer	• KLE • ELDIA	
UC-KLE-7 Ordering Raw Materials	1.Improvement in time-to-market ability	*Efficacy* Are the best offers successfully detected based	*Primary: Questionnaire* Questionnaire in the purchasing	1. Improvement in	*Estimated delivery:* M36	D8.8 Final Evaluation

	2. Improvements in the quality of products 3. Improvements in the establishment of good customer relationship and better interaction with the suppliers	on the specific defined raw material criteria? *Efficiency* Are the right people getting the right message in time? Are the relevant people reacting to messages? Are they analysing the proposed offers in an effective manner in order to accept the most efficient and high quality one? *Elegance* Does the method of communication to relevant employees/customers work well? Do people get messages in time? Do they react in time? Does the process flow smoothly? *Effectiveness* Is there an improvement in time to market ability? Is there a reduction of time/effort spent per offer by the purchasing department? Is the quality of raw materials improved? Are there any improvements in the establishment of good customer relationship and interaction with the suppliers? *Ethicality* Are all involved personnel happy with the use case? Do the not-selected suppliers feel bothered or	department about • Quality of raw materials • Time to market ability • Cost and effort savings • Relationship with customers/suppliers • Use of COMPOSITION ecosystem *Secondary: Workshop/Interview* • Workshop with raw material suppliers and KLEEMANN to identify issues regarding the operation of COMPOSITION. • Keep track of internal and external customer satisfaction. • Keep track of manufacturing quality.	manufacturing quality 2. Reduction of order-to-delivery time and shipping costs	*Involved Partners:* • KLE	

		overwhelmed?				
UC-ELDIA-1 Fill-level Notification	1 Cost savings due to fill level monitoring 2 Reduction of reaction time due to fill-level monitoring 3 Better interaction with clients 4 Reduction in logistics cost	*Efficacy* Do the sensors give us an accurate fill-level reading? *Efficiency* Do the Logistics Department personnel respond promptly to the fill-level notifications? Do the Drivers respond to the Logistics Department orders? Is there a reduction in the pick-up cycle? *Elegance* Does the level of communication to the Logistics Department work well? Does the whole process flow smoothly? *Effectiveness* Is there a reduction in reaction time? Do we achieve a better interaction with our customers? Is there a real cost reduction due to the fill-level monitoring? *Ethicality* Are all involved personnel happy with the use case?	*Primary: Questionnaire* • Questionnaires sent to the customers regarding promptness in service. *Secondary: Workshops* • Workshop with personnel involved in order to evaluate improvement in logistics process. • Workshop with customers in order to evaluate results of new system installed.	Reduction in collection cost Reduction of collection time. Improvement of customer service and satisfaction. Improvement in truck-route calculations.	Estimated delivery M36 Involved partners ELDIA KLE CERTH	D8.8 Final Evaluation
UC-ATL-1 Selling Software/Consultancy	1. Sales Growth 2. Potential New Clients 3. Satisfaction of	*Efficacy* Are new contacts/potential clients successfully reached out via the COMPOSITION ecosystem?	• Metric measure analysis of current/previous sales revenues. • Contact and communicate with new potential clients (face to face	1. A positive sales growth percentage over the specified time	*Estimated delivery:* M36 *Involved*	D8.8 Final Evaluation

	clients 4. Promotions Conducted through the COMPOSITION platform	*Efficiency* Does the contact base (potential clients) of the company grow as a result of the participation of ATL in the COMPOSITION ecosystem? Is it possible to launch advertising campaigns through the ecosystem? Is there an increase in the number of sales? Is there a reduction of time/effort spent by the sales and marketing department spent per new client acquisition? Are the relevant people of the potential clients being conducted through the ecosystem? *Elegance* Does the method of communication to relevant clients work well? Is the system easy to use? Does the sales and marketing department engage in the use of the ecosystem? *Effectiveness* Is there a reduction in sales and marketing costs due to effectiveness of Composition? Is there an increase in the company's earnings? *Ethicality* Are all involved personnel happy with use case? Do the contacted potential clients feel bothered or overwhelmed?	meetings, telco's). • Monitor and rank software/consultancy sales based on feedback of clients via questionnaires. • Keep track of conducted promotions to understand sales growth in relation to promotional programs. (Interviews, Face to face meetings, telco's)	period. 2. Total number of new potential clients contacted. 3. Satisfaction rate of clients via Quality Assurance questionnaires (ISO 9001). 4a. Total number of promotions conducted within the specified time period 4b. Success rate of promotions via the Composition Ecosystem	*Partners:* • FIT • CERTH • CNET • ISMB • ATOS • ATL	
UC-ATL-2 Searching for	1. SW solution search	*Efficacy* Is the SW solution successfully found via the	• Keep track of conducted searches done by potential new	1a. Total number of	*Estimated delivery:* M36	D8.8 Final Evaluation

Solutions	2. Search within COMPOSITION platform 3. SW solution awareness	COMPOSITION ecosystem or more "traditionally" via search engines, phone, mails? *Efficiency* Is it possible to launch First Visit campaigns through the ecosystem? Is there an increase in the number of finding a solution due to potential new clients contacting agent? Is there a reduction of time/effort spent by the sales and marketing department spent per new client acquisition? *Elegance* Does the search method work well for our clients? Is the system easy to use? *Effectiveness* Is there an increase in the signed contract with new customers? *Ethicality* Do the contacted potential clients feel bothered or overwhelmed?	customer to understand their needs (Interviews, Face to face meetings, telco's). • Keep track of conducted searches within COMPOSITION ecosystem (if supported by the system) • Keep track of visitors that contacted agent to understand customers' needs • Keep track of SW solution performance on search engines, phone, by mails, different events and COMPOSITION ecosystem.	searches conducted within the specified time period. 1b. Success rate of potential new customers contacted sales and marketing department 2. Success rate of potential new customers contacted agent 3. Number showing the rate when a customer is searching SW solution	*Involved Partners:* • FIT • CERTH • CNET • ISMB • ATOS • ATL	
UC-ATL-3 Searching Recommended Solutions	1. Recommended SW solution search 2. Returning clients 3. Email subscribers	*Efficacy* Is the SW solution successfully found as a recommendation from the COMPOSITION ecosystem?	• Keep track of how people are hearing about SW solution (Interviews, face to face meetings, telco's). • Keep track of satisfied customers	1a. Total number of recommended searches of solution 1b. Success	*Estimated delivery:* M36 *Involved Partners:*	D8.8 Final Evaluation

		Efficiency Is there an increase of potential new clients contacting the company? Is there a reduction of time/effort spent by the sales and marketing department spent per new client acquisition? *Elegance* Does the search method work well for our clients? Is the system easy to use? *Effectiveness* Is there an increase in potential new customers that contact the company after a positive recommendation? *Ethicality* Do the contacted potential clients feel bothered or overwhelmed? Do they feel obligated to provide input?	• Keep track of new subscriptions	rate of recommended searches via the COMPOSITION Ecosystem 2. Successful rate of satisfied clients 3a. Success rate of new customers 3b. Number of new subscribers	• FIT • CERTH • CNET • ISMB • ATOS • ATL	
UC-NXW-1 Decision Support over Marketplace	1. Increased number of solutions available for enhancing manufacturing 2. Increased number of potential customers of a tool / service 3. Completely flexible solution	*Efficacy* Are specific tools available in the marketplace for supporting decision process? Are any requests for specific analysis tool in the marketplace? *Efficiency* Is there an enhancement (in terms of time/effort) in the configuration of the production machine?	*Primary: Questionnaire* Questionnaire pre installation of system enquiring about • Downtime associated with configuration • Cost of configuration Re-circulate the same questionnaire following the introduction of use case	1. Reduction in downtime associated with configuration 2. Difference in cost of manufacturing process 3. Change in production	*Estimated delivery:* M36 *Involved Partners:* • NXW	D8.8 Final Evaluation

	through Composition IIMS 4. Improvements in manufacturing quality (using specific tools) 5. Reduction times from process monitoring (using specific tools) 6. Further reduction in time for reconfiguration and optimisation of products (using specific tools)	Are the relevant people supported in their choices? Is the analysis tool seller company reaching a higher number of customers? *Elegance* Does the matchmaking work well? Do customers get in touch with right sellers? Does the process flow smoothly? *Effectiveness* Is there a reduction in costs (for customers) due to early and more accurate configuration? Is there an increase of profits (for sellers) due to marketplace requests? *Ethicality* Are all involved personal happy with use case?	• Has production time improved? • Is it now easier/quicker for the appropriate person to perform configuration? • How much the system reduced costs? *Secondary: Workshop/Interview* • Workshop with potential participants (e.g. technicians, process owners) to identify differences of interests among stakeholders	time due to less refinement cycles 4. Increase of profits of analysis tool seller company		

6 Conclusion

This deliverable provides a baseline for how, when and by whom validation is going to take place. Each pilot partner has outlined the appropriate measurable metrics and guidelines for validation of each use case. This common pilot validation and evaluation combined with the results derived from the two pilots will be provided in D8.8 Final Evaluation Report of the COMPOSITION IIMS platform in M36.

7 List of Figures and Tables

7.1 Figures

7.2 Tables

8 References

(Glenaffric, 2007) Glenaffric Ltd (2007). *Six Steps to Effective Evaluation: A handbook for programme and project managers.*