WORKINGAGE

Smart Working Environments for All Ages

D1.2 Risk Mitigation Plan

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WP1 – Project Management

D1.2 – Risk Mitigation Plan

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1	0	07/06/19	Draft	Julia Czerniak - RWTH Vera Rick - RWTH
2	0	25/06/19	Integration of review comments	Vera Rick – RWTH

Executive Summary

Within this document, the risk mitigation plan is documented.

At first, the identified risks of the proposal are defined with their impact, likelihood to occur and proposed mitigation measures.

Further mitigation actions during the project lifecycle are discussed.

Here, in a first step, we describe the general procedure of risk mitigation in the project, where risks are reconsidered each half year.

Second, the AMICAI methodology is introduced as a measure for risk assessment, which will be conducted in the second year of the project.

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1 Introduction

Several implementation risks in each of the Work Packages were identified and documented in the Description of the Action (DoA) of the project. To guarantee the project's success, risks need to be monitored during the project lifetime and measures optimally have to be taken before risks occur. Therefore, we define the risks in a first step, considering proposed mitigation measures. In a second step, we develop the operational risk mitigation plan, which foresees regular risk monitoring during the project lifetime. Additionally, we introduce the AMICAI methodology (Brandl et al., 2019), which will be applied to mitigate risk from the second year of the project onwards.

2 Risks

Risks can be classified according to their expected value, as follows:

$$Expected\ value\ of\ Risk\ R = I \cdot L \quad (1)$$

Where:
I = Impact
L = Likelihood to occur

Especially high risks with either a high impact, occurrence probability or both, have to be monitored and mitigated carefully. Table 1 in the Annex gives an overview of the identified risks of the project, according to the Grant Agreement of the WorkingAge project.

3 Risk Mitigation

As mentioned above, to guarantee the success of the project, identified risks have to be considered, monitored, and mitigated. Risks management addresses issues that could endanger achievement of critical objectives. Effective risk management has to consider sources for cost, schedule and performance risks, as well as other risks, and specify practices to systematically plan, anticipate and mitigate these risks in order to minimise their impact on the project. This section describe the risk management processes to identify, analyse and mitigate risks efficiently.
For this reason, we develop a risk mitigation plan in this document.

3.1 Continuous Monitoring

The following plan was coordinated between the Scientific Committee Coordinator (SCC) and the Project Coordinator (PC), RWTH and ITCL respectively, regarding risk mitigation during the project lifetime.

- Before each half-year consortium meeting, the SCC will ask the WP leaders to review the status of the risks related to their WP and if there are any newly identified risks.
- By default, WP leaders are owners of the risks corresponding to their WP, and first responsible of monitoring/handling it. However, the PC can assign others as responsible in specific cases.
- Any member of the consortium who identifies a new risk shall inform his/her Task / WP leader about this immediately. The WP leaders inform both the PC and the SCC. The Ethics Committee, Exploitation/Innovation Board and Data Manager can also raise new risks, informing the PC and SCC.
- A document for Risk Mitigation was created (see Annex) that is going to be shared with the WP leaders in advance of the half-year meeting. Focus lies on critical risks and active Work Packages.
- In addition to risks, the scientific quality of the project is going to be controlled by means of the document.

The reviewed list of risks will then be discussed in the consortium meeting. Measures will be implemented, according to the proposed measures described above, if a risk is foreseen to occur. The focus should lie on the most critical risks.

The process of risk mitigation is conducted by the PC, who decides on risk ownership, mitigation actions and their planning.

The proposed timeline for risk mitigation is shown in Figure 1.

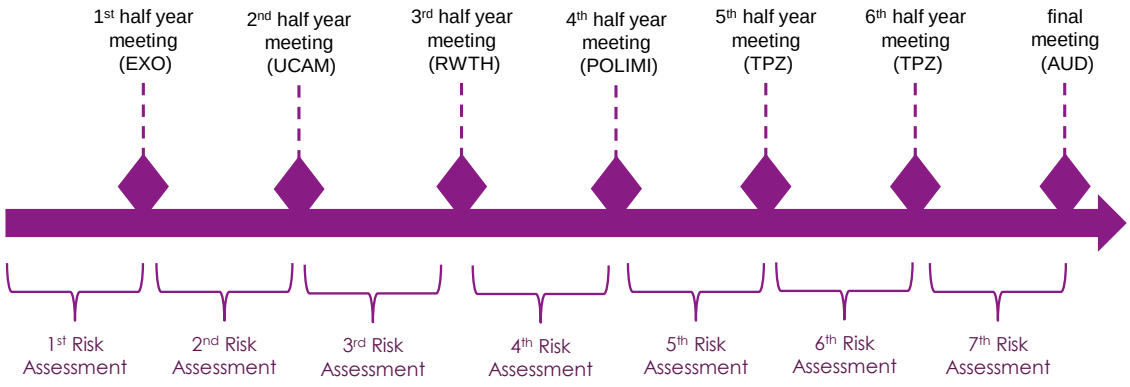

Figure 1: Risk Mitigation Timeline

3.2 AMICAI

For further risk mitigation, the AMICAI methodology (Brandl et al., 2019) will be implemented within the second year of the project, e.g. by means of a workshop with the partners.

The *Aachen method of identification, classification and risk analysis of innovated-based problems* (AMICAI) is an approach from an engineering perspective that enables the integration of ethical, legal and social implications into the day-to-day work of research and innovation. In particular, AMICAI provides a procedural guidance for practitioners in research and

innovation, breaking down the object of consideration into partial aspects and prioritizing the innovation-based problems in dependence of potential risks. This enables the users to apply AMICAI continuously during all stages of the research and development process and to analyse and choose between certain sociotechnical alternatives. In this way, problems that affect ethical, legal and social aspects can be understood, reflected and considered in the mostly technically focused research and development process.

In contrast to previous methods, AMCAI offers the advantage that it is applied in all phases of the process. Previous methods are typically used more or less exclusively in only one phase of the research and development process. Furthermore, in practice there are no methods with the possibility of quantifying the undesired effects of innovations and thus prioritizing them. However, this is necessary in order to continuously take undesired effects into account in everyday work, as they enable the possibility to concentrate on those with the high risk. Because of these advantages, the AMICAI method is preferred to other methods in the WorkingAge project.

4 Summary

This document contains the risk mitigation plan, which will help to timely detect any obstacles in achieving the WorkingAge project's objectives, and work around them. Defined risks will be monitored in a half year cycle. The AMICAI methodology will be used in a workshop to generate an overview of risks detected during the course of the project, not foreseen at the beginning. The Risk Mitigation Document is attached in the Annex of this document.

5 Annex

Risk Mitigation Plan

5.1 Risk Monitoring

The following critical risks were identified in the WorkingAge project proposal. The following table 1 shows the identified risks structured by work packages. We kindly invite you to reconsider them, updating them and adding any new possible risks.

Impact on the project: *how severe you believe that the consequences of the risk are for the outcome of the project*

- *L = low impact: if the risk materialises, the impact on the project is minor;*
- *M = medium impact: if the risk materialises, it cannot be ignored and accurate measures have to be taken to mitigate it;*
- *H = high impact: if the risk materialises, the success of the project might be compromised and consistent attention has to be put to recover it.*

Likelihood to occur: *how likely you believe the risk is to happen*

- *L = low probability: the risk is very unlikely to happen;*
- *M = medium probability: there are some probabilities that the risk might happen;*
- *H = high probability: the risk is very likely to happen; thus, contingency measures have to be planned carefully.*

Table 1: Identified Risks of the WorkingAge project (I = Impact, L = Likelihood to occur; H = High, M = Medium, L = Low; for H-H, for H-M/M-H/M-M, for H-L/L-H/M-L/L-M/L-L)

	#	Description of risk	I	L	R	Proposed risk-mitigation measures
WP1 – Project Management	1	Motivation Overtime	M	L		Approved planning. Work progress monitoring.
	2	Insufficient skill-set for project requirements. Staff turnover	H	L		Knowledge management systems. Global knowledge of the project. Shared standards specifications, and quality assurance methodology. Backup personnel. Tutorial, manuals, guidelines shared/available in repository.
	3	Partner dropping out	H	L		Complementary skills of research partners.
	4	Insufficient quality	H	L		Task/WP leader monitoring. Quality assurance and incremental testing methodologies.
	5	Workload. Issues amount	M	L		Possibility of online upgrading of adaptations.
	6	Unplanned/Unexpected costs	M	L		Implementation of mechanisms to redistribute workload among available resources, e.g. transmission of workload from helpdesk to relatives.
	7	Poor partners cooperation	M	L		Well detailed and fully agreed Coordination Strategy and Communication Plan; plenary meetings and monthly phone/teleconferences foreseen.
	8	Inadequate quality of deliverables	M	M		Agreed action plan for the Production of Deliverables, comprising rules for contents and

						timing schedule for comments, feedbacks and revision.
WP2 – User Centric Design	9	Objectives and requisites Imprecise definition	H	L		Participation of stakeholders in requirements' definition. Iterative user-centric design, development requisite evaluation during research cycles.
	10	Imprecise tests closure	H	L		Closure mechanisms of tests certified by all stakeholders involved.
	11	Unsatisfactory user need and requirements collection	H	L		Strong commitment of partners to implement user acceptance evaluation. Methodology and validation agreement for the User needs analysis and User requirements documentation, based on user centred approach. Use of iterative methodologies, strong tutoring/accompany.
WP3 – Intervention Design	12	Difficulties in the generation of an ontology	M	H		Ontology set up by conducting interviews with occupational safety experts to evaluate the correctness and completeness of the ontology contents.
WP4 – HCI Platform	13	Hardware issues	H	L		Contingency personnel available for equipment maintenance and assessment during tests. Acquisition of replacement parts to be available in each test site.
	14	User interface too complex and not accepted by the users	H	L		User interfaces to be designed keeping in mind functional and non-functional requirements (usability, accessibility,

						preferences, special needs, etc.).
	15	Software issues	M	L		Modular software design allowing intuitive replacement of components.
	16	Lack of SBC processing power for set of inputs	M	L		Pre-selection of SBCs with higher processing capabilities and similar compatibility with sensors.
WP5 - IOT	17	Integration issues with wireless transmission	H	M		Alternatives to mobile network data transmission. Changes in the logging process to accommodate scheduled transfers by wired connection.
	18	Sensor integration issues to SBC	H	M		Evaluation of distinct hardware solutions compatible with SBC interface. Design of hw/sw intermediary layer to provide bridging capabilities.
WP6 – Data Analysis	19	Inconsistent/Inadequate Methods	H	L		Laboratory conditions Tests to ensure suitable modelling in development stage.
	20	No real time data filtering	H	L		Raw-data collection-post-test data filtering. Specifications changes.
	21	Data logging/storage integration issues	H	L		Load-balancing strategies. Changes in base requirements of data collection platform
	22	Inconsistent Metrics	H	M		Alternative strategies for data fusion and metric calculation. Expert analysis for failure points and adjustments in Machine Learning approaches in each cycle.

WP7 – Ethics & Security	23	Personal data leakage. Security Breach into internet-enabled devices.	H	L		Exposed ends follow IEEE approved standards for encryption and Fixed/Removable storage. Anonymization or Pseudo-anonymization of user data.
WP8 – Deployment & Integration	24	Integration issues	H	M		Spec and standards joint development. Prototypes Mock tests in each site.
WP9 - Pilots	25	Participant abandonment before tests conclusion / Insufficient users recruited for pilot tests	M	M		D2.3 details pilot strategy and rules for recruitment, motivation, inclusion and exit plans, statistical estimation of the user sample, to cope with abandon and withdraw. Dissemination activities towards users/volunteers cases will increase their motivation.
	26	Lack of necessary infrastructure for tests.	H	L		Agreements with HW suppliers and connectivity proper identification of pilot sites and requirements. Involve Third Parties to enlarge spectrum of pilot sites.
	27	Damaged test hardware.	M	L		Contingency maintenance plan with availability of components and support personnel.
	28	Low degree of participant interest in the tests.	H	L		Communication and dissemination plans. Test design including participant encouragement as well as rewarding schemes.
	29	Sensors' Data not consistent / relevant in test field conditions.	H	M		Simple pre-experimental tests in different locations to anticipate problems. De-noising, data filtering

						at the cost of increased complexity of the measurement procedure.
WP10 – Dissemination, Exploitation Strategy and Value Chain Modelling	30	Narrow dissemination of project results	M	L		Detailed and exhaustive Dissemination Plan, reviewed. Tailored dissemination channels and targets
	31	End product is not accepted	H	L		Promotion and marketing plan.
	32	Insufficient exploitation	L	L		Dedicated WP with sufficient workers. Early exploitation plan agreements.

5.2 Scientific Quality

Please estimate the scientific quality of your Work Package by using the traffic light colours as follows:

 Scientific quality is not sufficient; measures need to be implemented,

 Scientific quality is in danger, observe and discuss,

 Scientific quality is fulfilled, no measures needed.

Work Package	*Scientific quality*	*Proposed measures*

6 Reference List

Brandl, C., Wille, M., Nelles, J., Rasche, P., Schäfer, K., Flemisch, F., et al. (2019). AMICAI: a Method based on Risk Analysis to Integrate Responsible Research and Innovation into the Work of Research and Innovation Practitioners: Science and Engineering Ethics. *Accepted*.