D1.4 - Risk assessment report

Grant Agreement n°	**957020**
Project Acronym	**BEYOND**
Project Title	**A reference big data platform implementation and AI analytics toolkit toward innovative data sharing-driven energy service ecosystems for the building sector and beyond**
Starting Date	01/12/2020
Duration	36
EU Project Officer	Stavros STAMATOUKOS
Project Coordinator	UBITECH
Consortium Partners	VTT, FVH, CIRCE, Suite5, IGM, KONCAR, ARTELYS, MYTILINEOS, CUERVA, BELIT, URBENER, BEOELEK,
Project Website	beyond-h2020.eu
Cordis	https://cordis.europa.eu/project/id/957020

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement n° 957020.

Deliverable No.	**D1.4**
Deliverable Title	**Risk assessment report**
Work Package	Project Management and Ethics Coordination
WP Leader	UBITECH
Due Date	31/05/2021
Actual Date of submission	29/05/2021
Version	1.0
Status	Submitted
Dissemination Level	Public
Authors	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH
Reviewers	George Bourdalas - IGM Jorge Rueda - CUERVA

Disclaimer: *The present report reflects only the authors' view. The European Commission is not responsible for any use that may be made of the information it contains.*

Version	Modification(s)	Date	Author(s)
0.1	ToC	02/03/2021	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH
0.3	Section 1	16/03/2021	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH
0.5	Section 2	15/04/2021	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH
0.7	Section 3, Introduction	28/04/2021	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH
0.9	Executive Summary	09/05/2021	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH
1.0	Updates on reviewers' comments	27/05/2021	Eleni Tsironi – UBITECH Christina Stratigaki – UBITECH

EXECUTIVE SUMMARY

The Risk Assessment report of the BEYOND project, Deliverable D1.4 provides the definition of a risk management plan, the risk assessment methodology and the procedures to be followed throughout the project, by defining a continuous risk assessment and mitigation approach, as well as identifying an initial set of risks that will be monitored and further populated during the project execution. It will identify the potential risks of the project and evaluate their impact and exposure; while proactively designing risk elimination methods in order to guarantee the seamless and proper execution of the project's tasks.

Abbreviations and Acronyms

Acronym	Description
BIM	Business and Innovation Manager
CA	Consortium Agreement
DoA	Description of Actions
DPO	Data Protection Officer
EAC	Ethical Advisory Committee
EU	Europe/ European
GA	Grant Agreement
LEPI	Legal and Policy Issues
PC	Project Coordinator
PM	Project Manager
PSC	Project Steering Committee
QAP	Quality Assurance Plan
TL	Task Leader
WPL	Work Package Leader

Table of Contents

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The deliverable's objective is to provide the definition of a risk management plan by defining a continuous risk assessment and mitigation approach.

The specific document will closely follow-up the project progress and provide continuous risk assessment and in case of problems, initiate the required corrective actions in co-operation with the concerned partners. To minimize the risks and potential delays or nonfulfillment of the promised goals, a general risk mitigation strategy will be prepared and will be observed during the whole project's lifespan.

The reporting tools of the deliverable is anticipated to be a "live" document, suffering modifications through the lifecycle of BEYOND project, extending the information already described, or providing changes in the project procedures. Each time this document is updated, all project partners will be informed of the publication of the new version and the changes made with respect to the previous version.

Section 1 gives an overview and explains the risk management plan, followed by Section 2 where the methodology is introduced and explained. Finally in Section 3 the management assessment is identified alongside with the initial risks.

1. Risk Management Plan

1.1 Overview

Successful implementation of any kind of project relies, amongst others, on timely identification and control of risks, foreseeing of the consequences and effective management of them via appropriate proactive actions. Project risks describe the impact on the project of circumstances such as diminished quality of the end results, increased costs, delivery delays, loss of community confidence, or even failure. Risks' possibilities as well as risks' impact should neither be neglected nor overrated. Being efficient and effective in identifying and performing all proactive actions regarding possible risks will aid towards achieving the challenging BEYOND objectives on time and according to budget; risk identification, management and mitigation constitutes, therefore, an integral part of the overall project management approach.

1.2 Benefits

When using Risk Management, risks are assessed continuously and used for decision-making in all phases of a project. Risks are carried forward and dealt with until they are resolved or they turn into problems and are handled as such.

Risk Management, when performed successfully, provides the following of benefits:

Prevents problems before they occur: identifies potential problems and deals with them when it is easier and cheaper to do so—before they are problems and a crisis exists

Improves product quality: focuses on the project's objective and consciously looks for things that may affect quality throughout product development

Enables better use of resources: allows the early identification of potential problems (the proactive approach) and provides input into management decisions regarding resource allocation

Promotes teamwork: involves personnel at all levels of the project and focuses their attention on a shared product vision and provides a mechanism for achieving it.

1.3 Classifying Risks

Classifying risks involves grouping risks based on shared characteristics. The groups or classes show relationships among the risks. Classification helps to identify duplicate risks and supports simplifying the list of risks. The objective of classifying risks is to

look at a set of risks and how those risks relate to each other within a given structure. The classes or groups of risks provide a different perspective when planning risks.

We distinguish different types of risks, such as:

General Risk: is this risk associated with the adequacy of the timeplan estimated and allocated for the development, production, and fielding of the system. Also, is associated with the ability of the project to achieve its cost objectives as determined in the DoA, and the key resources availability.

Technical Risk: is the risk associated with the evolution of the research results and the prototypes development of BEYOND affecting the level of performance necessary to meet the requirements of the DoA.

Business Risk: is the risk associated with end-user acceptance, market competition.

2. Risk Management Methodology

The risk management methodology has been produced on the basis of existing risk management practices and more specifically the Continuous Risk Management (CRM) paradigm developed by the Software Engineering Institute (SEI) of Carnegie Mellon University[1]. It aims at reporting risk identification, analysis and mitigation strategies for the BEYOND project.

2.1 Continuous Risk Management Approach

Continuous Risk management incorporates the following activities:

- Assessing continuously what could go wrong (risks);
- Determining which risks are important to deal with; and
- Implementing strategies to deal with those risks.

The Continuous Risk Management (CRM) paradigm developed by the Software Engineering Institute (SEI) as indicated in the following figure:

FIGURE 1 :CONTINUOUS RISK MANAGEMENT (CRM) PARADIGM

This iterative roadmap for risk management contains the following elements:

- **Identify:** makes all known project risks explicit before they become problems.

[1] http://www.sei.cmu.edu

The objective of risk identification is to locate risks before they become problems and to incorporate this information into the project management process.

- **Analyse:** a process of examining the risks in detail to determine the extent of the risks, how they relate to each other, and which ones are the most important. Analyzing risks has three basic activities: a) evaluating attributes of risks b) classifying risks c) prioritizing risks. The objective is to transform risk data into decision-making information.

- **Plan:** translates risk information into decisions and mitigating actions (both present and future) and implements those actions. The objectives are, make sure consequences and sources of the risk are known, develop effective plans, produce, over time, the correct set of actions that minimize risk and impacts while maximizing opportunity and value, plan important risks first.

- **Track:** monitors risk indicators and mitigation actions. The objective is to collect accurate, timely, and relevant risk information and to present it in a clear and easily-understood manner appropriate to the person/group who receives the status report. The status reports generated during tracking are used by project personnel during control to make decisions about managing risks.

- **Control:** corrects deviations from the risk mitigation plans. The objective is to make informed, timely, and effective decisions regarding risks and their mitigation plans.

- **Communicate:** enables the sharing of all information throughout the project and is the cornerstone of effective risk management. The objectives of communication are for project personnel to understand the project's risks and mitigation alternatives, understand the risk data and make informed choices within the constraints of the project, eliminate the barriers to effective communication.

2.2 Risk Exposure

Risk exposure is a measure created by combining the impact and probability of the risk. These terms are identified below at the level of detail compliant to that of the SEI (four levels of impact and three of probability, translating to different levels of risk exposure).

Effect / Impact: the effect of the particular risk on the project, which is determined on the basis of the risk's effect on the project (e.g. performance, cost, schedule). The levels of impact are: (4) Uncontrollable, (3) Critical, (2) Marginal and (1) Negligible.

Probability: the chance that a particular impact will occur. The levels of probability are: (3) High, (2) Medium and (1) Low.

Risk exposure is an attribute of risk that is derived from two of the attributes: impact (effect/loss) and probability (likelihood). You may use the combined attribute of risk exposure in place of the individual values of impact and probability.

Risk exposure (RE) is defined by the following: RE = Prob(UO) * Impact(UO)

TABLE 1 RISK EXPOSURE

Probability / Effect / Impact	High Frequent (3)	Medium Probable (2)	Low Imporbable (1)
Very High Uncontrollable (4)	HIGH	HIGH	MEDIUM
High Critical (3)	HIGH	MEDIUM	MEDIUM
Medium Marginal (2)	MEDIUM	MEDIUM	LOW
Low Negligible (1)	MEDIUM	LOW	LOW

If the impact and probability have been evaluated qualitatively using ordinal numbers, multiplying these ordinal values to obtain risk exposure provides information that if not careful, can be misinterpreted.

For risks where exposure is high, specific mitigation strategies shall be put in place and acted upon.

2.3 Risk Monitoring

The project will continuously monitor and assess identified risks and pay specific attention to risks that have been ranked as with high and medium exposure. Each member of the consortium is responsible for monitoring and reporting the effectiveness of the handling actions for the risks assigned.

- Risks rated as **High** will be reported to the PC, who will handle and track them until the risk is considered Medium or Low.
- Risks rated as **Moderate** will be reported to WLs, who will also track them until the risk is considered Low. However, the risk will be handled within the work package under the responsibility of the work package leader.
- Risks rated as **Low** are tracked within the work package and monitored continuously to ensure they stay low.

2.4 Risk Mitigation and Resolution

Once the risks have been identifying, it is essential that existing and future mitigation resolution actions are considered. These include putting measures in place to eliminate or reduce the risk, and include providing support to the involved partners, increasing resources, responsibility shifts and work plans amendments. In the risk register, resolution actions which can be applied to fix the issue or reduce its severity will be proposed for all identified risks associated with the project.

For each identified risk, one of the following risk mitigation approaches will be selected to address it:

- **Avoid** – Eliminate the threat by eliminating the cause;
- **Mitigate** – Identify ways to reduce or limit the likelihood or the impact of the risk;
- **Accept** – Nothing will be done. This approach is rejected if there are other possibilities;
- **Transfer** – Make another party responsible for the risk (buy insurance, outsourcing, etc.).

Each identified risk has partner responsible for the resolution: The Risk Responsible Partner. This is the BEYOND responsible for making sure that the resolution actions are implemented to mitigate the risk.

The main role of the risk responsible partner will be to monitor the identified risks and to report their status to the project manager in the first instance. The risk responsible partner is not necessarily required to implement resolution actions themselves, but is

in charge to ensure that such actions have been implemented by other/relevant partners.

3. Risk Management Assessment

Risk assessment is an iterative process. Each risk assessment is a combination of risks identified/ analysed in the previous phase and the identification/analysis of risks on current milestones/deliverables according to the DoA.

3.1 Risk Log

The Project Manager will manage and maintain a risk management log in the project repository. The risk information template included in Annex I is to be used for identifying new risks as well as modifying the status of risks, tracking the status and monitoring the mitigation strategy evolution.

All project participants, and in particular the project managers and WP Leaders, will be responsible for raising any material or perceived risk as part of the normal reporting. All risks and issues will be registered in the project's web-based risk log and the status and mitigation of each risk element will be reviewed regularly and reported at each GA meeting.
The Risk log table in the repository will comprise 10 elements:

- ID
- WP - Involved Work Package(s)
- Risk description
- Probability - Likeliness to occur
- Impact
- Risk Exposure
- Remedial actions - mitigation measures
- Who mitigates
- Status (which can be 'Active, 'Mitigated' or 'Avoided)
- Priority
- Check Date - Risk reporting date
- State of the Play – Actions
    - Reference Period
    - Mitigation Measures applied
    - Risk Materialisation
    - Comments, if the risk mitigation measure could not be applied.

3.2 Initial Identified Risks

A preliminary list of identified risks along with their contingency planning is presented in the section below. Classification and importance of each risk if determined by two factors: likelihood and impact.

TABLE 2 RISKS AND CONTINGENCY PLANS

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
1	General - Losing critical staff or partners at crucial point of the project	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Low	Med	Low (2)	The consortium has enough diversity and expertise to replace them by other qualified staff within the same organisation or within the consortium. / The knowledge of the rest of partners can cover defaulting partners or partners that leave during the project execution period.
2	General - Technical/ administrative disagreement among consortium partners	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Low	Med	Low (2)	Continuous communication between all the partners / The PM is the responsible for solving conflicts during the project. If necessary, the GA will decide the right solution according to the CA.
3	General - Unexpected delay delivering deliverables	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Med	Med	Med (4)	Regular monitoring of the project / Related WP leaders and task leaders will be supported by other partners not involved before. In parallel periodic conference calls in the WP will prevent delays and in case that a delay is foreseen, coordinated by the PM, recovery plans will be established. PM will deliver to EU the report describing the cause of

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
						the delay and the contingency plan.
4	General - Communication problems among partners	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Low	Med	Low (2)	The QAP will define the communication procedures and the use of ICT communication tools will be encouraged / The PM is the responsible of solving communication problems, establishing communication flows and calling to bilateral meetings if necessary
5	General - WPs resources not well balanced	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8, WP9	Low	Low	Low (1)	Regular monitoring of the project / Monitoring of the work and reallocation of resources by the SC in other WPs where necessary.
6	Technological - Lack of maturity of key technological components.	WP3, WP4, WP5, WP6	Med	Low	Low (2)	Regular monitoring of the project / Verification of technologies in periodic Living Lab meetings / The technologies used as reference for the BEYOND implementation (technology brought from partners) will require at least TRL6.
7	Technological -Reluctance from pilot partners to provide data due to confidentiality and security issues.	WP3, WP4, WP5, WP6, WP7	High	Med	Med (6)	Consortium agreement with terms regarding access to data and existing knowledge / Additional confidentiality agreements between the demo partners and the supporting technology partners for the knowledge/ data which is characterized as "sensitive" and "confidentiality"

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
8	Technological - Significant deviations from the planned technical expectations.	WP2, WP3, WP4, WP5, WP6	Med	Low	Low (2)	Iterative development periodically verified in all project meetings guarantees an early detection of deviations / The integration of mature technologies minimizes the chance of significant deviations / TM and BIM will monitor the technical development process
9	Technological - Unavailability of data that would lead in inefficient analytics and optimization methods/algorithms	WP3, WP4, WP5, WP6	High	Med	Med (6)	Regular monitoring of the project / BEYOND team includes experts with deep knowledge in their domains to ensure the avoidance of assumptions or simplifications during modelling / Demo partners willing to install additional equipment for data gathering purposes/ TM & BIM will closely follow by means of intermediate validation establishments
10	Technological - Interoperability problems between components that have been built on heterogeneous frameworks	WP2, WP3, WP4, WP5, WP6	Low	Low	Low (1)	Partners will use best practices to prevent interoperability thrust while assessing the design specifications for each component. Compliance with available open standards will ensure standards-based interoperability / Consortium partners are deeply involved in standardization committees and possess deep knowledge of interoperability issues

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
						to be addressed in BEYOND / TM and technical partners will agree any technical decision that may impact interoperability.
11	Technological - Performed requirements analysis is ineffective resulting in project drifting into wrong direction	WP2	High	Low	Med (3)	The TM and respective TL hold significant experience, being TMs in several previous similar projects. / TM and TL will monitor the definition process.
12	Business - Limited acceptance by the end-users	WP2, WP7, WP8	Low	Low	Low (1)	Well defined user requirements and baseline, along with cost-benefit validation of the solution / TM and BIM will follow up and monitor the user requirements activities accomplishment / Specific engagement activities are foreseen to ensure cocreation with the end-users towards enhanced acceptance
13	Business - Out of the radar competition could hinder innovation and commercialization of results	WP8	Low	Low	Low (1)	Market intelligence activities will ensure continuous monitoring and analysis of the market and competition landscape / The BIM will ensure the thoroughness and quality of the resulting reports.
14	Business - Disputes over ownership of IPR amongst consortium partners	WP8	Med	Low	Low (2)	Standard IPR and access rights clauses will be included in the CA which will be signed before the project starts in order to avoid future disputes. The consortium has

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
						already discussed these aspects for the avoidance of such problems/ The PM together with the BIM are responsible for solving such conflicts. If necessary, the PSC will decide according to the CA.
15	Technological - Low progress on community building and engagement of stakeholders	WP3, WP4, WP5, WP6, WP7, WP8	High	Med	Med (6)	Demonstrator partners already possess and are committed to provide the required big data for the project implementation. External data sources are exclusively open and no barriers or severe obstacles are expected for their integration with the BEYOND platform. User engagement is a key aspect of the project and a dedicated task will be coordinating the activities of all partners for this purpose. Constant evaluation of stakeholder engagement will be performed and corrective actions towards improving the efficiency of the living lab will be promptly launched. activities.
16	Technological - Reluctance from stakeholders taking part in demonstrators to provide data due to confidentiality,	WP3, WP4, WP5, WP6, WP7	Med	Med	Med (4)	Integration of new data and knowledge in BEYOND along with data sharing, adhere to the security, privacy and trust policies for personal and business data through (i) the introduction of a secure data playground that will allow data producers and data consumers to collaborate

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
	data privacy and security issues					for significant shared value generation in a secure and trustful manner (complying with relevant requirements of the NIST Big Data Reference Architecture, Y.3600: Big data - Cloud computing-based requirements and capabilities, ISO/IEC DIS 20547-3 Big data reference architecture & the Big Data reference model as promoted by the BDVA TF6-SG6 WG) and (ii) the utilization on blockchain technology that will facilitate knowledge exchange, setting the appropriate security, data privacy, data quality probing and IPR policies to resolve on-the fly how data can be handled by each stakeholder group, based on its content, its value and peer-to- peer agreements between the collaborating entities, allowing the creation of a trustful and rigorous data sharing community, where value is fairly shared and exchanged. Moreover, in nontechnical terms, the CA will include specific terms regarding access to data and existing knowledge. Additional confidentiality agreements between the demonstrator partners, individuals and the

Risk No	Description of Risk	Wp No	Impact	Propability	Exposure Level	Proposed risk-mitigation measures
						supporting technology partners for the knowledge/ data which is characterized as “sensitive” and “confidential” will be drafted and signed, under the coordination of the EAC, the LEPI and the DPO.

3.3 COVID-19 Risk Assessment

In the light of the coronavirus pandemic which began in early 2020, the BEYOND consortium pays special attention to the related developments and intents to monitor potential impacts and risks that may arise.

A COVID19-related risk template Annex II is available to all partners so as to document impact, risks and mitigation actions to foresee and prevent possible delays and enable mitigation list of actions. The monitoring will be continuous so as to minimize potential impact.

Conclusions

The deliverable's objective is to provide the definition of a risk management plan by defining a continuous risk assessment and mitigation approach. It will identify the potential risks of the project and evaluate their impact and exposure; while proactively designing risk elimination methods.

The specific document will closely follow-up the project progress and provide continuous risk assessment and in case of problems and its reporting tool will be a continuous updated document which will be used for identifying new risks as well as modifying the status of risks, tracking the status and monitoring the mitigation strategy evolution.

Annexes

Annex I – Risk Log Template

BEYOND Risk Log

											State of the Play - Actions			
ID	WP	Risk description	Probability	Impact	Risk Exposure	Remedial actions	Who mitigates	Status	Priority	Check Date	Reference Period	Mitigation Measures applied	Risk Materialisation	Comments, if the risk mitigation measure could not be applied, please indicate
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

Annex II - COVID-19 Risk Log Template

A	B	C	D
Project Title	**BEYOND**		
Organization name :	*- please provide your answer here -*		
Organization country:	*- please provide your answer here -*		
Role in the work package:	*- please provide your answer here -*		
Date:	*- please provide your answer here -*	(e.g. partner)	
Current WPx status:			
please refer to the current tasks you are involved in WPx	*- please provide your answer here -*	(e.g. in Task X.X and DX.X, and in the development of component X)	
Current situation in country:			
please refer to current national/gov. policies around the COVID-19 pandemic	*- please provide your answer here -*	(e.g. work from home when possible, curfew)	
Current situation in your organization:			
please refer to the institutional policies around work during the COVID-19 pandemic, i.e do you work from home, availability, etc.	*- please provide your answer here -*	(e.g. obligatory work from home)	
What is the impact on your project work :	**Impact 1.**	**Impact 2.**	**Impact 3.**
Please describe the impact that COVID-19 has on your WPx work, cosider key activities, deliverables, components, sensors, delays, milestones please be very specific.	*- please provide your answer here -*	*- please provide your answer here -*	*- please provide your answer here -*
What is the identified risk:	**Risk 1.**	**Risk 2.**	**Risk 3.**
please refer to the foreseen risks per Task / Deliverable,component, testing, or any other action- please also use the color coding to reflect the risk level (green,	*- please provide your answer here -*	*- please provide your answer here -*	*- please provide your answer here -*
What is your mitigation plan	**Plan 1.**	**Plan 2.**	**Plan 2.**
please suggest mitigation plans for the above mentioned risks.	*- please provide your answer here -*	*- please provide your answer here -*	*- please provide your answer here -*
Other issues			
are there any other issues that have an impact on the execution of the WPx work for your organization?	*No other issues*		