



Big Data Value Spaces for Competitiveness of European Connected Smart Factories 4.0

Horizon 2020 EU Grant Agreement 780732

Title	D1.6 – Risk Management Plan v3
Document Owners	Jesús Alonso, INNO; Silvia de la Maza, INNO; Oscar Lázaro, INNO.
Contributors	All
Dissemination	Public
Date	05/07/2019
Version	V1.0



Version history

01/07/2019	Structure of the deliverable and third risk collection based on FMEA methodology
03/07/2019	First draft of the document
05/07/2019	Final version
11/10/2018	
11/10/2018	
11/10/2018	
11/10/2018	

Document Fiche

Authors	Jesús Alonso, INNO; Silvia de la Maza, INNO; Oscar Lázaro, INNO.
Internal Reviewers	
Workpackage	WP1
Task	T1.3
Nature	Report
Dissemination	Public

Project Partners

Participant organisation name	Acronym
Asociación de Empresas Tecnológicas Innovalia	INNO
Volkswagen Autoeuropa, Lda *	VWAE
Visual Components	VIS
Automatismos y Sistemas de Transporte Interno S.A.U.	ASTI
Telefónica Investigación y Desarrollo SA	TID
Volkswagen AG. *	VW
UNINOVA	UNINO
FILL GmbH. *	FILL
TTTECH Computertechnik AG	TTT
RISC Software GmbH	RISC
PHILIPS Consumer Lifestyle B.V. *	PCL
PHILIPS Electronics Nederland	PEN
Interuniversitair Micro-Electronicacentrum VZW	IMEC
Centro Ricerche Fiat S.C.p.A. *	CRF
SIEMENS S.p.A.	SIEMENS
Prima Industries S.p.A	PRIMA
Politecnico di Milano	POLIMI
AUTOTECH ENGINEERING, AIE *	GESTAMP
Fundació Privada I2CAT, Internet I Innovació Digital A Catalunya i2cat	I2CAT
TRIMEK S.A.	TRIMEK
CAPVIDIA N.V,	CAPVIDIA
Volvo Lastvagnar AB *	VOLVO
Chalmers Tekniska Hoegskola AB	CHAL
Whirlpool EMEA SpA *	WHIR
SAS Institute Srl	SAS
Benteler Automotive GmbH *	BAT
It.s OWL Clustermanagement	OWL
Fraunhofer Gesellschaft Zur Foerderung Der Angewandten Forschung E.V.	FhG
Atlantis Engineering	AE
Agie Charmilles New Technologies SA *	+GF+
Ecole Polytechnique Federale De Lausanne	EPFL
Institut Für Angewandte Systemtechnik Bremen GmbH	ATB
Rheinische Friedrich-Wilhelms-Universität Bonn	UBO
Ethniko Kentro Erevnas Kai Technologikis Anaptyxis (CERTH)	CERTH

The University of Edinburgh	UED
Institute Mines Telecom	IMT
International Data Spaces e.V.	IDSA
FIWARE Foundation e.V	FF
GEIE ERCIM EEIG	ERCIM
IBM ISRAEL – Science and Technology LTD	IBM
ESI Group	ESI
Eneo Tecnología, S.L	ENEO
Software Quality Systems S.A.	SQS
Consultores de Automatización y Robótica S.A.	CARSA
INTRASOFT International	INTRA
United Technologies Research Centre Ireland, Ltd *	UTRC-I
Fratelli Piacenza S.p.A. *	PIA
RiaStone - Vista Alegre Atlantis SA *	RIA
Unparallel Innovation, Lda	UNP
Gottfried Wilhelm Leibniz Universität Hannover	LUH

*LHF 4.0 – Lighthouse Factory 4.0 * RF – Replication Factory 4.0

Executive Summary

The document is the updated version of D1.4 and D1.5 Risk Management Plan versions 1 and 2. The same qualitative and quantitative methodology established in D1.4 continues being the base of the V3 developed in this document. The V3 focuses on the 34 risks highlighted as the project is marching on and re-assessed the 6 risks identified in the M18 of the project. The following the principals are referenced with the objective to maintain coherence and control new risks:

- Activities related with pilots (WP4-8) re-assessed the risks that threat the scaling up of pilot activities are well captured in your analysis;
- Activities with KPIs (WP9) re-assessed the risks that would ensure KPIs on follow up investment and business impact;
- Activities with platforms (WP2-3) re-assessed the risks to make sure mitigation measures are in place to assure that each pilot implements and aligns with technologies, components and architecture established in WP2 and WP3, which is of paramount importance to the coherency of the whole project; and
- Activities related with management and communication re-assessed risks to make sure all related activities correspond and react agilely with new situations and contingency plans are in place should any major incidents occur.

The quantitative methodology defined in the V1 of the plan still applies here, implying three levels (low, medium and high) of different risks. Having been assessed in terms of probability and impact, they were listed in a prioritised table of threats on basis of their foreseen risk level (risk=probability x impact). Probability and Impact for each threat were defined on a scale between 0 and 1 according to a low medium-high. Moreover, mitigation measures are introduced to reduce original risks, which effect being assessed by the comparison of original risks presented without those measures and the actual risks presented with those measures. In the end, a risk assessment matrix is presented to visualize this assessment.

This deliverable is the third and last release of the Risk Assessment and Management Action Plan at M18. Risks are ephemeral. Capturing their changes simultaneously with the development of the project is key to having them well under control and ensuring a smooth and uninterrupted progress of the project. The updated version of risk management plan serves to guarantee the successful rolling out of the Boost 4.0 Industrial Data Space.

Keywords: Risk management, risks in the project, mitigation measures, risk assessment

Disclaimer

This document does not represent the opinion of the European Community, and the European Community is not responsible for any use that might be made of its content. This document may contain material, which is the copyright of certain Boost 4.0 consortium parties, and may not be reproduced or copied without permission. All Boost 4.0 consortium parties have agreed to full publication of this document. The commercial use of any information contained in this document may require a license from the proprietor of that information.

Neither the Boost 4.0 consortium as a whole, nor a certain party of the Boost 4.0 consortium warrant that the information contained in this document is capable of use, nor that use of the information is free from risk, and does not accept any liability for loss or damage suffered by any person using this information.

Acknowledgement

This document is a deliverable of Boost 4.0 project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 780732.

Table of contents

Executive Summary	5
Table of contents	7
Abbreviations and Acronyms	8
List of Figures.....	9
1 Introduction	10
1.1 Scope and organisation	10
2 Risk analysis background and goals	11
3 Risk management methodology.....	12
3.1 Risk identification and assessment.....	¡Error! Marcador no definido.
3.2 Re-assessment of the initial risks identified	12
3.3 Risk management and mitigation measures	12
3.3.1 Management risks (general).....	14
3.3.2 Technical risks	15
3.3.3 Impact risks	17
3.3.4 Legal risks	17
3.4 Mitigation and risk management effect.....	18
4 Conclusions.....	20
5 References.....	21
APPENDIX E: Title.....	¡Error! Marcador no definido.

Abbreviations and Acronyms

Acronym	Meaning
CA	Consortium Agreement
CPPS	Cyber-Physical Production System
DoA	Description of Action
EC	European Commission
GA	General Assembly
IPR	Intellectual Property Regulations
KPI	Key Performance Indicator
REI	Responsible Exploitation & Innovation Board
RRI	Responsible Research & Innovation
TCC	Technical Coordination Committee
WP	Work Package

List of Figures

Figure 1 - Boost 4.0 Working Packages Flow Chart	10
Figure 2 - Risk assessment procedure	¡Error! Marcador no definido.
Figure 3 - Mitigation measures reducing the original risks.....	13
Figure 4 - Original risks distribution	18
Figure 5 - BOOST 4.0 actual risks chart.....	19

List of Tables

No se encuentran elementos de tabla de ilustraciones.

1 Introduction

This is the third version developed on the basis of the Risk Management Plan V1 and V2, with the shared objectives to track, assess and mitigate potential risks during the project lifetime. This is the last deliverable related with the Risks Management.

As stated in D1.4 and D1.5, the project strategic board continues being responsible to manage risks emerged in the process of the project so as to avert potential risks that would endanger the progress and accomplishment of the project. Based on the initial risks identified in the first period of the project, WP leaders and task leaders have reassessed 34 risks gathered in deliverables D1.4 and D1.5 while checking how the status quo are reacting with the project activities carried out. Moreover, they are used as elements to link the progress to the capacity to impact significantly in the research and industrial domains.

1.1 Scope and organisation

The D1.6 finalises the classification of classes of risks applied in D1.4, D1.5 and Boost4.0 DoA: Management; Technical & Innovation risks due to the ambition of the scientific and pilot work packages. This encompasses achieving a seamless big data interoperability or models transforming current engineering practices or allowing advanced simulation (simulated reality) or forecasting (harmonized production planning) capabilities. Impact risks due to the market acceptance and/or to complexity of the BOOST 4.0 solutions.

The relationship of different working packages has been demonstrated in the flow chart showed below. (Figure 1)

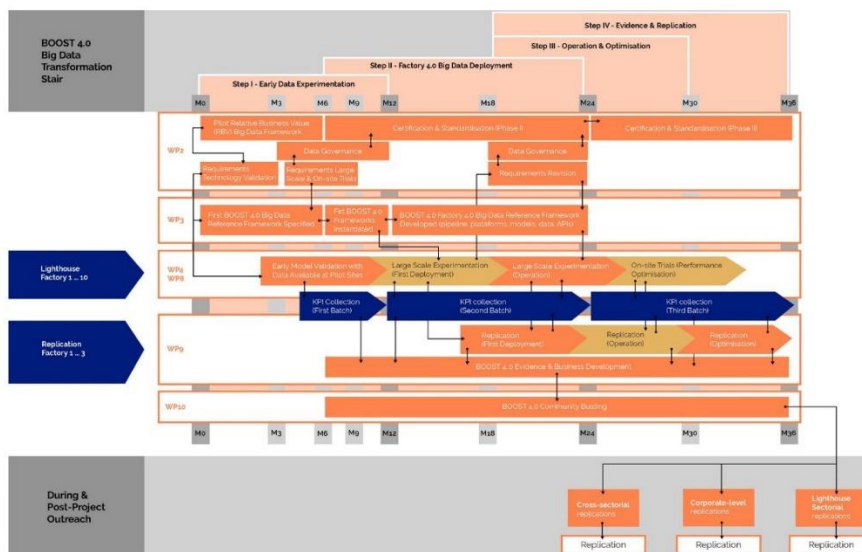


Figure 1 - Boost 4.0 Working Packages Flow Chart

2 Risk analysis background and goals

The accomplishment of the series of risk management plan relies on the project strategic board, an efficient and functioning organisation with the mandate of the project strategic board in terms of:

- Project organisation, responsibilities, authority
- Project planning & control
- Results, documentation & data control

The Risk Plan is a support to the Project Management activities.

3 Risk management methodology

3.1 Re-assessment of the initial risks identified

In the spirit of reassessing the initial risks identified in the Risk Management Plan V1 and V2, the consortium has assigned the WP leaders to consult task leaders that are on hands of the concrete activities to re-assess the initial risks and come up with new risks based of their evolution, the following updates can be concluded.

- Most of the new risks emerged are technical ones occurred in different pilots, as well as the ones related with KPIs;
- Legal risks and management risks maintain stable as the project is marching on as planned during the first eighteen months of the project;
- Impact risks are mitigated thanks to the enlightening performance in communications and dissemination.

More detailed analysis and content can be found in the Chapter 3.3, the BOOST 4.0 related risks tables.

3.2 Risk management and mitigation measures

The following is the list of risks table with colour coded for different level of risks. The comparison between original risk and actual risk vividly demonstrate the effectiveness of mitigation measures, which are testified in the % of risk reduced and later in the risk matrix.

The following figure also illustrated the philosophy of how the mitigation measures are reducing the initial risks level of the risks identified. It's obvious that effect of mitigation measures is shown in the reduction of probability and impacts.

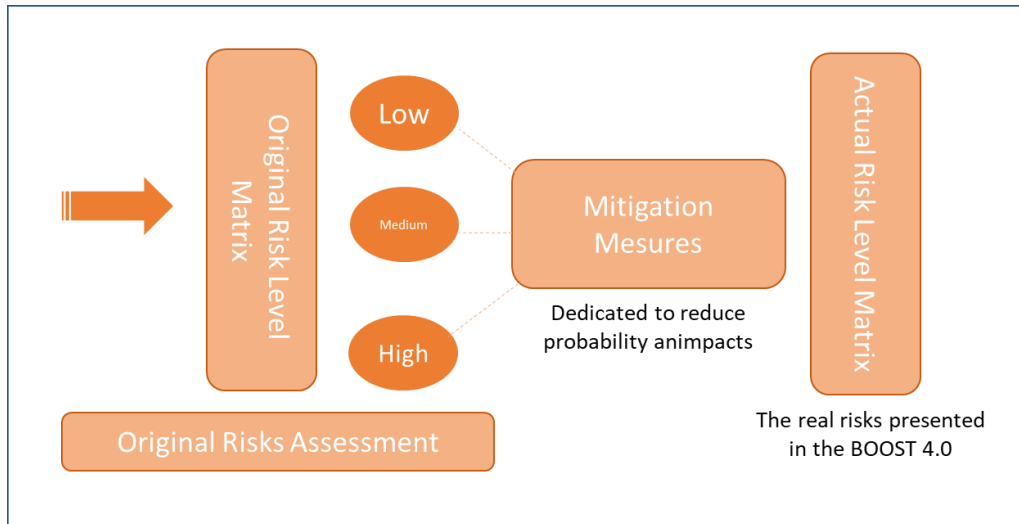


Figure 2 - Mitigation measures reducing the original risks

3.2.1 Management risks (general)

Status	Risk ID	Risk Type	WP	Event/Threat	Cause	Effect	Original Probability	Impact	Original Risk Level	Mitigation Measures	Mitigation Effect	Actual Probability	Annual Impact	Actual Risk Level	% Reduced	Responsible	Date of Review
Active	R8	Management	WP3	Delayed inputs	relevant implementations of IDS components by non-Boost IDS actors are not ready in time/not sufficiently complete	Delayed provision of pilots	0,30	0,70	0,21	continuous contact with respective actors	0,1	0,10	0,63	0,07	0,67	WP3 task leader	1 July 2019
Active	R9	Management	WP3	pilots not conforming to BOOST4.0 Reference Architecture and vocabulary	incomplete information from the pilots regarding the used/required standards and terminologies	Low generalisation and reusability, limited learnings	0,60	0,80	0,48	periodic workshops of pilot developer and technical partners	0,4	0,05	0,48	0,04	0,92	replication management board	1 July 2019
Active	R11	Management	WP3	lack of real-world data	productive data is not available/shared in the consortium	technical implementation delayed, applicability of technologies cannot be evaluated	0,80	0,70	0,56	local deployment/evaluation of components, restricted networks, Data Masking; utilizing open data	0,2	0,50	0,56	0,35	0,38	Project Strategic Board	1 July 2019
Active	R20	Management	WP1	Delayed deliverables	Slower learning curve of collaboration procedures (submission, revision, quality standards) reestablished for large lighthouse partnership	Slower project reporting ramp-up	0,80	0,7	0,56	Weekly/Bi-Weekly WP calls, Process tracking and periodic status check. Individual support from Project management office	0,3	0,45	0,49	0,32	0,3	Project Strategic Board	1 July 2019
Active	R23	Management	WP7	Business objectives achievement for both Business Scenarios	Objetives set not aligned with reality.	Objetives not achieved, expected benefits not drafted correctly.	0,60	0,7	0,42	Objetives establishment based on the pilot plant situation and the business processes solutions and with a close monitoring of selected KPIs.	0,4	0,36	0,42	0,25	0,4	Monitoring & KPI Evaluation manager	1 July 2019
Active	R29	Management	WP1	Delayed deliverables	Slower learning curve of collaboration procedures (submission, revision, quality standards) reestablished for large lighthouse partnership	Slower project reporting ramp-up	0,80	0,7	0,56	Weekly/Bi-Weekly WP calls, Process tracking and periodic status check. Individual support from Project management office	0,3	0,40	0,49	0,28	0,3	Project Strategic Board	1 July 2019
Active	R30	Management	WP9	Original work plan modification	WP9 activities start earlier than planned in the GA to coordinate activities with other WPs	Unforeseen work for partners leading to low involvement and limited results	0,20	0,4	0,08	Increased collaboration between WP leaders through short monthly calls	0,5	0,10	0,20	0,04	0,5	Project Strategic Board	1 July 2019

Table 1 - Management risks

3.2.2 Technical risks

Status	Risk ID	Risk Type	WP	Event/Threat	Cause	Effect	Original Probability	Impact	Original Risk Level	Mitigation Measures	Mitigation Effect	Actual Probability	Actual Impact	Actual Risk Level	% Reduced	Responsible	Date of Review
Passed	R1	Technical	WP2	Delayed user/system requirements	WP2 doesn't get prompt and complete input for its deliverables. Early delays in the project (consortium agreement) affect WP2 deliverables which have early due dates.	Delayed WP2 deliverables. Slower progress in defining the Boost4.0 Reference Architecture.	0,50	0,7	0,35	Bi-weekly WP2 calls to coordinate effort and communicate results. Hybrid approach for the architecture that includes both top down and bottom up.	0,3	0,00	0,49	0	1	INTRASOFT	1 July 2019
Passed	R2	Technical	WP2	User/system requirements are not adequate or complete	End-users don't provide enough details about the platform to be realized in the project.	WP3 implementations are complicated or not feasible.	0,30	0,8	0,24	Technical partners are involved in the elicitation process. Several iterations will help refine and clarify requirements.	0,3	0,00	0,56	0	1	INTRASOFT	1 July 2019
Passed	R3	Technical	WP2	Boost4.0 reference architecture doesn't meet pilot requirements	The Boost4.0 RA disregards or doesn't cover pilot requirements. Also delayed requirements may affect it.	Pilot implementations are complicated or not feasible.	0,50	0,8	0,4	Boost 4.0 RA includes a bottom-up approach that covers pilot requirements. Furthermore the development of the RA is iterative and includes feedback from all WP2 partners. A Task Force has also been introduced in order to support the RA alignment with existing reference models and architectures and the pilots.	0,3	0,00	0,56	0	1	INTRASOFT	1 July 2019
Active	R4	Technical	WP3	Trusted trading of data and services in a common data space is technically compromised	Technical limitations of involved technologies	Limit the potential usage of the BOOST Data space	0,30	0,7	0,21	Close follow up and implementation in phases	0,2	0,15	0,56	0,11	0,5	Technical & Innovation Board	1 July 2019
Active	R5	Technical	WP3	IDS outcomes from WP3 are not used by the pilots	IDS complexity prohibits pilots to integrate the WP3 outcomes in their production line	Pilots prefer their traditional production process rather than the enhanced with smart factory technologies	0,90	0,8	0,72	Adjustment of technologies and solutions existing in the pilots to the IDS specification, in a way that minor changes will be required in their day-to-day activities.	0,6	0,10	0,32	0,08	0,89	Technical and Innovation Board	1 July 2019
Active	R6	Technical	WP3	Lack of IDS applications in the BOOST4.0 marketplace	The implemented IDS connectors are not generic enough to be used by third parties	BOOST4.0 lacks of useful IDS applications	0,50	0,7	0,35	Generalisation of IDS connectors from the first steps of design and implementation, to take into account different application scenarios, data structures, communication protocols. Furthermore, partners which bring in assets into WP3, have to be enabled to implement their technology as an EIDS app in order to have a marketplace, which brings plenty of functionality.	0,8	0,10	0,14	0,07	0,8	Technical and Innovation Board	1 July 2019
Active	R7	Technical	WP3	Inefficient handling of resource scalability for big data processing	Manual handling of resource scalability is difficult	Hindering of data processing	0,30	0,5	0,15	Application of automated resource elasticity handling mechanisms to the big data processing	0,5	0,10	0,25	0,05	0,67	Technical and Innovation Board	1 July 2019
Active	R10	Technical	WP3	state-of-the-art technologies/resources not sufficiently regarded in use cases	provided tools are not user friendly enough to be adapted by use case partner without continuous and intense support	inefficient implementation, no significant results, lack of scientific progress	0,70	0,40	0,28	regular hands-on trainings, one responsible contact for each tool/technology, collection of technology/resource description and documentation in the file share	0,3	0,10	0,28	0,04	0,86	Technical & Innovation Board	1 July 2019
Active	R12	Technical	WP3	data models incapable for pilot needs	vocabularies inadequately capture information required for applications or are too complex (e.g. in terms of lacking descriptions or intransparent requirements)	lacking usage of shared terms, challenging exchange of data/invoication of APIs	0,60	0,40	0,24	widely used standard vocabularies at the center, extended by domain-specific concepts, iterative contact of technology partners and pilots	0,4	0,20	0,24	0,08	0,67	Technical & Innovation Board	1 July 2019

Table 2 - Technical risks (1)

Active	R13	Technical	WP3	security concept not in place	IDS Certification too elaborate, secure exchange protocol unreliable, cumbersome implementation of secure connectors	productive data not exchanged	0,90	0,20	0,18	Data Masking, exchange of dummy data to prove exchange functionality	0,3	0,30	0,14	0,06	0,67	Technical & Innovation Board	1 July 2019
Active	R14	Technical	WP3	component interoperability not achieved	All BOOST 4.0 components come from different sources with different APIs, data formats, and data models;	BOOST4.0 components cannot interact or exchange data	0,40	0,80	0,32	All BOOST 4.0 components need to be adapted to the same communication formats and interfaces. In cases where this is not possible we will contribute with additional modules	0,6	0,10	0,32	0,08	0,75	Technical & Innovation Board	1 July 2019
Active	R15	Technical	WP3	provision of metadata not feasible	Semantic interoperability requires the description of metadata in RDF. Correct RDF annotations are a challenging task for non-experts.	Structured registration of components not possible at the platform, only unstructured/ambiguous descriptions provided	0,90	0,30	0,27	Automatic generation of descriptions (IDS Information Model), demonstrators with respective descriptions, validation engines	0,2	0,20	0,24	0,06	0,78	Technical & Innovation Board	1 July 2019
Active	R16	Technical	WP3	unstable data model	unexpected updates and modifications on the data model hamper its usage	data model not continuously used	0,50	0,30	0,15	transparent release strategy and communication, stable accessibility to previous releases	0,3	0,10	0,21	0,03	0,8	Technical & Innovation Board	1 July 2019
Active	R17	Technical	WP3	specifications of external initiatives not applicable	Guidelines and standards from respective groups do not regard the BOOST4.0 requirements sufficiently	BOOST4.0 implementations and research results are incompatible with major standard proposals	0,20	0,40	0,08	active alerting of the respective initiatives	0,1	0,10	0,36	0,04	0,5	Technical & Innovation Board	1 July 2019
Active	R21	Technical	WP3	BOOST 4.0 algorithms and services do no support/extend AI and they are inefficient to contribute beyond the State-of-the-Art	Data analytics techniques and algorithms are not based on well known techniques and standards and they are not in compliance with the new trends in machine learning etc.	The project will not be able to contribute effectively in the corresponding research fields and it will not offer innovative solution to pilot partners.	0,30	0,7	0,21	Thorough analysis and research in related works, methods and standards. Testing of different and new analytics approaches in pilot cases.	0,5	0,15	0,35	0,11	0,3	Technical & Innovation Board	1 July 2019
Active	R22	Technical	WP7	Business Processes not possible to be implemented according plan and project definitions.	Pilot plant technical requirements and limitations not properly estimated, mismatch between requirements, limitations and business impact.	Large scale pilot experimentation delayed and further cost, quality and efficiency impacts.	0,60	0,8	0,48	Workshop activities with pilot plant teams and Bi-Weekly partners calls to deeply analysis and clear requirements assesment.	0,3	0,42	0,56	0,34	0,3	Project Strategic Board	1 July 2019
Active	R24	Technical	WP7	Business Scenarios not flexible and scalable from pilot plant to rest of manufacturing plants from Gestamp group.	Pilot project outputs not defined on a horizontal deployment basis for current and future projects.	Pilot cannot reach corporative scale.	0,60	0,6	0,36	Horizontal and vertical impact analysis considering both Business Scenarios at an early stage between all parties.	0,5	0,30	0,30	0,18	0,5	Project Strategic Board	1 July 2019
Active	R25	Technical	WP7	Pilot partners are not able to provide technical solutions	Proposed technical solutions do not cover, reach Business requirements.	Functions from Business Scenarios won't be accomplished due to discrepancies between what is required and what is provided.	0,70	0,8	0,56	All technical solutions will be developed, and tested on lab conditions and afterwards on a PoC condition to ensure requirements compliance.	0,6	0,28	0,32	0,22	0,6	Project Strategic Board	1 July 2019
Active	R26	Technical	WP08	Unnecessary maintenance actions	False positives from the fault detection mechanism	Boost 4.0 smart maintenance solution not accepted by the end users (frustration).	0,3	0,5	0,15	Thorough evaluation of the proposed solutions	0,6	0,12	0,20	0,06	0,6	Pilot Management Board	1 July 2019
Active	R27	Technical	WP08	Results of the smart maintenance solution are not reliable	Data from sensors is too noisy and unsynchronised	There is not much trust and acceptance in the proposed solution	0,3	0,5	0,15	Efficient preprocessing of the data and enhancement of the backend data collection system	0,6	0,12	0,20	0,06	0,6	Pilot Management Board	1 July 2019
Active	R31	Technical	WP9	KPIs divergence	KPIs definition/identification made on the theoretical implementation of pilots	KPIs collection might slightly diverge than foreseen during the actual implementation of pilots	0,50	0,6	0,3	Continuous monitoring and revision of KPIs	0,6	0,20	0,24	0,12	0,6	Monitoring & KPI Evaluation Manager. Pilot Management Board.	1 July 2019

Table 3 - Technical risks (2)

3.2.3 Impact risks

Status	Risk Type	WP	Event/Threat	Cause	Effect	Original Probability	Impact	Original Risk Level	Mitigation Measures	Mitigation Effect	Actual Probability	Actual Impact	Actual Risk Level	% Reduced	Responsible	Date of Review
Active	R18	WP3	Unnecessary spending of efforts	Development of vocabularies and technology solutions in WP3 that are not specifically tailored to the needs of the use cases in the other WPs	Unnecessary spending of effort in WP3 and lack of useful vocabularies / ways to use them in the use case WPs	0,60	0,4	0,24	Close communication between WP3 and the other WPs by ensuring that at least one representative of WP3 is present in every regular call of the other WPs	0,4	0,15	0,24	0,06	0,75	Technical & Innovation Board	1 July 2019
Active	R28	WP08	Too much effort is required to setup and adapt the proposed solution at a new installation	Complexity of the proposed solution	End users are not interested in adopting the solution.	0,2	0,4	0,08	Utilisation of self-training and self-adapting methodologies	0,5	0,10	0,20	0,04	0,5	Pilot Management Board	1 July 2019
Active	R35	WP10	The dissemination of the project results is not sufficient to create impact.	Message is not clear and interest from community is low	Boost 4.0 not accepted by community	0,50	0,89	0,45	Revise message, increase communication. Individual level outputs to be communicated (IDS, algorithms, infrastructures, vocabularies, standards...)	0,7	0,10	0,27	0,09	0,8	Public relationships & communications office	1 July 2019

Table 4 - Impact risks

3.2.4 Legal risks

Status	Risk Type	WP	Event/Threat	Cause	Effect	Original Probability	Impact	Original Risk Level	Mitigation Measures	Mitigation Effect	Actual Probability	Actual Impact	Actual Risk Level	% Reduced	Responsible	Date of Review
Active	R32	WP3-8	GDPR compliance issues in carrying out pilots	Pilots identify the need of using personal data for the implementation of pilots	The use of personal data needs to comply with EU directives and CA agreements	0,05	0,8	0,05	CA defines the liabilities of all parties, the extreme low probability of using personal data. Data Governance data will supervise agreed governance procedures are followed	0,9	0,01	0,08	0	0,99	Pilot Management Board	1 July 2019
Active	R33	WP3-8	Business-critical data released consortium-wide or made public by inadvertence	Misuse of confidential data without the suitable written agreements between the parties	Breach of confidentiality	0,10	0,7	0,08	CA defines the liabilities of all parties and the strict procedures to be followed by parties. Increased control procedures to be in place	0,8	0,02	0,14	0,01	1	Pilot Management Board	1 July 2019
Active	R34	WP1, 9, 10	IPR conflicts resulting in stop of partnership or results are not delivered by partners	Joint ownership of results is not clear	Stop exploitation of results	0,80	0,9	0,72	Arbitration mechanisms set in CA and GA are triggered.	0,3	0,40	0,63	0,36	0,3	Project Strategic Board	1 July 2019

Table 5 - Legal risks

3.3 Mitigation and risk management effect

Having designed corresponding mitigation measures, the monitoring procedure and all the tools necessary to the mitigate original risks, it's obvious to see the change of status quo from the two charts for comparison demonstrated below.

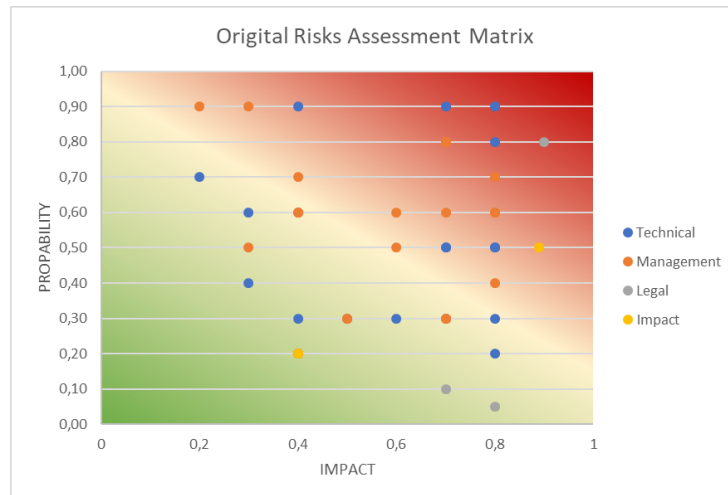


Figure 3 - Original risks distribution

If no mitigation measures are put in place, the project represent relative high risks, with about 30% of risk factors resting in the red zone, most of them management and technical risks. The riskiest ones are related to the huge amount of data to gather from the Pilots Data Systems, scalability problems, which are more concrete technical risks derived from the initial risks concerning scalability problems. Initial legal risks, for example IPR conflicts and GDPR concerns are reassessed and considered less risky than in the first period. IPR present remains high risks mainly because the high negative impacts it will have should such incident happened, which entails scandals and other further legal disputes.

However, like original risks, no new risks are left aside. They are taken good care of by different highly targeted mitigation issues, which have certain effects to bring down the level of probability and impacts, resulting in lower risk levels in actual situation. As a result, the general situation in actual risks chart is that, most of the risks factors now reside in green zone.

What remains to be concerning is risks is about pilot infrastructure facilities being not enough to accomplish the project ambition. As pilots are key players in the project and carry huge weight in the success demonstration of algorithm viability, hence should be carefully handled as the project marches on into further stages.

It can be also observed that, among many risks, technical risks are generally more concerning than management risks, legal risks and impact risks, due to the technology and

innovation ambition of the project. Thanks to the sound and solid management structure and a committed consortium, the management risks are drastically reduced after mitigation measures. On the other hand, the Consortium Agreement that has been negotiated among all the partners to the grain of every single details have ensured that the risks on the legal side are considerably low. For example, R9 and R8 are both on the edge of zero probability.

Overall, the top five risks the project present are:

- IPR conflicts resulting in stop of partnership or results are not delivered by partners
- Considering the huge amount of data to gather from the Pilots Data Systems, scalability problems.
- Delayed Deliverables
- Pilot partners are not able to provide the necessary data sets - quantity, timeliness, QA

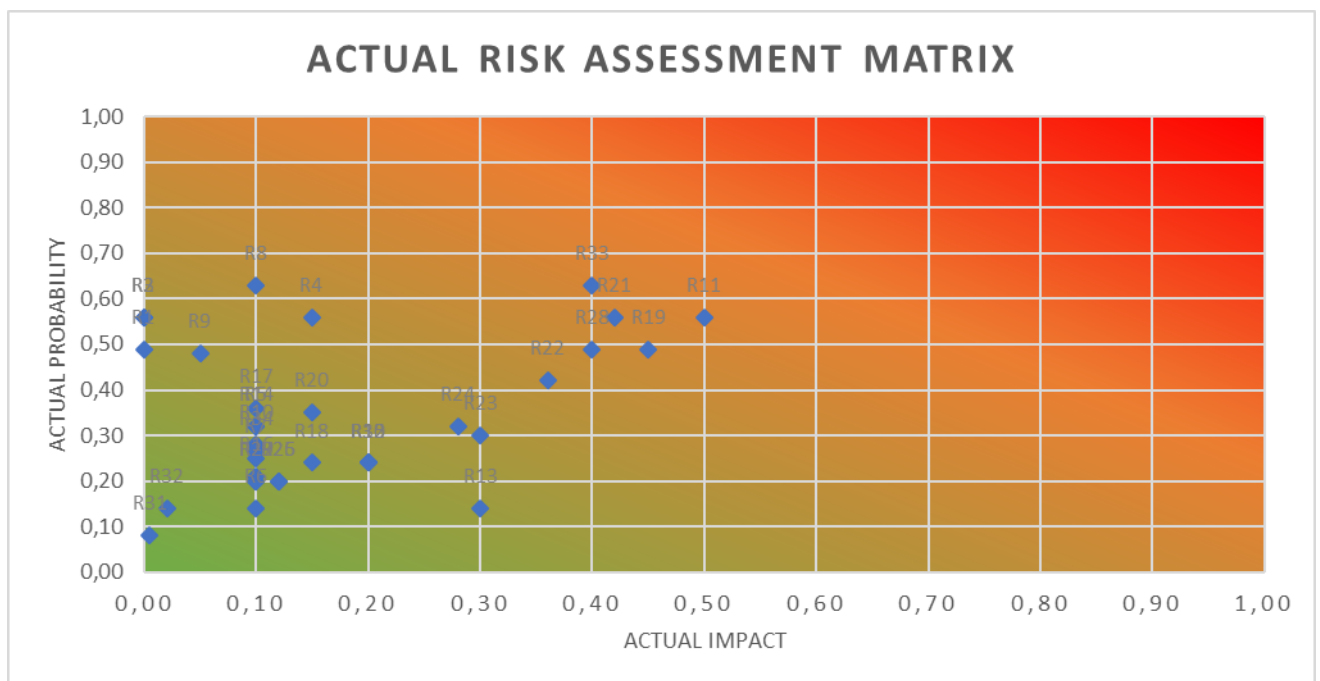


Figure 4 - BOOST 4.0 actual risks chart

4 Conclusions

Deliverable D1.6 Risk Management Action Plan V3 is the third and last issue of the three risk management deliverables planned in the project, which represent the planning and implementation of the BOOST 4.0 risk management strategies and their continuous assessment.

The document has reassessed the various risks identified in the middle of the project (M18). This represents an active process to control and monitor project advancement, in alignment of the whole strategy. It also reassures the effectiveness of FMEA methodology while dealing with an objective assessment of risk severity at all levels of project implementation.

Next activities regarding risk management and control are comprised of continuous monitoring of the new incidents occurred, reassess them with the planned timetable indicated in the table and allow possible deviations when changes in the working environment or any unexpected factor occurred in the whole duration of the project.

5 References

- [1] Z. Duric et al., "Integrating perceptual and cognitive modeling for adaptive and intelligent human-computer interaction," in Proceedings of the IEEE, vol. 90, no. 7, pp. 1272-1289, Jul 2002.
- [2] R. Anderson, John & Matessa, Michael & Lebiere, Christian. (1997). ACT-R: A Theory of Higher Level Cognition and Its Relation to Visual Attention. Human-Computer Interaction. 12. 439-462. 10.1207/s15327051hci1204_5.
- [3] F. Zaeh, M & Beetz, Michael & Shea, K & Reinhart, G & Bender, K & Lau, C & Ostgathe, M & Vogl, W & Wiesbeck, M & Engelhard, M & Ertelt, C & Rühr, Thomas & Friedrich, M & Herle, S. (2009). The Cognitive Factory. Changeable and Reconfigurable Manufacturing Systems. 355-371. 10.1007/978-1-84882-067-8_20.
- [4] Cognitive manufacturing & Industry 4.0. <https://www.ibm.com/blogs/internet-of-things/manufacturing-industry-4-0/>