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IECEU

Handbook

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9.2 Project Management Handbook

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LIST OF ACRONYMS

CIVCOM	Committee for Civilian Aspects of Crisis Management
CSA	Coordination and support action
CSDP	Common Security and Defence Policy
EDA	European Defence Academy
EEAS	European External Action Service
ESDC	European Security and Defence College
GA	Grant agreement
H2020	EU Framework Programme for Innovation and Research Horizon 2020
IECEU	Improving the Effectiveness of Capabilities in EU Conflict Prevention
LoI	Letter of intent
MFA	Ministry of Foreign Affairs
MOD	Ministry of Defence
MoI	Ministry of Interior
MOU	Memorandum of understanding
NDA	Non-disclosure agreement
NGO	Non-governmental organisation
PAT	Project admin team
PC	Project coordinator
PM	Project management
PMH	Project Management Handbook
PMIS	Project management information system
PMO	Project management office
POC	Point of contact
PRINCE	Prince (PProjects IN Controlled Environments) – a structured method for effective project management
QA	Quality assurance
QM	Quality manager
SAB	Security Advisory Board
SC	Steering committee
SPO	Security project officer

EXECUTIVE SUMMARY

The main objectives of this Project Management Handbook (PMH) are to raise understanding regarding project management and provide project partners with adaptable guidance for project implementation from different perspectives. This PMH was created as part of the IECEU (Improving the Effectiveness of Capabilities in EU conflict prevention) project, which has received funding from the EU Framework Programme for Research and Innovation HORIZON 2020.

In this document we identify project management topics in order to successfully implement coordination and support projects in the field of EU border and external security for academic researchers, policy-makers, SMEs, governmental public bodies and other project workers. This is done by first setting the context and background theory from previous years, and then defining the current practices of project implementation in the IECEU project. We consider the key aspects, a couple of which are mentioned here: project cycle, knowledge management, legal aspects, administrative and financial matters, and ethics, safety and security.

The project management priorities were identified by analysing the literature and latest workshops related to EU projects. The published papers were analysed to ensure that they meet with EU H2020 guidance according to project implementation. The literature analyses also include articles from other fields, in order to enable learning from cross-sectorial fields. The PMH aims to define clear support for border and external security project implementation.

With regard to the project management background, this PMH resulted in the definition of the project management cycle, knowledge management, risk and conflict management, work breakdown structures (WBS), and project organisation. The four key areas of project implementation are listed as agreements and legal issues, administrative matters, financial matters, and coordination systems. These aspects are highly necessary in order to successfully conduct a project. Moreover, the elaboration of communication protocols, quality assurance, ethics, and safety and security is included as part of this PMH.

Both theoretical and practical analyses supported the achievement of the set objectives and have led to this practical handbook for project management. By setting the practical guidance and clear figures for project management, the PMH can increase the efficiency and quality of project management, not only in this IECEU project, but also in the future.

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

The aim of the Project Management Handbook (PMH) is to provide an overall understanding of successful project management and project implementation. This production gathers the key elements of project management, project implementation, project management information systems, security, safety and ethical issues together. It facilitates project management from a wider perspective and defines a set of approaches and concepts to support future projects and the delivery of day-to-day project management work.

The Project Management Handbook (PMH) is a fundamental working tool that people working on projects can benefit from. Since written text in this deliverable is also designed to reach a wider public audience than only those among the IECEU Consortium, we aim to support and help managers and project teams to the successful completion of their projects. Readers will find the project management concepts, suggested approaches, tools and data needed for project implementation. Moreover, our goal is that people from all levels in different organisations will find this deliverable useful. The handbook is intended to meet the following design principles:

- Appeal – the PMH should provide a generic and useful theoretical background
- Flexibility and practicality – the PMH should provide practical and flexible examples
- Accessibility – the PMH should be easy to use and provide suitable ideas and instruments to be adapted and applied by IECEU partners
- Privacy protection – the PMH should protect personal data and information

Firstly, this deliverable emphasises what project management is and why it exists by defining *project management* and, later, setting out a selection of *project management approaches*. This conceptual framework of project management applies to all organisations in which projects are important for survival. All project management sections include findings from the IECEU project. Secondly, from the perspective of how project management works, the key aspects are included in the chapter '*Project implementation*' as an elaboration of the IECEU project. It includes agreements and legal issues and rules to be agreed in terms of administrative matters and reports, financial matters, and coordination within a consortium. Since technology is developing so rapidly, we have also taken *project management information systems (PMIS)* into account. PMISs play an important role in project management, communication, data exchange and the establishment of web tools and software.

1.2 IECEU PROJECT INTRODUCTION

The objective of the IECEU project is the enhancement of external European Union (EU) activities. The consortium is coordinated by Laurea University of Applied Sciences (Finland) and consists of a diverse group of civilian, research and military organisations reflecting the variety within EU missions. The overall goal of the project is to identify approaches and solutions to respond to future challenges and threats. The IECEU consortium consists of a multinational team of 11 partners from seven different countries (Finland, Denmark, Slovenia, Ireland, Austria, the Netherlands and Belgium). The IECEU is funded by the EU Framework Programme for Research and Innovation HORIZON 2020 and it studies the conflict prevention, crisis management and peacebuilding capabilities of the EU.

The project analyses and evaluates the missions' and operations' effectiveness in three selected case study areas, where Common Security and Defence Policy (CSDP) activities are represented: the Balkans, Africa, and the Middle East/Asia. Such comprehensive analysis of current external actions can provide better answers for creating more effective missions and operations. Through analyses and evaluations, the project will identify the best practices and develop new approaches and solutions. In order to achieve the set goals, the IECEU project aims to strengthen cooperation between different actors in the operational and political context. The project looks to provide recommendations for the EU to guarantee long-term stability. The three main goals of the IECEU project are:

- 1) to analyse and assess the current situation of ongoing and past missions and operations: to identify the effectiveness of EU external actions and their impact;
- 2) to learn from lessons provided by these missions and operations;
- 3) to provide new solutions, approaches and recommendations for the EU to guarantee long-term stability.

Specific objectives for the project include creating recommendations for new types of solutions and mechanisms for conflict-preventive activities as an approach to guaranteeing safe communities, and for the EU to strengthen its capabilities and to focus its strengths more effectively. The IECEU project consists of nine different work packages (WPs), of which WP9 is management, including project administration and financial management, facilitation of project committees, and quality assurance and development.

1.3 RELATION BETWEEN D9.2, D9.3, D9.4

The tasks of IECEU management (WP9) are divided into several tasks and deliverables. D9.2 'Project Management Handbook', D9.3 'Assessment of the Project Development' and D9.4 'Quality Plan' are closely connected. **D9.2 Project Management Handbook** is a general overview of the project management approach and management procedures of the IECEU project, whereas **D9.3 Assessment of Project Development** defines the overall development of the IECEU project, and **D9.4 Project Quality Plan** is a reference to everyday management tasks designed to ensure high quality projects, and is the tool for verifying whether the agreed procedures have been followed and whether adjustments are needed. **D9.4 Quality Plan** serves as a guide for the project coordinator, in order to ensure that quality reviews will occur at appropriate points in the project, and as a reference for all project partners, in order to understand their responsibilities regarding the project deliverables and outcomes. Moreover, the role of the IECEU Steering Committee (D9.1) and Conflict Resolution Procedures (D9.5) are key actions in the overall project management of the IECEU.

1.4 TYPE OF ACTION: COORDINATION AND SUPPORT ACTION (CSA)

The IECEU project is funded by Horizon2020 programme as a **Coordination and support activities (CSA)** type of action. Horizon 2020 is the biggest EU research and innovation programme, with almost €80 billion of funding available over seven years (2014 to 2020). The political backing for H2020 is provided by Europe's leaders and the Members of the European Parliament, who agreed that investment in research and innovation is essential for Europe's future. The goal of H2020 is to ensure Europe produces world class science and technology that leads to economic growth.

The CSA activities in the IECEU project are divided and shared by each partner's organisational strengths. The main support activities are analyses and scientific papers, policy papers, assessments and evaluations, and new concepts and methodologies of effectiveness. A key idea of the project is to bring professional and experts working in different environments (geographical) and in different organisations (EU, UN, OSCE, NGOs, individual experts, etc.) to work together in the same environment. The coordination is based on high-level experts and their strong

commitment to the success of the project. All participating organisations are responsible for coordination activities.

The project partners represent a wide spectrum of knowledge and experience in the area of conflict prevention and, consequently, represent diverse approaches to the project topic based on their own area of expertise, including theoretical, academic and practical perspectives. The consortium members are universities and other academic institutions that have good access to the key knowledge of the project. The project aims to draw on all of these perspectives, attempting to identify common ground where possible, but also taking a comprehensive approach to foster mutual learning and cooperation. The purpose is to build a common understanding and view in the field of conflict prevention. In doing this, the project recognises and tries to reflect the complexity of the reality of conflict prevention rather than losing important insights through reducing its analysis to a single perspective.

When comparing CSA projects to innovation and research action projects, the key difference can be found in the implementation of the activities. Research and innovation actions clearly tackle defined challenges, which can lead to the development of new knowledge or a new technology. Innovation actions should focus more on closer-to-the-market activities (e.g. prototyping, testing, demonstrating, piloting, scaling up), especially if they aim to producing new products and services. CSA projects should aim to implement tasks and activities in collaboration with the consortium, other projects, programmes and policies. This also means that the work package implementation should be shared among partners to ensure cooperation during the project. The CSA funding covers coordination and networking.¹

1.5 FOR WHOM THIS DOCUMENT IS INTENDED

This deliverable has been created specifically for the IECEU project consortium/IECEU partners, describing the project management aspects to be followed throughout the whole duration of the project. Nevertheless, we aim to see this deliverable reaching a wider audience, such as higher education students, project managers, people participating in project implementation, decision-makers and organisational management. The selections of topics has been created in order to support reaching the target groups. The purpose is to describe and analyse project management

¹ European Commission, (2014) '*Horizon2020 in brief – The EU Framework Programme for Research and Innovation*', European Union, 2014. Accessed 20 October 2015.

working and raise the understanding regarding H2020 project implementation. The collection of tables and figures aims to support presenting the key findings from this document.

1.6 DELIVERABLE STRUCTURE

The deliverable is structured in the following manner:

Chapter 2: Project Management – this chapter introduces project management and the selected key elements of project management according to current literature. The key elements are: the project management cycle, knowledge management, risk and conflict management, work breakdown structure (WBS), and project organisation structure. In order to bring a practical perspective to this handbook, the IECEU project is referred to as a case in all selected elements.

Chapter 3: Project Implementation – the third chapter addresses the key aspects of successful project implementation, such as agreement and legal issues, administrative and financial matters, coordination systems and PMISs. This chapter is strongly influenced by the implementation of the IECEU project.

Chapter 4: Quality Assurance in IECEU – this chapter on quality assurance in IECEU concentrates on defining the selected solutions in the IECEU project for quality control and review. It briefly shares the principles of quality indicators, quality review and quality inspections.

Chapter 5: Communication Protocols – this chapter presents the communication protocols within the project consortium and external audiences. Basically, communication actions are divided into internal communication and dissemination. The protocols address the commonly used project communication tools and templates.

Chapter 6: Ethics, Safety and Security – finally, as a separate section, we identify solutions for conducting ethics, safety and security aspects from a project management perspective. This chapter gathers information about data protection and intellectual property rights (IPR), for example. Moreover, this chapter focuses on providing clear safety steps based on the safety issues in project management and security aspects when implementing projects in unsafe areas.

1.7 DISSEMINATION NOTE

The dissemination of productions, such as deliverables, is a key activity of H2020 projects.² Instead of only focusing on tools and how this production will be disseminated, we aim to define the key message of this deliverable, its target audiences, the desired outcomes and the key objectives in first figure below (Figure 1. Dissemination strategic overview). Moreover, this dissemination note includes the dissemination operative plan (Figure 2. Dissemination deliverable operative plan). The end user groups (EUGs) of the IECEU are divided into five different groups in the dissemination draft plan. The expected end users of the IECEU project are:

- (i) project partners;
- (ii) the advisory board (incl. organisations and institutions);
- (iii) EU institutions: CIVCOM, EEAS, ESDC, EDA, etc.;
- (iv) international and national organisations;
- (v) respective countries' Mols, MFAs, MoDs;
- (vi) non-governmental organisations (NGOs);
- (vii) universities, experts and researchers;
- (viii) other projects and partners.

How does the deliverable represent European collaboration? This deliverable addresses the implementation and best practices of the Horizon2020 funded IECEU project, which focuses on EU conflict prevention with various consortia.

How are the outcomes of the deliverable relevant to our everyday lives? In almost every organisation, projects are planned and run on a daily basis. At the same time, we are living in a hectic world with no time for massive reading exercises. This PMH aims to support both perspectives: to run projects smoothly, and to quickly find topics that are relevant to readers.

How will it be ensured that the outcomes of the deliverable are taken up by political decision-makers, the industry or the scientific community? The target groups will be reached with the use of defined IECEU dissemination methods, tools and activities (elaborated in figures 1 and 2).

² European Commission, (2014) *Communicating EU research and innovation guidance for project participants*. Version 1, 25 September 2014. Accessed 7 January 2016.

Project Management Handbook

Key Message

The Project Management Handbook aims to define the overall understanding of the role of project management in the Europe of today and give practical guidance to successful project implementation.

Target Audience

- 1) IECEU and other CSA-type activity project members
- 2) Project participants (especially in Europe)
- 3) Higher education and training-related project managers
- 4) Defined end users of IECEU (e.g. EC, EEAS, Member States, including ministries)

Desired Outcomes and Objectives

- 1) Better understanding of H2020 projects (especially CSA-type activity)
- 2) Better understanding of the purposes of projects at the European level
- 3) More effective project implementation
- 4) Better understanding of the issues to be considered in project execution

Figure 1. Dissemination strategic overview

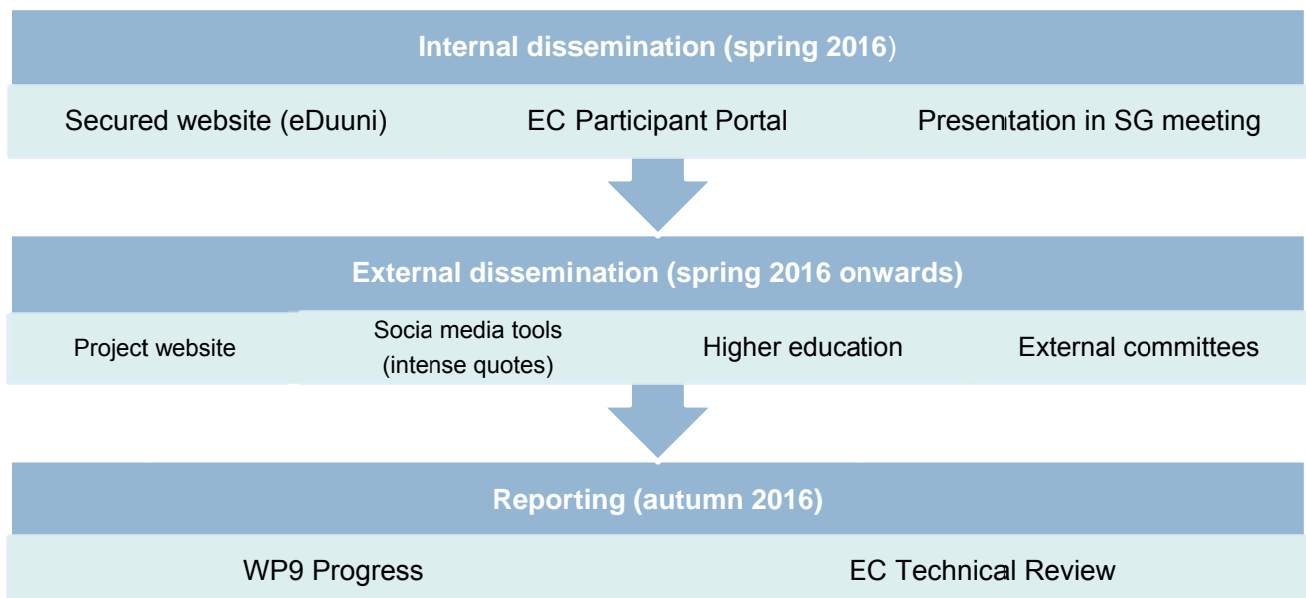


Figure 2. Deliverable Dissemination Operative Plan

2 PROJECT MANAGEMENT

Project Management has become a core competency, and nearly every manager is involved in managing one or more projects. Moreover, the role of projects in organisations is receiving increasing attention.

This chapter introduces the background of the project management theory and literature review and the selected key aspects regarding project management: the project management cycle, knowledge management, risk and conflict management, work breakdown structure, and finally project organisation.

Turner (1998) defined a project as ‘...endeavour in which human (or machine), material and financial resources are organised in a novel way, to undertake a unique scope of work, or given specification, within constraints of cost and time, so as to deliver beneficial change by quantitative and qualitative objectives.’³ According to Turner (1998), project-based management includes five functions: organisation, scope, time, quality and cost. Kerzner⁴ argues that ‘a project is any series of activities and tasks that have a specific objective to be completed within certain specifications; have a defined start and end date; have funding limits; consume money, people and equipment; and are multifunctional.’ Andersen understands projects from an organisational perspective as ‘A project is a temporary organization, established by its base organization to carry out an assignment on its behalf.’⁵

As a term, *project management* first appeared in 1953 in the US defence-aerospace sector.⁶ Today, project management can be seen as a professional discipline with its own body of knowledge and skills. Project management expertise can benefit any kind of organisation. In order to focus on how projects contribute to the strategic goals of an organisation, a holistic, integrative view of project management provides the most value. This view should also include the process of selecting projects that can provide the best support for a particular organisation’s strategy.

³ Turner, (1998) *The Handbook of Project-Based Management: Improving the Process for Achieving Strategic Objectives*.

⁴ Kerzner, H. (2015) *Project management: a systems approach to planning, scheduling, and controlling*, 11th edition. John Wiley & Sons, Hoboken, NJ. Accessed January 2016.

⁵ Andersen, E.S. (2008). *Rethinking Project Management— An Organisational Perspective*. Prentice Hall, Harlow, England.

⁶ Johnson, S.B. (2013) *The Secret of Apollo: Systems Management in American and European Space Programs*. Johns Hopkins University Press, Baltimore.

Moreover, several project management models exist. A simple project management model created by Mike Bell includes five key elements: scope, inputs, project, risks and outputs. The scope sets the boundaries for the project implementation. Inputs should be made based on the needs. The project is broken into five phases: initiation, planning, approval, delivery and closure. The outputs focus on what will be delivered and are split into outputs and outcomes.⁷

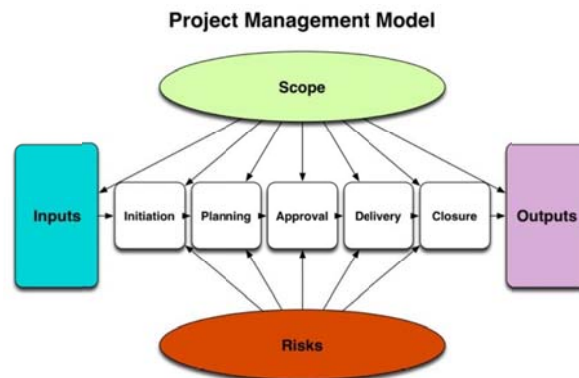


Figure 3. A Simple Project Management Model (Bell)

According to Belout,⁸ a project's results are influenced by managing people. In 2002, Cooke-Davies observed that *'it is people who deliver projects, not processes or systems.'*⁹ Also, in 2005 it was indicated that project success or failure is based on the people involved in the project.¹⁰ The change from project management tools and techniques towards the social and behavioural aspects of the management of projects has been increasing in recent years.¹¹ Also, most projects are research and development-oriented. This means that the projects aim to develop activities, provide recommendations and lead towards change. The willingness of employees and managers to accept the changes and recommendations provided by the projects is as important as other topics related to project management.¹²

The tailoring of project methodology provides an adequate level of control to guarantee the achievement of a successful project. For the project consortium, structured project management following defined steps means managing the project in a logical and organised way. The project

⁷ Bell, M. (2013) *Effective and Efficient Project Management – A simple approach to structuring, running and making projects successful*. Simple Improvement Ltd. (2003). Accessed October 2015:

⁸ Belout, A. (1998). *Effects of human resource management on project effectiveness and success: towards a new conceptual framework*. *Int. J. Proj. Manag.* 16 (1), p. 23.

⁹ Cooke-Davies, T. (2002). *The 'real' success factors on projects*. *Int. J. Proj. Manag.* 20 (3), page. 189.

¹⁰ Henrie, M., Sousa-Poza, A. (2005). *Project management: a cultural literary review*. *Proj. Manag. J.* 36 (2), p. 5.

¹¹ Leybourne, S.A., (2007). *The changing bias of project management research: a consideration of the literatures and an application of extant theory*. *Proj. Manag. J.* 38 (1), p.61.

¹² Jetu, F., Riedl, R. (2012). *Determinants of information systems and information technology project team success: a literature review and a conceptual model*. *Commun. Assoc. Inf. Syst.* 30 (article 27), 455–482.

management approach focuses on developing in-depth feasibility projects and analysis upfront in order to create an appropriate project strategy, governance and delivery structure. Following the project management approach, detailed work breakdown structures, resource plans and delivery timeline schedules will be covered with the proposed methodology. This approach helps to maximise project delivery performance (cost, time, scope and quality), while minimising project risks. The selection of well-proven project management tools supports project success and offers continuous control over the project. This will help project partners to concentrate on their work at the same time. A background theory of project management shares several aspects that lead to successful project management.

Without a project management method, all project actors will have different ideas about how things should be organised and when the different aspects of the project will be completed. According to Prince2 Project Management methodology '*...project failures are all too common. The reasons for failure are wide and varied. Some common causes are: Lack of coordination of resources and activities; lack of communication with interested parties; poor estimation of duration and costs; insufficient measurables; inadequate planning of resources, activities, and scheduling; lack of control over progress; lack of quality control, resulting in the delivery of products that are unacceptable or unusable.*'¹³

According to Svejvig and Andersen's¹⁴ latest literature search, six different project management categories have been defined: '*contextualization (expanding the project concept to encompass elements such as environment and organizational strategy), social and political aspects, rethinking practice (alternative methods), complexity and uncertainty, the actuality of projects (how projects are actually carried out), and broader conceptualization.*' The majority of project management literature has not focused specifically on project managers' perspectives. The latest research conducted by Andersen¹⁵ showed that project managers see their assignments differently. This naturally leads to a situation where better and clearer recommendations on which project management methods are used in project implementation. The overall understanding of a good project management method will support the project to achieve the desired results. The key features defined in this deliverable regarding project management are: the project management cycle, knowledge management, the work breakdown structure (WBS), and project organisation structure.

¹³ JISCinfoNet Service. (2010). *An Introduction to PRINCE. Project Management Methodologies.*

¹⁴ Svejvig, P. & Andersen, P. (2015) *Rethinking project management: a structured literature review with a critical look at the brave new world.* p. 278-290.

¹⁵ Andersen, E.S. (2016) *Do project managers have different perspectives on project management?* p.64.

2.1 PROJECT MANAGEMENT CYCLE

Dividing a project into phases simplifies the process and enables leadership in the best possible direction. The five project process groups (1983 PMI PMBoK¹⁶) are defined as:

1. Initiating
2. Planning
3. Execution
4. Monitoring and Controlling
5. Closing

At the beginning of a project, the basic idea needs to be well explored and elaborated. Moreover, this initial phase includes goals for the project, decisions concerning the partners and parties to carry through the project implementation, and the project leader writing the plan and/or proposal. Especially in the initial phases (initiation and planning), the answers to these specific questions should be analysed: Why does this project exist? Who are the possible partners in this project? What are the key objectives and the results? What is the scope of the project (including the setting of boundaries)?

Even though the project management cycle and other project management methods create a tight framework, the leadership should be visionary and motivating¹⁷. *'Instead of looking at the project as a closed entity, this perspective sees the project as an open organization in tight contact and cooperation with the base organization and its environment.'*¹⁸

¹⁶ Project Management Institute. (2013). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, Fifth Edition.

¹⁷ Bass, B.M. (1985). *Leadership and Performance Beyond Expectations*. Free Press, New York.

¹⁸ Andersen, E.S. (2016) *Do project managers have different perspectives on project management?* p.61.

2.1.1 PROJECT MANAGEMENT CYCLE IN IECEU

In the IECEU project, we have applied the basic understanding of the project management cycle to the context of external EU actions and CSA project implementation and activities. A comprehensive *project management cycle* of the IECEU¹⁹ is strongly connected to both technical cycles: the overall concept of the IECEU project and the work plan (Grant Agreement: Technical Annex). The project management cycle is planned as part of project management (WP9) tasks. The set of critical risks described in the project planning phase has been notified when creating the project management cycle. The project management cycle is implemented in the whole IECEU, but also separately in each work package implementation.

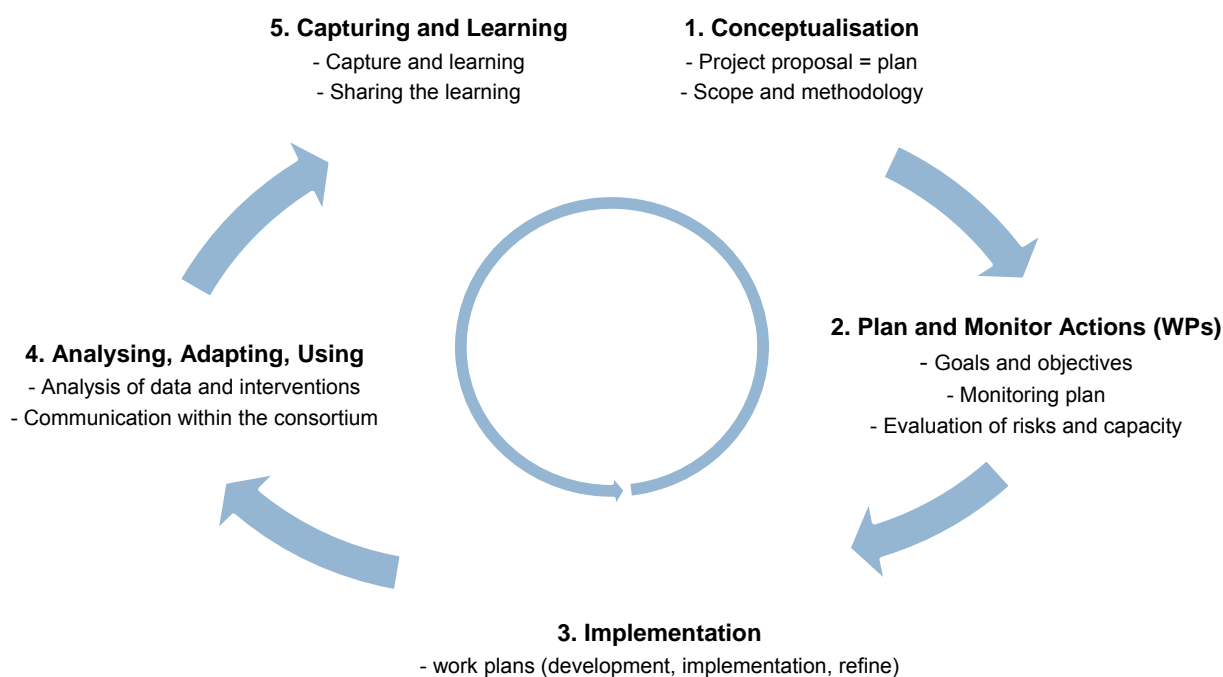


Figure 4. IECEU project management cycle

Conceptualisation: the elaboration of project scope and methodology shall be defined during this first project phase. This phase includes expanding and encompassing the project concept to relevant elements such as current understanding and study fields. As a result, this phase provided a project proposal at the

¹⁹ IECEU project (2015). *D9.5 M1 Conflict Resolution Procedures*.

beginning of the project. Moreover, in WP implementation this process will elaborate the first work plan for execution.

Plan and monitor actions (WPs): in order for the project to meet the end users' needs, this phase shall redefine the goals and objectives for work package execution. The overall project plan is the stable foundation for the detailed plans. The first work plan needs to be monitored. The risks and capacities must be updated and evaluated.

Implementation: if the earlier phases have been effectively conducted, project execution and implementation are fluent processes. Nevertheless, there are always changes, which mean that execution shall be a critical process with an understanding of how the actions are developing. The activities and actions of this phase can be diverse, based on the work package. The activities in a CSA project vary and they can include desk-based studies, field studies, active data collection, organising panel discussions, presentations, end user events, dissemination, gathering and analysing needs and feedback, providing publications, making research studies more available for public audiences, and utilising and exploiting relevant data for political decision-makers and/or other end users.

Analysing, adapting and using: successful execution and implementation of the project or work package provides information and results to be analysed, adapted and used in relevant areas and fields. Depending on the objectives, the relevant bodies for this phase/process can be project consortium organisations, external end users (e.g. political decision-makers, industry, academics, technologies) or the general public. The use of change management processes, dissemination strategy, communications and exploitation is necessary during this phase.

Capturing and learning: at the end of the project or work package, one purpose is to gain more knowledge and skills at all levels: individual, group (consortium), organisational and public. Failures also provide platforms for the learning process. By sharing one's own experiences, the learning can happen in a wider framework (e.g. higher education). This phase aims to integrate the project findings to broader conceptualisation levels.

2.1.2 ANALYSE AND EVALUATE PROJECT MANAGEMENT IN IECEU

To be able to analyse and evaluate project management or project success, it is necessary to define the key measures or indicators. In an innovative project, the project success can be seen as long-term impacts: *'project success in consortia is evidently a secondary and intermediary issue as compared to the expected longer-term impacts in the industry and benefits to member*

organizations. As primary measures of success, consortia typically seek for example industry-level success as compared to another country's industry in terms of market shares or profits.²⁰

In the IECEU project, we aim to collect relevant quantitative and qualitative data regarding project management that will be analysed as part of the quality assurance process. In order **to analyse and evaluate effective project management**, the IECEU project quality plan²¹ has so far defined three data categories in terms of how the data will be collected:



Figure 5. IECEU: evaluate the project management.

The analysed project management data provides information regarding quality, but also a platform for learning. In the IECEU project, we understand the quality assurance process as a backbone to a constructive learning environment. *'The Quality Assurance process is also concerned with discovering and handling errors as early in the project life cycle as possible. As soon as any risk is identified, the WP leader will define a mitigation strategy as outlined in the Project Plan.'*²²

The quality assurance or quality control processes support the overall coherence and conformity of the project. For project management itself, quality assurance as tool ensures that the project productions meet the set requirements in the grant agreement.

²⁰ Artto et al (2008). Project strategy: strategy types and their contents in innovation projects.

²¹ IECEU project (2015). D9.2 M4 Project Quality Plan.

²² IECEU project (2015). D9.2 M4 Project Quality Plan.

2.2 KNOWLEDGE MANAGEMENT

The aim of knowledge management structures is to provide a multi-disciplined approach to achieving objectives.

The use of knowledge management theories in project management should aim to support the development and research activities and the basic nature of the project itself. According to the initial 1983 PMI PMBoK®²³ (Project Management Body of Knowledge) the nine knowledge areas in project management are:

1. Project Integration Management
2. Project Scope Management
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resources Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management

Table 1. PMI PMBoK®: the nine knowledge areas

In 1995 Nonaka & Takeuchi defined **organisational knowledge creation** as ‘the capability of a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services and systems.’²⁴ They built a theory to describe how knowledge creation by individuals becomes organisational knowledge. They defined two types of knowledge – tacit and explicit. **Explicit knowledge** is the knowledge that can be written down and transferred from one person to the next. **Tacit knowledge** is more difficult to articulate because it often arises out of experience. The knowledge ranges from individual to team, group, organisation and beyond. Moreover, they described the models of knowledge: socialisation, externalisation, combination, and

²³ Project Management Institute. *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* — 5th edition

²⁴ Nonaka & Takeuchi. (1995). *The Knowledge-Creating Company*. p.3.

internalisation. 'A spiral emerges when the interaction between tacit and explicit knowledge is elevated dynamically from a lower ontological level to higher levels.'²⁵ The knowledge spiral by Nonaka and Takeuchi is introduced below.

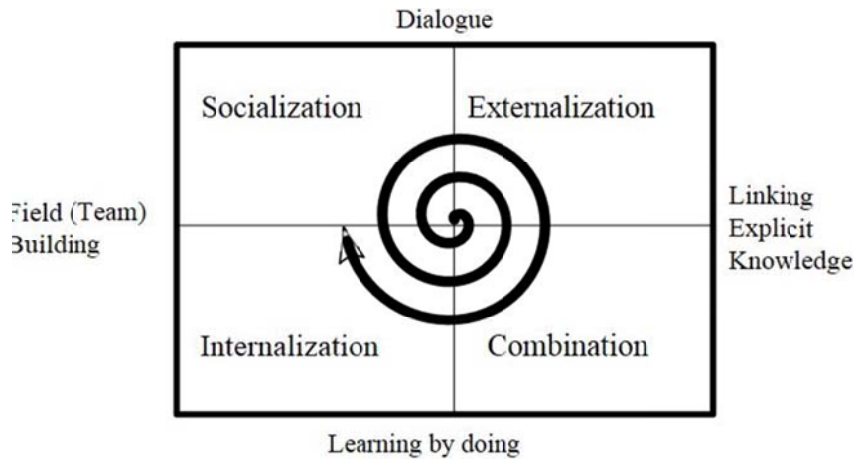


Figure 6. The knowledge spiral by Nonaka and Takeuchi

In practice, the opportunity for knowledge creation and management is as an enabler for new developments. The purpose of the conceptual framework phase is to develop an informed framework that provides an initial understanding and explanation of the issue, problem or phenomenon that is the focus of the theory.²⁶

How can we implement knowledge creation and management theories in practice?

As an answer to this question, the knowledge theory introduced in this chapter is lacking the strong components on how the theory should be transferred into practice. In project management, we understand that the knowledge management operational tools need to be based around a combination of communication and tacit knowledge-sharing as well as transferring it to explicit knowledge rather than relying entirely on the written documents as knowledge products. The management strategy defined within the project should aim to support the view that people need to get together to share experiences, knowledge and build understanding. These processes must be a facilitated part of the project management.

²⁵ Ibid, p.57.

²⁶ Lynham (2002) *The general method of theory-building research in applied disciplines*. *Advances in Developing Human Resources* 4(3), 221-241

2.2.3 KNOWLEDGE MANAGEMENT IN IECEU

In the IECEU project, we aim to test Nonaka & Takeuchi's knowledge spiral in the project environment. Moreover, the IECEU project reflects the work and activity of EU external actions, which represents a combination of diplomatic service, foreign affairs and security policy²⁷. The combination of selected CSA activities will facilitate the natural environments for knowledge creation, such as:

- **Co-creative workshops and policy-level discussions**, which will enable open dialogue for project participants;
- **Literature-based desk studies**, which will transfer tacit knowledge to explicit knowledge;
- **Testing and validation of project results at the political level**, which will support the link between tacit and explicit knowledge;
- **Organising training and seminars**, which will enable the learning.

These knowledge management areas can be implemented at all levels: project management, organisational, team, group and individual. To ensure effective knowledge management, we have tested the application of project management body of knowledge to the IECEU project implementation. In the figure below, the knowledge management areas are represented by a couple of examples at the operationalisation level of project management.

Knowledge management area	Operationalisation in project management
Project Integration Management	1) <u>Project Management Level</u> - Each beneficiary: integration with partner strategies by each beneficiary 2) <u>End User Community Level</u> - integration with relevant training and education - integration with research, academics and at the policy level
Project Scope Management	3) <u>Project Management Level</u> - Each beneficiary: respond to internal objectives and goals - Each beneficiary: updated information and situational awareness picture 4) <u>End User Community</u> - defining the end user needs in collaboration - defining key challenges and threats in collaboration

²⁷ European Union (2016) *European External Action Service*.

Knowledge Management Area	Operationalisation in project management
Project Time Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - PMO: overall situation picture - Each beneficiary: time management (timesheets, work allocation) <p><u>End User Community</u></p> <ul style="list-style-type: none"> - Introduction of the key findings in order to support planning and decision-making
Project Cost Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - PMO: overall situation picture - Each beneficiary: cost management (PMs, travels and other costs)
Project Quality Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - Quality Manager: overall situation and processes - Each beneficiary: implementation of the tasks <p><u>End User Community</u></p> <ul style="list-style-type: none"> - External board and committee validations and assessments
Project Human Resources Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - Each beneficiary: responsibilities by expertise areas - Each beneficiary: continuous learning and development at all levels <p><u>End User Community</u></p> <ul style="list-style-type: none"> - Participation to external boards and committees based on expertise areas and experiences
Project Communications Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - PMO: overall communication management - PMO and responsible WP: establishment and implementation of communication procedures and guidelines for internal and external communications <p><u>End User Community</u></p> <ul style="list-style-type: none"> - information sharing by selected communication means
Project Risk Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - PMO: Overall risk management and update processes - Each beneficiary: defining, updating risks and risk mitigation plans <p><u>End User Community</u></p> <ul style="list-style-type: none"> - External board and committees: support with updates on risks and mitigation plans
Project Procurement Management	<p><u>Project Management Level</u></p> <ul style="list-style-type: none"> - PMO: overall lead of procurement management - Each beneficiary: subcontracting procurement processes <p>5) <u>End User Community</u></p> <ul style="list-style-type: none"> - Subcontracting if needed

Table 2. IECEU knowledge management areas

2.3 RISK AND CONFLICT MANAGEMENT

Risk management aims to reduce the risk areas in the project life cycle. Proper risk management helps to avoid project crises and improve problem solving by managing risks early in the project life cycle.

Plenty of positive reasons for investing in effective risk management practices can be found. Effective risk management provides a better basis for decision-making at strategic, tactical and operational levels when it builds logical, systematic and transparent auditable processes. The use of those processes must end up by providing a clear understanding of potential risk profiles and options for dealing with them.²⁸

In order to prevent possible risks and conflicts, the definition of the possible critical risks in projects is necessary. Risk management starts *with identifying potential problems* and eliminating or reducing the damage the realisation of those risks would cause. Risk assessment and management should be conducted at the start of the project and also throughout the project life cycle, in order to ensure that risks are acknowledged and controlled appropriately. It is usually impossible to eliminate all risks, but they can be recognised and dealt with.²⁹

The risk management process requires that each **risk is assessed** and **measures are formulated** to prevent it (avoidance actions) or minimise its effect (amelioration actions). Both need to be considered because avoidance measures may fail. Failure to adequately manage risks will threaten the success of the project. As the project proceeds the nature of risks changes. Old risks disappear and new ones come up. Consequently, risk management is a continuous process, so risks should be regularly reviewed and reassessed. The first step is to identify and evaluate the potential risks in the planned work.

*According to Binder (2007), the **conflict management process** begins with the situation whereby two or more parties have a different viewpoint on the same topic, hindering or improving the project performance³⁰.*

²⁸ Loosemoore, M., Raftery, C.R., Higgon, D. (2006). *Risk Management in projects* – 2nd Edition. p.5.

²⁹ IECEU- project (2015). *Project Quality Plan*.

³⁰ Binder, Jean. (2007) *Global Project Management – Communication, Collaboration and Management across Borders*. ISBN-13: 9780566087066.

The conflicts may arise among individuals, groups, teams or organisations. They can be based on the differences of expectations, visions, opinions, intentions or interpretations of the project plan.

In practice, a conflict may appear among stakeholders sharing the same country culture (intra-country), or among stakeholders from different countries with different cultural background (inter-country). A conflict may be diverse, regarding issues like gossips or rumours. Normally, a conflict among individuals is a situation where another person considers something to be right when another considers it to be wrong. At some stage, modifications to a project may lead to the contractual conflicts. Conflicts may arise when interpreting the project description of an action or agreements. This can result in misunderstandings among partners. Also 'bad' project management strategy or lack of implementation of project management strategy could lead to conflicts.³¹ In order to have clear procedures for conflict management processes, these topics should be analysed and agreed at the project management level:

- 1) a clear project management/organisation chart;
- 2) a decision about the body in charge of major conflicts must be made in the early stages of the project;
- 3) a way of dealing with day-to-day conflicts (e.g. open discussion);
- 4) a selection of conflict resolution approach and procedures.

According to research, there is a connection between conflict resolution styles and work environment, and levels of stress and impact.³² Nevertheless, conflicts can have a harmful impact on project implementation in terms of efficiency and effectiveness. Also, a conflict may lead to frustration and loss of efficiency. From another point of view, differences in approaches and opinions can lead to improved ways of implementing a project, if the conflict resolution is carried out successfully. Conflict can serve as a constructive mechanism or change. The awareness of project conflict resolution approaches and their consequences can support project managers to create optimal work environments.

³¹ IECEU project (2015) Conflict Resolution Procedures.

³² Friedman, R et al. (2000). *What goes around comes around: the impact of personal conflict style on work*. p. 32-55

2.3.1 RISK MANAGEMENT IN THE IECEU PROJECT

Risk management in the IECEU project³³ takes place on three levels:

1. At the strategic level: it is concentrated on the relation between the project and the consortium with its environment. Risk management at this level is the responsibility of the project consortium.
2. At the tactical level: it is concentrated on the WPs' contribution to the project objective. Risk management at this level is the responsibility of the project consortium and the project board/work package leaders.
3. At the operational level: it is concentrated on activities within the work packages, which are the responsibility of each work package leader.

At the beginning and during each work package (WP), it is the responsibility of the WP leader and the sub-WP leaders to conduct a risk assessment, ensuring that due consideration has been given to all risks associated with the WP that is to be commenced. The following figure explains the process behind risk analysis.



Figure 7. IECEU risk analysis process

To decrease the risks during the project, the critical risks relating to the project implementation should be presented. The possible risks described in the project work plan, for example, are: 1) defaulting partner, 2) schedule slippage, late delivery and slow progress in general, 3) turnover of key personnel, 4) the methodology is not aligned with appropriate needs. The table³⁴ below follows Horizon2020 guidance for defining the risks and risk mitigation measures:

³³ IECEU project (2015). Project Quality Plan.

³⁴ IECEU project (2015). Technical annex: Description of Action.

Description of risk	WP(s) involved	Proposed risk mitigation measures
Defaulting partner	ALL	e.g. <i>'this risk will be handled by the encouragement of the partner by the project coordinator.'</i>
Schedule slippage, late delivery and slow progress in general	ALL	e.g. <i>'this risk will be handled by the periodic progress status assessments performed by the project manager and reported to the project coordinator and the steering committee as part of progress reports.'</i>
Turnover of key personnel	ALL	e.g. <i>'this risk will be managed by standardising the way of working across the various teams so that remaining personnel can temporarily compensate for the absent one, while waiting for a permanent substitution.'</i>

Table 3. IECEU risks and risk mitigation measures

Moreover, the establishment of external end user committees and boards is an important role in terms of the risk mitigation of security concerns, data protection issues and ethics issues. Valuable information provided at a grassroots and practical level is necessary for a complete situation picture of overall project management. Implementation of all risk management levels (e.g. risk analysis) is an active process during the implementation of the IECEU project.

2.3.2 CONFLICT RESOLUTION IN IECEU³⁵

As addressed earlier in this deliverable conflicts may appear and arise in multiple situations among project participants or external members. Multinational projects (i.e. IECEU), with multiple locations, organisations, time zones and cultures, can generate conflicts due to cultural differences, different behaviours, distribution of work/responsibilities/power, different native language, acceptable times for meetings, or working styles according to norms or standards. To prevent such conflicts from arising and ensure clear understanding of the actions in conflict situations, the IECEU project has prepared a set of procedures to be followed if any conflicts between consortia appear. Conflict resolution can be seen as highly sensitive to cultural practices.

³⁵ This chapter is according to IECEU Conflict Resolution Procedures

In IECEU we are seeking to resolve the conflicts through cooperative and collaborative methods and practices. In situations of conflict, the IECEU project management office (PMO) and especially the project coordinator will always foster discussions to identify their potential reasons.

In order to reach the common purpose of the IECEU project, a conflict resolution working process can be used when opposing views or disagreements arise. Conflict resolution procedures are developed to provide a rapid and effective means to resolve/settle conflicts and disagreements. The procedures enable a comprehensive environment in which to interpret situations as well as agreements. An overall goal of conflict resolution in IECEU is to minimise the conflict and resolve it as soon as possible. IECEU conflict resolution procedures and methods to be used can be seen from the picture below:



Figure 8. IECEU conflict resolution procedures

2.4 WORK BREAKDOWN STRUCTURE (WBS)

Consequently, detailed planning has to be conducted at the start of the project.³⁶ To organise the scope of the project use of work breakdown structure (WBS) supports, assigns the responsibility to plan and perform the work.³⁷ WBS is supposed to reflect the total scope of work involved in the project.

*'The project work is organized around a work breakdown structure (WBS) that divides the overall project goals into specific activities or tasks for each project area or component.'*³⁸ At same time WBS should be the source for project cost estimations, risk mitigation and schedule planning. Moreover, WBS should be based on either planned actions or outcomes. If the project is a deliverable-oriented then the WBS should be created based on these outcomes. The WBS normally covers the whole project scope. The schedule of the project maps out the flow of work and creation of project deliverables. Well-prepared WBS provides the information of both: flow of work and deliverable production.

2.4.1 WORK BREAKDOWN STRUCTURE IN IECEU

The IECEU project WBS is created with a comprehensive understanding of project scope, work flow, deliverable production and responsibilities, in order to provide the overall picture for the project coordinator, project managers and consortium members.³⁹ The work breakdown structure (WBS) defines;

- 1) The division of work (**Work Packages and Tasks**)
- 2) The division of work during the project (**Months**)
- 3) The division of type of action/activities (**Status**)

³⁶ Andersen (2016) *Do project managers have different perspectives on project management?* (2016) 58–65

³⁷ Lawrence, P. Leach. (2014) *Critical Chain Project Management*. Third Edition. London. 2014.

³⁸ PM4DEV (2007) *Project Management Organizational Structures – project management for development organizations*. p. 5.

³⁹ IECEU project. (2015). *Annex 1 - Description of Action (DoA)*. Grant Agreement.

4) The division of responsibilities between partner organisations and the project (**Leader**)

5) The division of productions (**List of deliverables**)

				1st year												2nd year												3rd year						List of Deliverables							
Months:		Leader		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30								
WP 1:	Status	Work Package 1	ORG																																						
Task 1.1	Strategic planning	Task 1	ORG																																						
Task 1.2	Mutual Learning	Task 2	ORG																																						
Task 1.3	Coordination btw MSs	Task 3	ORG																																						
Task 1.4	Policy Dialogue	Task 4	ORG																																						
Task 1.5	Communication	Task 4	ORG																																						
WP 2:	Learning Study	Work Package 2	ORG																																						
Task 2.1	Netw orking	Task 2	ORG																																						
Task 2.2	Netw orking	Task 2	ORG																																						
Task 2.3	Study	Task 8	ORG																																						
Task 2.4	Netw orking and coordinatio	Task 9	ORG																																						
Task 2.5	Aw areness-raising	Task 10	ORG																																						
WP 3:	Learning Study	Work Package 3	ORG																																						
Task 3.1	Netw orking	Task 11	ORG																																						
Task 3.2	Netw orking	Task 12	ORG																																						
Task 3.3	Netw orking	Task 13	ORG																																						
Task 3.4	Netw orking	Task 14	ORG																																						
Task 3.5	Study	Task 15	ORG																																						
Task 3.6	Netw orking and coordinatio	Task 16	ORG																																						
Task 3.7	Aw areness-raising	Task 17	ORG																																						
WP4:	Learning Study	Work Package 4	ORG																																						
Task 4.1	Netw orking	Task 18	ORG																																						
Task 4.2	Netw orking	Task 19	ORG																																						
Task 4.3	Study	Task 20	ORG																																						
Task 4.4	Netw orking and coordinatio	Task 21	ORG																																						
Task 4.5	Aw areness-raising	Task 22	ORG																																						
WP 5:	Coordination with pogra	Work Package 5	ORG																																						
Task 5.1	Aw areness-raising	Task 23	ORG																																						
Task 5.2	Design of new infra	Task 24	ORG																																						
Task 5.3	Design of new infra	Task 25	ORG																																						
Task 5.4	Mutual Learning	Task 26	ORG																																						
WP 6:	Policy Dialogue	Work Package 6	ORG																																						
Task 6.1	Coordination: MSs	Task 27	ORG																																						
Task 6.2	Strategic planning	Task 28	ORG																																						
Task 6.3	Strategic planning	Task 29	ORG																																						
Task 6.4	Strategic planning	Task 30	ORG																																						
WP7:	Strategic planning	Work Package 7	ORG																																						
Task 7.1	Strategic planning	Task 31	ORG																																						
Task 7.2	Aw areness-raising	Task 32	ORG																																						
Task 7.3	Aw areness-raising	Task 33	ORG																																						
Task 7.4	Aw areness-raising	Task 34	ORG																																						
WP 8:	Dissemination	Work Package 8	ORG																																						
Task 8.1	Aw areness-raising	Task 35	ORG																																						
Task 8.2	Netw orking, learning, discus	Task 36	ORG																																						
Task 8.3	Dissemination	Task 37	ORG																																						
Task 8.4	Dissemination	Task 38	ORG																																						
Task 8.5	Netw orking	Task 39	ORG																																						
WP 9:	Coordination	Work Package 9	ORG																																						
Task 9.1	Coordination	Task 40	ORG																																						
Task 9.2	Coordination	Task 41	ORG																																						
Task 9.3	Coordination	Task 42	ORG																																						

Figure 9. IECEU Work Breakdown Structure (WBS).

2.5 PROJECT ORGANISATION STRUCTURE

A well-designed project management structure is essential to project success. The top of the organisation pyramid has more authority and responsibility than members/partners located lower down.

The project structure must be created so that it meets with the various project needs during different phases. It has been argued that two factors in particular influence the process of a developing project management structure: the level of specialisation and the need for coordination. For example, for large projects that have several technical and specification areas, there is a need to design a project structure that supports goals, approaches and methodologies. On the other hand, the educational components need a more informal and open structure.⁴⁰

The project management structure should be designed, covering all critical areas, as a comprehensive framework for making coordinating and structural decisions. It will foster cooperation between all partners and the various stakeholders involved in the project. The success of a project relies on the implementation of an efficient management structure and adequate operative procedures capable of addressing the challenges normally encountered in such large cooperation and collaboration initiatives. Depending on the consortium, every project needs its own management structure.

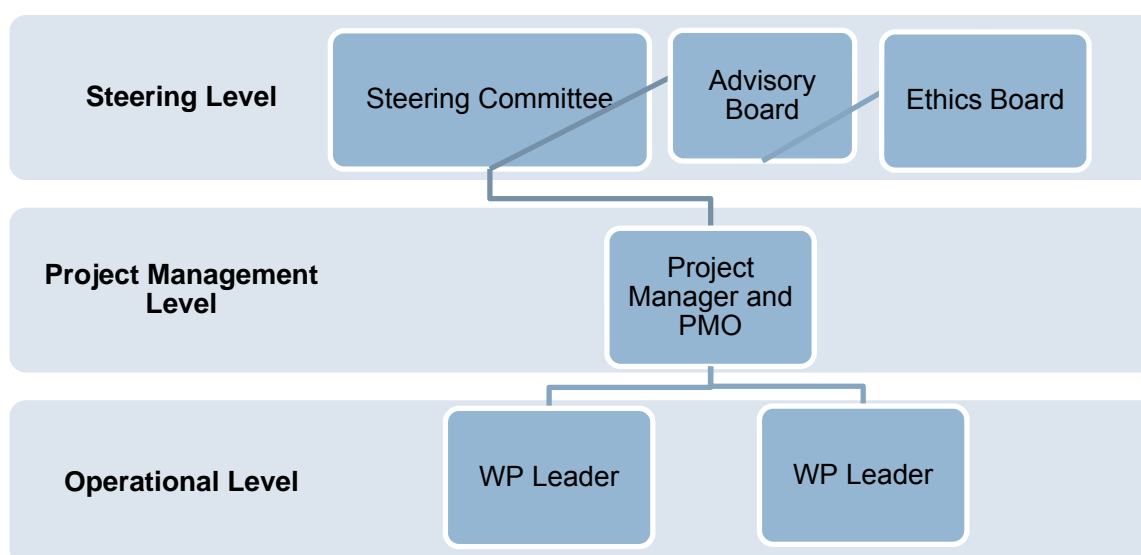


Figure 10. A simple project organisation structure

⁴⁰ PM4DEV (2007) *Project Management Organizational Structures – project management for development organizations*. p. 3-5.

In the coordination and support of projects, cooperation is one of the values and it also guides project structure planning. In the IECEU project (as with the CSA project), it must be ensured that the various components are integrated so that their efforts contribute to the overall project goal.

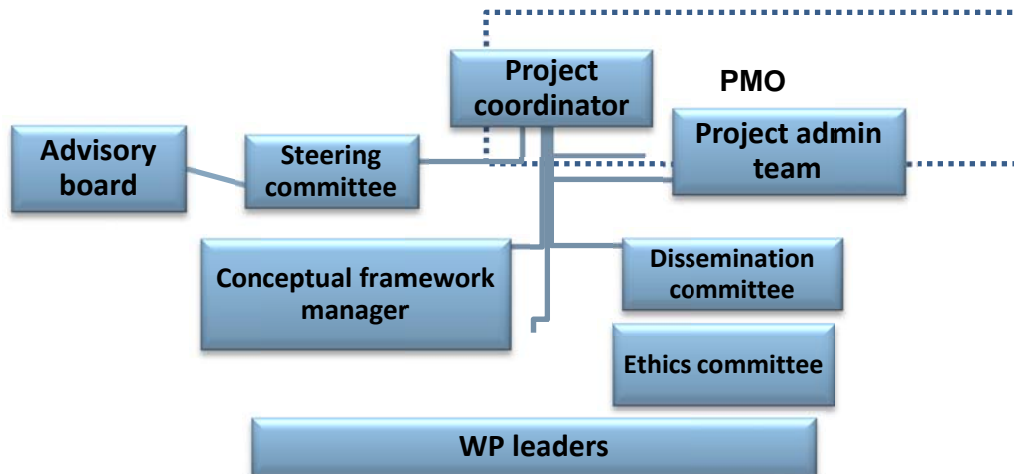


Figure 11. IECEU organisation structure

Effective collaboration requires central coordination, clear rules for communication and unambiguous mechanisms for decision-making.

2.5.1 DESCRIPTION OF THE ROLES AND RESPONSIBILITIES IN IECEU

The IECEU project's organisation structure defines the hierarchy, the level of responsibilities and authority between project members. Moreover, the specific roles and their responsibilities are defined in the proposal phase and are followed during the project implementation.

Steering Committee (SC)

The chairman (CM) will provide strategic management as the highest decision-making and arbitration authority in the project. Each of the partners in the consortium will appoint one representative contact that will act as a focal point within the consortium taking part in the SC (and in other management bodies, depending on the responsibilities entrusted to them). The SC has an

important role, since it contributes to the control and monitoring of impacts achieved by project activities. The main responsibilities of the SC are:

- supervising, approving and amending project and cost reports transmitted to the EC;
- ensuring cooperation and coordination among the consortium members.

Project Coordinator (PC)

The coordinator will be the intermediary between the parties and the funding authority. The PC is a managerial role, with responsibility for the project's overall coordination, acting as a point of contact for all administrative content while ensuring that all guidelines established by the different decision bodies are observed. He/she will act as the official and only channel between the consortium and the European Commission. He/she will:

- be responsible for day-to-day coordination tasks;
- ensure that work package leaders implement the quality control measures;
- address possible conflicts, looking for the widest internal consensus and taking care that project internal rules are respected, including legal and ethical obligations. In the event that consensus is not reached, he/she will apply the rules for problem management and conflict resolution.

Project Management Office [PMO]

In order to successfully run a multi-stakeholder project, the existence of a permanent project management office (PMO) is necessary. The PMO shall comprise the project coordinator (PC) and her/his staff, together with the SC and PAT, addressing issues regarding (1) quality and risk opportunities management and (2) financial and administrative management. The main responsibilities of the PMO are to:

- manage the EC contract and consortium agreement;
- manage the computation of the distribution of funds among the partners;
- coordinate and supervise the tasks;
- organise steering committee (SC) meetings (logistics, agenda, presentations, minutes);
- ensure overall project coordination, with the aim of meeting the project schedule and objectives;
- provide a helpdesk for contractual and financial issues;
- manage day-to-day financial administration.

Quality Manager

The quality manager is responsible for the implementation of quality procedures established in the project quality plan. He/she will:

- continuously guide, track and monitor the quality of the project's activities and products (together with the project coordinator);
- monitor the WP activities with online questionnaires;
- draft quality monitoring reports and submit these to the project coordinator;
- advise the project coordinator on necessary actions to adjust, modify and fasten the activity of a work package, if necessary.

Conceptual Framework Manager (CFM)

The CMF is responsible for ensuring successful conceptual scientific and academic work in the project. The CFM is a managerial role that has the overall conceptual framework responsibility in the project. She/he will provide support to the PC where conceptual framework and/or research themes are concerned.

Project Security Officer (PSO)

The PSO will be appointed in the first SC meeting at the beginning of the project. The role of the PSO is to ensure that security aspects are taken into account during the project (with the SC and the security advisory board) and provide support for security-related issues when the project members face them.

Dissemination Committee (DC)

The DC is responsible for ensuring that the project results and achievements are disseminated and exploited effectively. The DC proposes and takes care of the dissemination activities of the project, led by the main partner in charge of dissemination. The DC sends the reports about the impact of the project to the PMO. The dissemination committee is also responsible for the integration of the project results with the relevant training and education programmes. In a nutshell, the responsibilities of the DC are:

- ensuring effective dissemination;
- finding new solutions to disseminate information more effectively;
- integrating the project results with relevant training programmes;
- ensuring dissemination goals are achieved.

Ethics Committee

The EC ensures that all the ethical requirements are taken into account throughout the whole project. It also ensures that the IECEU ethics guidelines are established. The EC will directly report to the PMO if any ethical concerns need to be raised. The responsibilities of the EC are:

- ensuring the establishment of ethical requirements;
- providing feedback regarding ethical issues;
- building the ethical guidelines in cooperation with methodology and framework building.

Advisory Board (AB)

The advisory board shall consist of potential recipients and end users of the information, relevant EU agencies and institutions, and independent experts in the relevant fields. AB members shall be invited to sign a letter of interest (LoI) to formalise their collaboration in the project. The responsibilities of the AB are to:

- provide feedback and expert advice to the SC and conceptual framework manager;
- align the final project outcome to the needs and standards.

Security Advisory Board (SAB)

The security advisory board will be established in the first SC meeting at the beginning of the project and it will include three members. The role of security advisory board is to take into account the up-to-date security concerns and raise awareness within the consortium.

Work Package Leaders (WPL)

The coordinator shall be assisted by the work package leaders, who will be responsible for the day-to-day technical management of the work undertaken within their work package, coordinating the contributions from all subordinate work packages or tasks, and ensuring that they comply with the work package description. They will periodically report to the coordinator. The responsibilities of WPLs are:

- planning the execution of their work packages;
- arranging meetings between work package participants;
- monitoring the progress of each work package under their control;
- identifying any current or potential future divergence from the plan;
- identifying and maintaining a register of all significant risks;
- ensuring that all project deliverables are produced on time;
- providing progress reports.

3 PROJECT IMPLEMENTATION

In terms of successful project management, the project implementation is elaborated in this chapter from the IECEU project implementation perspective. This chapter aims to answer the following question: How does project management work in practice? It includes relevant grassroots-level activities that are relevant to multinational and inter-organisational project implementation.

The key elements of project implementation presented in this chapter are: agreements and legal issues, administrative and financial matters, coordination systems, rules to be agreed in terms of intellectual property rights (IPR), quality assurance of the project deliverables, and communication procedures within the project consortium. In the IECEU project, these aspects are mainly managed as part of project management tasks. Nevertheless, the conduct of the work and tasks is the responsibility of every beneficiary/partner. Moreover, safety, security and ethical issues must be addressed and considered in project implementation. In this PHM, these topics are the subject of their own chapters (chapters 5 and 6).

3.1 AGREEMENTS AND LEGAL ISSUES

The implementation of the project usually starts with finalising the specific agreements among funders and partners. A project usually has to negotiate a funding agreement with the funder and a collaboration agreement with the partners.

Depending on the project, it may also be necessary to draft agreements on confidentiality, right of use of the material, ownership, and right of use of the results as well as on the future utilisation and commercialisation of the results. Key agreements must be to be agreed and signed by a funding body, project consortium and possibly other relevant actors/stakeholders (e.g. advisory board). Multiple sets of legal issues and rules need to be agreed in multi-stakeholder projects. In the case of research, innovation and development activities during the project implementation must be planned, decided and agreed on with ethical principles (e.g. European Code of Conduct for Research Integrity) and applicable law (e.g. international, EU and national).

The funding agreement/contract is signed with the funder when necessary. Usually a funding application and the funders' funding decision are sufficient. If the funder wants an agreement, it takes the initiative and provides the contract model. In international projects, the agreement is usually made between the principal funder and the applicant organisation, not between all implementers involved in the project. The agreement with the funding body should include the relevant parts like terms and conditions, description of work/action, estimated budget, accession forms and financial statements. The Horizon 2020 Grant Agreement is signed by all partners. **As an example:**

In the Horizon 2020 Programme, the **grant agreement** is signed by Research Executive Agency (REA) ('the agency'), under the power delegated by the European Commission ('the Commission'), coordinator and all beneficiaries. The agreement is composed of:

- Terms and conditions
- Annex 1 Description of the Action (DoA)
- Annex 2 Estimated budget for the action
- Annex 3 Accession forms
- Annex 4 Model for the financial statements
- Annex 5 Model for the certificate of the financial statements
- Annex 6 Model for the certificate of the methodology

By signing the agreement or the accession form, the beneficiaries accept the grant and agree to implement it under their own responsibility and in accordance with the agreement, with all the obligations and conditions it sets out. The grant agreement builds a clear set of procedures for project implementation and is the main guidance document.

Table 4. EC Horizon2020 grant agreement

The **consortium agreement** needs to be agreed and signed by the project consortium partners. The consortium agreement is also signed by all the partners/beneficiaries. Collaboration and partnership agreements on various levels are signed in a project, depending on the partners' responsibilities and obligations and whether any financial obligations are involved, or on the funder's instructions and requirements. Parties that commit to the project by offering work or other contributions where no money is involved may also participate in the project. The cooperation may, however, involve an obligation to report costs if the funder has approved it as part of self-financing (calculated contribution, voluntary work).

‘Consortium agreements are mandatory for all collaborative projects unless otherwise specified in the applicable work programme or call for proposals. They cover issues that will or may arise during the project (e.g. how to make decisions, resolve conflicts or safeguard intellectual property rights). The consortium agreement should be signed before the grant agreement.’⁴¹ **A partnership agreement** may also be formed very lightly, for example when a company states in an email that they will participate in the project. It is usually advisable to negotiate a written contract before work commences. It is easier to negotiate the contract terms with the other partners before starting work on the project. The funder’s conditions for funding usually take priority over all other agreements. Therefore, the collaboration agreements must not include any conditions that are not in accordance with the funding conditions. In EU projects, universities and higher education institutions favour the DESCA model consortium agreement. More information on this model can be found at <http://www.desca-2020.eu/>. The content of the agreement may be as set out below, for example.

Consortium/ Partnership Agreement

- Parties to the agreement
- Purpose and goals of the agreement
- Validity period
- Responsibilities of the parties in the project
- Finances and financial reports as well as monetary transactions
- Other reporting in the project
- Project management
- Confidentiality
- Rights of use for the results and material
- Publishing
- Responsibilities
- Termination/cancellation of the agreement during the agreement period
- Applicable law and settling disputes
- Appendices of the contract
- Signatures

Table 5. Consortium/partnership agreement

⁴¹ European Commission (2014) Horizon2020 – Guide for Grant Agreement Preparation.

A **letter of intent (LoI)**, a **memorandum of understanding (MOU)** or a **letter of interest** is a binding force. Sometimes a contract is intended to obligate the signatories to participate in a project, even if the details of the project will only be agreed on later. On the other hand, sometimes the agreement only expresses the signatories' interest in the project, and does not yet obligate the parties to participate in the project. It is important to read through the contract carefully in order to identify whether the contract is binding or not.

A **mandate letter** is used in cases where one organisation authorises another to apply for funding on its behalf. A **non-disclosure agreement (NDA)** is especially designed in the interests of companies to agree on confidentiality. There is often a desire to agree on confidentiality when preparing the project, in which case a separate non-disclosure agreement is signed because a collaboration agreement has not been negotiated yet. The actual collaboration agreement also usually contains a confidentiality clause.

All persons participating in the project on behalf of partner organisation (beneficiary) must sign a **transfer of rights agreement** on transferring the right arising from the project to the participating organisation, i.e. a transfer of rights agreement. **Procurement** legislation, the funder's regulations on tendering, and organisational procurement instructions must be complied with in all procurements. For subcontracting, a **subcontract agreement** has to be negotiated which, in addition to the other conditions, e.g. payment, also takes into account the rights to ownership of the results. The funder may limit subcontracting (buying external services) within projects. The funder may require that a supply contract also be made for all other procurements.

The condition for granting a research permit and releasing information or material is that the person conducting the research or writing the report commits to handling the data in line with the legislation concerning the **handling of personal data and privacy protection**. The person conducting the research/writing the report is obliged to use the information or material in confidence and solely for conducting the research/writing the material in question, and to ensure the privacy and anonymity of the persons studied. After carrying out the research/report, the material must be disposed of in an appropriate way. In this context, the receiver of the research permission also agrees on the practicalities of sending a questionnaire, for example.

If a **person register** such as that described in the **Personal Data Act** is formed during the research, a description of the file for scientific research or a description of the file must be attached to it. When necessary, a preliminary assessment of research ethics must be attached to the application. The researcher must commit to complying with the regulations in the Personal Data Act in handling and securing information, and any possible research registries containing personal

data on individual persons formed during the research must be disposed of or stored in the way required in the Personal Data Act. The legislation related to the EU Framework Programme for Research and Innovation Horizon2020 is listed below⁴²:

H2020 Framework Programme — Regulation (EU) No [1291/2013](#) of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020) (OJ 347, 20.12.2013, p. 104).

Euratom Research and Training Programme (2014-2018) — Council Regulation (Euratom) No [1314/2013](#) of 16 December 2013 on the Research and Training Programme of the European Atomic Energy Community (2014-2018) complementing the Horizon 2020 – The Framework Programme for Research and Innovation (OJ L 347, 20.12.2013, p. 948).

H2020 Specific Programme — Council Decision [2013/743/EU](#) of 3 December 2013 establishing the Specific Programme Implementing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020) (OJ L 347, 20.12.2013, p. 965).

Rules for Participation (RfP) — Regulation (EU) No [1290/2013](#) of the European Parliament and of the Council of 11 of December 2013 laying down the rules for the participation and dissemination in Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) (OJ L 347, 20.12.2013, p.81).

Financial Regulation (FR) — Regulation (EC, Euratom) No [966/2012](#) of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the European Union (OJ L 298, 26.10.2012, p.1).

Rules of Application (RAP) — Commission Regulation (EC, Euratom) No [1268/2012](#) of 29 October 2012 on the rules of application of I Regulation (EC, Euratom) No 966/2012 of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union (OJ L 298, 26.10.2012, p.1).

The term intellectual property rights (IPR(s)) refers to patents, patent applications and other statutory rights in inventions; copyrights (including without limitation software copyrights); registered design rights, applications for registered design rights, unregistered design rights and other statutory rights in designs; and other similar or equivalent forms of statutory protection, wherever in the world they arise or are available, but excluding rights to confidential information and/or trade secrets. The IECEU project adheres to the consortium agreement according to IPRs. For example, the results are owned by the party that generates them. Moreover, the rights of authors of literature are protected by copyright.

⁴² European Commission, (2015) The EU Framework Programme for Research and Innovation Horizon 2020. AGA – Annotated Model Grant Agreement, version 2.1, 30 October 2015. p. 5.

3.2 ADMINISTRATIVE MATTERS

Time and costs should be seen as delimitations or framework conditions for the project. Administrative matters are devoted to the management activities for the day-to-day life of the consortium, including administrative issues and tasks.

The arrangements must be planned and implemented as part of administrative matters. Project events require administrative support with *logistics* (e.g. travel reservations and accommodation). Moreover, the administrative tasks vary from *drafting agendas* and minutes of the meetings, preparing *project presentations* (e.g. master PowerPoint presentations), maintaining *CRM* (custom relationship management) systems, preparing and updating *project descriptions*, and finally supporting communications and internal dissemination.

Minutes (or memorandums) of the meetings are written and collected parts of administrative matters. The minutes must be signed by the chairperson and the secretary as well as the examiners of the minutes, or the minutes will be examined and approved in the following meeting. Memorandums can be signed by the chairperson or the secretary of the meeting. The minutes or memorandums must list those present. The funder may also require lists of those present to be signed personally. The minutes or memorandums must also state the location of the meeting and the time (start and finish) as well as the matters discussed and decided.

The **IECEU project management office (PMO)** acts as a responsible player in terms of project administrative matters. The PMO coordinates and supervises the project tasks. The contracts and agreements are conducted, developed and managed by PMO administrative activities. The PMO is responsible for keeping the contracts in the project up to date and preparing contracts with new organisations and persons joining the project. In multi-stakeholder projects, the funds need to be distributed among project partners. The funds are distributed by the project management administrative office. Together with the SC and the PC, the PMO also ensures the overall project coordination with the aim of meeting the project schedule and objectives. Ideally, the PMO includes experts from each responsibility area.

The project admin team (PAT) is a separate team in the PMO that is responsible for **the arrangements** (logistics, agenda, presentations and minutes). The administrative support and

helpdesk should be available for partners for the entire duration of the project. The team consists of experts that have wide experience of the responsibilities.

Project staff monitor their working hours daily in a relevant project information management system. A person must send a monthly working hours report every month in order to have updated data. Normally, the internal/ and/or organisational project manager approves the working time monitoring regarding his/her project as soon as possible in order to enable the timely circulation of approvals. The overall working time monitoring of a person should be approved by his/her superior. In order to monitor working hours, the beneficiaries might use a reporting system online or basic Excel sheets.

The selected monitoring system and/or Excel sheet should include the basic data related the hours completed for the action/work:

- 1) Date of the action/work
- 2) Project with project number
- 3) Working hours per date
- 4) The type of cost (e.g. personnel cost, other cost, travel cost)
- 5) Selection of work package
- 6) Selection of task
- 7) Selection of unit where the task is completed
- 8) Description of the work

Administrative guidance for IECEU project partners:

Administrative task	Task completion
Logistics: booking travels and accommodation	Immediately when the date of the task is decided (but no later than <u>one month earlier</u>)
Preparation of an agenda	No later than <u>two weeks before</u> the meeting
Preparation of a presentation	No later than <u>one week before</u> the presentation
Drafting minutes	First draft immediately after the meeting (drafted by secretariat) Second draft with additions and revisions (no more than two weeks later), Final version (no more than <u>three weeks after the meeting</u>)
Internal reports	Consortium financial reports <u>every six months</u> (each partner) WP progress reports <u>every three months</u> (WP leader)
Monitor of working hours	Monitoring on a daily basis Acceptance by hierarchy <u>every month</u>

Table 6. Guidance of administrative tasks

3.3 FINANCIAL MATTERS

In multi-stakeholder projects, all beneficiaries have an independent role in financial matters and reporting. The agreement/contract defines the general conditions for costs to be eligible. The main categories in H2020 eligible costs are **actual costs**, **unit costs**, **flat-rate costs**, **direct personnel costs**, **direct costs for subcontracting**, and **other direct costs** (e.g. travel costs). Project-related invoices, accounting transfers and corrections are handled as other **accounting matters**, and in addition to instructions from the funding body, the same legislature and regulations apply as with accounting for companies. A project number for separate monitoring is required. As a project progresses, the project number must be put on purchase, travel and sales invoices so that the expenses are transferred for **monitoring in accounting**. The project manager must **check the project expenses** monthly from the project's nominal ledger and report any changes and additions immediately. Accounting transactions of projects can be monitored in an accounting information system and sorted into project cost categories. If no information system is available, the time sheets can be completed in Excel forms.

All invoices for the project must include the relevant target area number and the information required by the funder as reference data. The invoice address for invoices paid by the project (purchase invoices) is always the relevant partner organisation's financial services. Nowadays, an invoice request can be made using an electronic form. Typically, invoices are approved by the project manager and checked by the financial officer. For accounting purposes, all invoices must be accompanied with an adequate explanation about the **reason for the cost in line** with the funder's instructions and the Act on Public Contracts; in purchase invoices the information is inserted into the comments field, and in travel invoices the traveller includes it in the travel description.

The PC/WP leader/task leader/project manager decides on the **project-related trips** according to the project plan and work execution. A person gets an approval from his/her principal. The reason for the trip and how the trip is linked to the project must be included in the travel expenses report as well as the reasons for using anything other than public transport (own car, taxi). A travel report must be submitted for trips. Typically, travel invoices are checked by financial services and approved by the project manager. Copies of submitted payment applications/cost accounting documents are recorded in accounting information systems. The financial unit will calculate and record the **salary** targeted at the project. The financial service provides an account of how the

salaries have been calculated.

3.4 COORDINATION SYSTEM

A well-planned coordination system ensures good project implementation.

The coordination system introduced in this section concentrates on European Commission H2020 coordination processes. Nevertheless, the project management by the project coordinator can be elaborated in other projects, grants, bids or tenders. The IECEU coordination system includes three key phases: grant preparations, grant management and project management. Each phase further explains the tasks and activities to be ensured by the coordinator. The project management phase illustrated below also includes practical coordination activities that are seen as effective when coordinating project consortia.

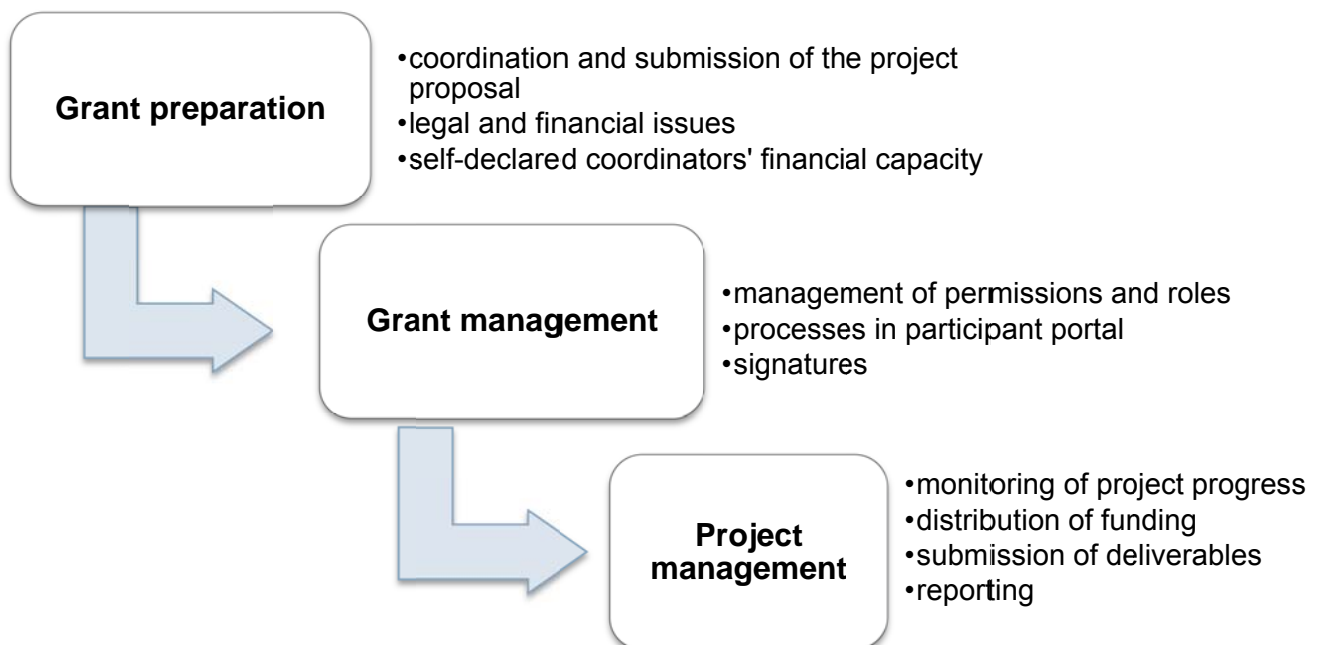


Figure 12. IECEU coordination system

The grant preparation phase includes the overall coordination of the project proposal and finally

submission to the funding portal. The coordinator must coordinate and manage the grant and he/she will be the central contact point for the EC. The legal and financial issues need to be ensured and the permissions and roles must be managed by the coordinator in the European Commission Participant Portal. At the grant proposal phase, coordinators are asked to self-declare their financial capacity. The grant preparation phase enables agreement negotiations with the funder.

The grant management phase is mainly facilitated on the online Participant Portal. The approved consortium is invited by the European Commission (EC) to prepare and sign a grant agreement, which is a standard contract⁴³ established between the EC and the project coordinator. The project coordinator performs grant agreement revisions and associated material. The European Commission Horizon2020 Grant management is only organised electronically, in the Participant Portal. The European Commission (EC) has launched a Participant Portal for H2020-funded projects. It gathers together the whole project process, from the application period until the end of the project. The Participant Portal is a single gateway for all exchanges. To enter the legal, administrative and financial data, the minimum set-up of roles that you need to prepare and conclude for the grant agreement in the Participant Portal are⁴⁴:

- ✓ 1 primary coordinator contact (CoCo)
- ✓ 1 participant contact (PaCo) per beneficiary
- ✓ 1 LEAR per organisation
- ✓ 1 legal signatory (LSIGN) per organisation
- ✓ 1 financial signatory (FSIGN) per organisation.

The grant must be signed by the coordinator and each beneficiary by the LSIGN (legal signatory). The final grant agreement should be prepared based on the proposal selected for funding. The process of grant preparation and management in the Participant Portal is illustrated below:

⁴³ European Commission (2015) *The EU Framework Programme for Research and Innovation Horizon2020 – AGA Annotated Model Grant Agreement*.

⁴⁴ European Commission (2014) *Horizon2020 – Guide for Grant Agreement Preparation*.

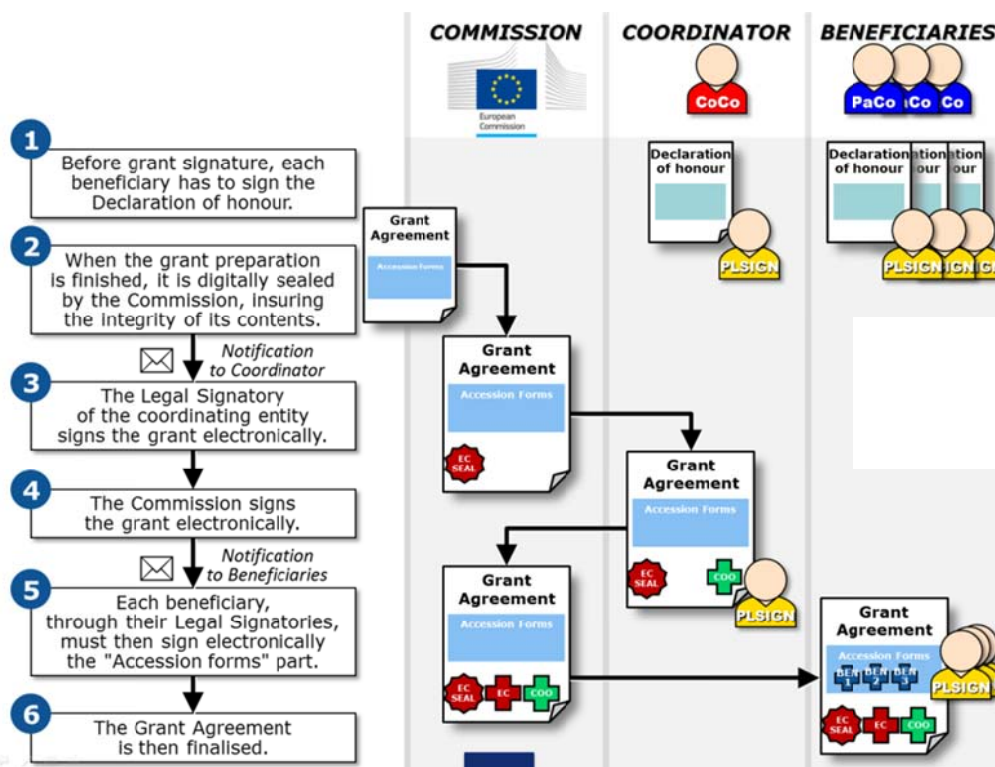


Figure 13. Grant agreement process.⁴⁵

The **project management** phase includes several key activities to be undertaken by the project coordinator. The project coordinator monitors the progress and achievement of objectives in relation to work accomplished and the costs of the project. Moreover, the payments are made for the coordinating organisation, which is in charge of distributing the payments between the beneficiaries/partners. The coordinator is also responsible for submitting the technical and financial reports to the funder using the templates provided. Normally the reports need to be submitted in the language of the agreement. According to the Horizon2020 Annotated Model Grant Agreement,⁴⁶ the project coordinator must:

- (i) ensure that the action is implemented properly;
- (ii) act as the intermediary for all communications between the beneficiaries and the EC;
- (iii) request and review any documents or information required by the EC and verify their completeness and correctness before passing them on to the EC;
- (iv) submit the deliverables and reports to the Participant Portal;

⁴⁵ European Commission (2014) *Participant Portal Paperless Grant Management*.

⁴⁶ European Commission, (2015) *The EU Framework Programme for Research and Innovation Horizon 2020. AGA – Annotated Model Grant Agreement*, version 2.1, 30 October 2015.

- (v) ensure that all payments are made to the other beneficiaries without unjustified delay;
- (vi) inform the EC of the amounts paid to each beneficiary.

The PC is the most responsible beneficiary in terms of the tasks listed above. The PC monitors, requests and reviews documents, submit deliverables and reports, and ensures the payments are successfully completed. At times, drafting and finalising the minutes is not enough, so the project coordinator might use the **coordination/management diary** in order to keep up with all necessary data. In the case of conflict, the established conflict resolution procedures should aim to support the work of the project coordinator.

The project coordinator also reports related to the grant agreement and EC liaison. **Interim reports** are prepared by partners and WP leaders, and they report on the progress of the given WP and the use of resources. **Progress reports** are prepared by WP leaders and define the progress of WPs, including the updated risks and risk mitigation plans. Progress reports support the understanding of the project progress towards the project coordinator. **Periodic reports** are prepared by the PC and they summarise the status of project work, use of resources, highlights and possible deviations between actual and planned scenarios.

IECEU activities aiming to facilitate good coordination include:

- **Meetings:** these can be arranged among partners, consortia and external committees
- **Workshops:** the workshops will increase social interaction and raise awareness
- **Policy dialogues:** to enhance understanding in the policy-making community
- **Dissemination:** the results and achievements of the project must be disseminated
- **Advisory and Integration Group:** to enhance impact of the project
- **Secured online platform:** to increase the online coordination with the members (sharing documents, online discussions, etc.)

3.5 PROJECT MANAGEMENT INFORMATION SYSTEMS (PMIS)

Project Management Information Systems (PMIS) usually aim to support project managers in decision-making, planning, organising and controlling projects. A big advantage of the PMIS is that it is not software but an online-accessible database that can be easily accessed by anyone who has access to the internet. Storing data centrally in an online database speeds up the whole project process and improves the overall progress.⁴⁷

When working on collaborative projects with academic institutions, private enterprises and government organisations, project management and document centralisation divert large amounts of energy. This leads to several user roles with different interests in the project, project management practices and requirements for PMIS. Therefore, PMIS should be adapted to the requirements and needs of these collaborative projects and users.⁴⁸ For collecting, organising, storing and processing project information, the PMIS provides an excellent framework.

⁴⁷ Raymond & Bergeron. (2015) *Impact of Project Management Information Systems on Project Performance*. p. 1339.

⁴⁸ Berzisa, S. et al (2015). *Platform for Management of Business and Educational Projects*. p.126

4 QUALITY ASSURANCE IN IECEU ⁴⁹

The decision of the quality assurance methods to be applied must be done at an early stage of the project. The quality assurance framework should aim to describe, compare, analyse and implement quality management and quality assurance approaches. The IECEU applies ISO/IEC 19796-1 to its own operations. It serves to compare different existing approaches and to harmonise these into a common quality model. IECEU outputs and processes will be qualified and quantified according to the quality assurance mechanism that is described in this document.

The IECEU's approach to quality is based on implementing work packages and creating deliverables throughout the project that contribute to delivering the required project output and impact.

In general, quality assurance in the project will be carried out on two levels: the progress monitoring level, related to monitoring both the formal milestones of the project as well as a set of WP-internal milestones of smaller granularity, and the project output assessment level, related to the assessment of the different output types of the project (e.g. content output, technical/software output, evaluation/validation output, dissemination/valorisation output, scientific output).

4.1 WORK PACKAGE PLANNING PROCESS

The work plan should include planning for work to be conducted, and the development of deliverable development plans. In these plans, the work package leader responsible for a particular deliverable will present the proposed structure of the deliverable as well as the task allocation between project participants. The process for developing a work package is described in the figure below.

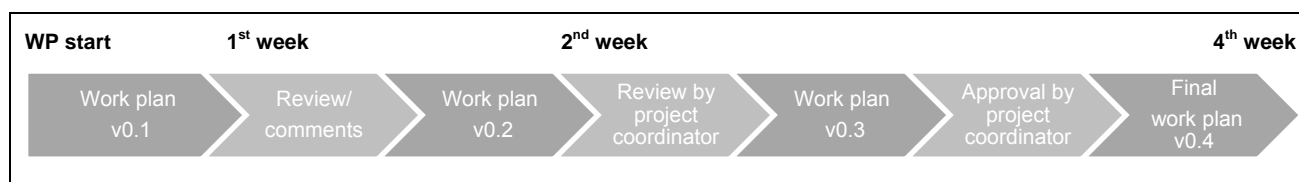


Figure 14. Work plan process

⁴⁹ This chapter is written according to the IECEU Project Quality Plan (2015).

The work package leader will be in charge of ensuring that the work is carried out according to schedule and that the expected deliverables are produced. The work package leader should submit a progress report every three months after the start date of the work package to the project coordinator. The report will include information on progress in relation to the work plan. The work package leader will also ensure that all steps of the work package development are fully documented according to the quality guidelines.

4.2 DELIVERABLE PRODUCTION PROCESS

The deliverables must be created according to the project work scope. The deliverables are the official documents that serve as content-oriented reporting to the EC. Once the deliverable development plan is confirmed by the project coordinator, all project partners will focus on providing appropriate content to the partner responsible for the corresponding deliverable. Based on the received input, the WP leader will prepare the final draft of the deliverable and will circulate it to the relevant project partners for feedback eight weeks before the deadline of the deliverable. The review period for the reviewers takes one week.

The responsible partner will have a period of one week to undertake all necessary improvements and changes in the document and prepare a pre-final version to be sent for review to partners selected by the project coordinator, six weeks before the deadline. The table below presents the phases and the timeframes of the deliverable production process:

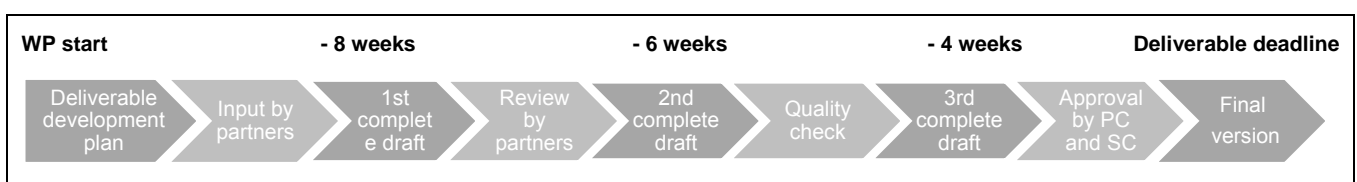


Figure 15. Deliverable production process

The final version is sent to the project coordinator for approval and is then submitted to the EC Participant Portal.

4.3 QUALITY ASSURANCE INSPECTION AND REVIEW

IECEU quality inspection is a systematic, structured assessment conducted in a documented and organised fashion. This approach to quality inspection can be used:

- during the implementation of Work Packages;
- during the development of deliverables;
- to mark the completion of work packages;
- to mark the completion and approval of deliverables;
- to complement testing, e.g. simply for checking test results.

The progress of work is tracked using the following indicators:

GENERAL QUALITY INDICATORS

Quality Indicator	Reference
<i>e.g. the proposed contents are in accordance with the objectives</i>	<i>e.g. Description of Action (DoA)</i>
<i>e.g. the allocation of the tasks is realistic and consistent with the roles of the partners in the work package/task</i>	<i>e.g. Description of Action (DoA)</i>
<i>e.g. The proposed timetable is realistic and matches the deadline</i>	<i>e.g. Description of Action (DoA)</i>

Table 7. IECEU examples of general quality indicators.

WORK PACKAGE QUALITY INDICATORS

Quality Indicator	Reference
<i>e.g. the work package has been implemented through cooperation</i>	<i>e.g. Description of Action</i>
<i>e.g. the activity corresponds to the project specifications</i>	<i>e.g. Description of Action</i>

Table 8. IECEU examples of work package quality indicators

DELIVERABLES QUALITY INDICATORS

Quality Indicator	Reference
<i>e.g. the deliverable is in accordance with the objectives stated in the description of work</i>	<i>e.g. Description of Action (DoA)</i>
<i>e.g. the deliverable is compliant with the templates and editing guidelines</i>	<i>Templates provided by the PC</i>

Table 7. IECEU examples of deliverables quality indicators

TECHNOLOGY QUALITY INDICATORS

Quality Indicator	Reference
<i>Functionality</i>	<i>The capability of the software product to provide functions that meet stated and implied needs when the software is used under specified conditions.</i>

Table 8. Example of IECEU technology quality indicator

The use of a quality indicator will ease and structure the project quality assurance processes. The indicators are prepared by the PC and the QM, and finally agreed with the whole consortium. When analysing the project development and the overall quality, the general quality indicators should be referenced. In order to analyse the quality of a work package, the indicators specified for

it must be used. Since deliverables are the main products of a project, the quality review must be stressed with deliverable processes as well. Special attention to technology quality indicators must be paid in large research and development projects, but also in all projects that develop any technology as primary or secondary products during the project (tools, applications, websites, etc.)

In the IECEU project, quality assurance reviews are conducted with the use of an online application. The agreed indicators with references are transferred into a user-friendly online application. An IECEU partner, ENQUIRYA, is responsible for maintaining and updating the QA application and sharing access rights with partners when necessary. The application collects the data from every review and finalises reports as feedback for the WP/deliverable leader. Based on the QA report, the recommendations and suggestions should be taken into consideration. In addition, the online quality assurance application can be quality reviewed using technology indicators.

5 COMMUNICATION PROTOCOLS

Project Communication Management is the knowledge area that employs the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval and ultimate disposition of project information.⁵⁰

The purpose of communication procedures is to assist the project team in enhancing communication among all parties involved, identifying internal and external stakeholders, and developing the project dissemination/communication plan. Effective project communication ensures successful project working for the duration of the whole project. The planning of communication at the strategic level is the difference between these projects and ad hoc efforts. Project communication can be divided into two: internal and external project communication.

5.1 INTERNAL COMMUNICATION

Internal communication is vital for establishing a well-functioning network in which the input of all internal stakeholders is needed for the successful achievement of project objectives. Effective internal communication can be created from a combination of selected methods and tools to be used in project implementation. The main target group for internal communication is the consortium members, but maintaining a good flow of information between the consortium and the funder/client is also very important.

The selection of internal communication methods must be decided on at the project management level. The selected method(s) guide the members towards coherent communication procedures for the duration of the entire project. The actors responsible for communication planning start by specifying who needs the information, when it is needed, who will deliver it and how it should be delivered. Methods of communication include the details for answering who, what, when and how. The IECEU also adheres to the project organisation structure in internal communication protocols. Beyond these internal communication methods and tools presented in this chapter, work package

⁵⁰ PMBOK® Guide—Third Edition

leaders can set specific communication requirements in the implementation plan for each work package.

Who needs information in the project organisation?

- ✓ Partners' point of contact (POC) **needs** the information regarding overall project status
- ✓ WP leaders **need** the information from other WP leaders
- ✓ WP leaders **need** the information from task leaders
- ✓ Task leaders **need** the updated information and work plans from WP leaders
- ✓ External boards **need** the project results
- ✓ Partner admin POCs **need** reporting guidance and details
- ✓ PAT **needs** completed reports from partner admin POCs and partner POCs

Who delivers the information in the project organisation?

- ✓ PMO/PC **delivers the information** to the beneficiaries' POCs
- ✓ WP leaders **deliver** the work plans, updates and deliverables to PC
- ✓ WP leaders **deliver** the work plans, updates and deliverables to task leaders
- ✓ Task leaders **deliver** the results of the task
- ✓ Expert/reviewer/researcher **delivers** information based on their competence
- ✓ PAT **delivers** the reporting templates and deadlines to the partner admin POC
- ✓ Partner admin POC **delivers** completed reports to PAT

5.1.2 INTERNAL COMMUNICATION TOOLS

The use of communication tools aims to answer to question: How should the information be delivered?

The most common internal communication tools to be used by IECEU project partners are:

i. Email

Most of the communication between consortium members occurs via email. Participants will use electronic mail facilities to enable the distribution of documents by electronic means, thus reducing the delays associated with other methods of distribution. Note that large attachments to emails should be zipped.

A mailing list of all contacts has been drawn up and is updated regularly. For specific queries, direct mailing between concerned partners is preferred. The subject of all project emails should begin with '[IECEU:]' to allow users to filter emails using email client facilities.

To	The receivers related to the issue (e.g. <i>project points of contact (POCs)</i>)
Cc	Other relevant receivers, to whom the information is 'for your information' (e.g. <i>finance POCs, administrative POCs, steering committee POCs</i>)
Subject	Project name: key message of the mail (e.g. <i>IECEU: WP1 initial work plan</i>)
Message	Key message and list of actions

Table 9. Email format

ii. Consortium meetings

Meetings of consortium partners (steering committee) are to be held in order to check progress, decide on further steps and supervise the management board (MB), especially relating to deliverables, milestones and any changes that might occur during the project. Minutes will be prepared after the meeting and will be sent to partners for review and commentary. For the online meetings of the consortium/steering committee, the open data services will be used to organise the meetings and/or workshops. The agenda for the meetings will be sent as agreed in the consortium agreement.

iii. WP leaders meetings

Meetings between related WP leaders should be organised whenever integration and coordination between WPs is necessary. Minutes must be prepared in order to inform other project participants as well.

iv. Bilateral meetings

Some project issues must be handled through bilateral meetings either in person or via selected devices (e.g. video, phone, online). Bilateral meetings should be considered when dealing with confidential information or between a coordinator and a beneficiary.

v. Video conferences (e.g. Skype)

Whenever a certain important issue needs to be discussed in between meetings and a prompt reaction by consortium members is required, a video conference may be organised. Minutes should be drafted based on the key conference findings.

vi. Teleconferences

Phone conferences are traditional and easy to organise at short notice. Minutes or key notes should be drafted based on the key findings of the conference.

vii. Restricted partner area on the website

A joint workspace (intranet) is an area on a webpage that is only accessible via password to the consortium members (or if appropriate, to other invited experts) that serves as a communication platform and enables the consortium members to share their experience, documents and tools.

5.1.3 PROJECT TEMPLATES

Successful implementation of the selected methods and tools requires good understanding of the technicalities of templates. The official project templates are to be used for creating and presenting all documents for the EC (deliverables, progress reports, etc.). These deliverables must be provided by the PC. The template and consequently the documents for the commission will show the following pieces of information on the cover page:

- **Title and logos:** the title of the document will be shown along with the relevant logos, such as the project logo. According to the H2020 project management guidelines, the European flag must be given appropriate prominence when displayed together with the project's logo.
- **Partners:** the names of the partners that contributed to the document.
- **Dates, due and actual:** the due submission date along with the actual submission date.
- **Leading organisation:** the name of the lead organisation for the preparation of the document must be indicated here.

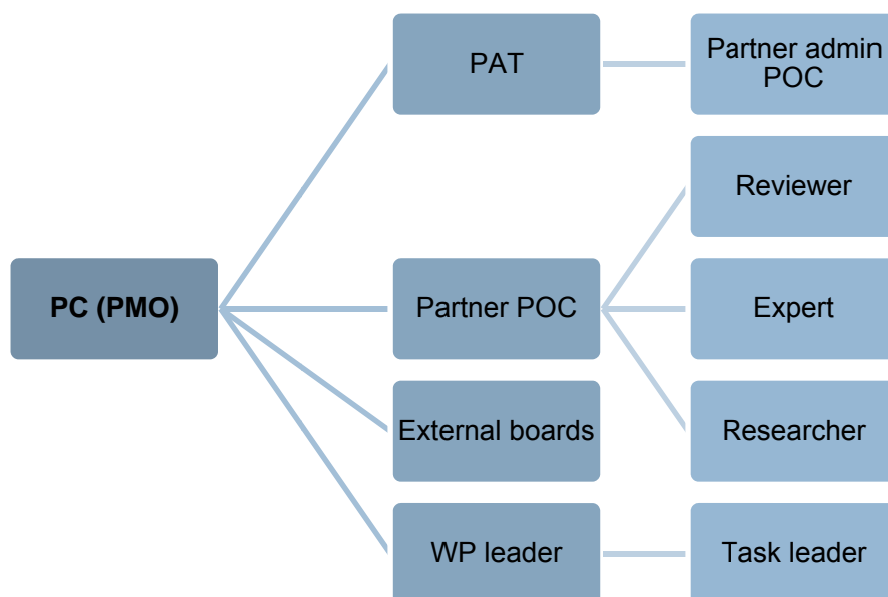
- **Revision:** this field denotes the version of the document, which may be in the form v1, v2, v01, etc. The value 'Final' denotes that the version of the document is the submitted one.
- **Dissemination level:** in this field, the list of persons or groups involved in the document distribution is reported. The dissemination level field can have one of the following possible values:
 - PU: the document is open and public to everyone
 - PP: restricted to other programme participants (including the commission)
 - RE: restricted to a group specified by the consortium (including the commission)
 - CO: the document is confidential, i.e. restricted to the consortium members, including agency, commission and project reviewers.

The deliverables must always contain an executive summary and conclusions. An executive summary is a report, proposal or portfolio, etc. in miniature (usually one to two pages). The executive summary contains enough information for the readers to become acquainted with the full document without reading it. Usually, it contains a statement of the problem, some background information, a description of any alternatives, and the major conclusions. Someone reading an executive summary should get a good idea of the main points of the document without becoming bogged down with details. An executive summary differs from an abstract in that the former's purpose is to inform the reader of the points to be covered in the report without any attempt to tell what is said about them. The following list will introduce the basic structure of the deliverable.

- Table of contents.
- List of figures.
- List of tables.
- List of abbreviations and terms: a list providing the full titles and/or explanations of the abbreviation and terms used in the document.
- Introduction: this is a beginning section that states the purpose and goals of the following text within the document. This is generally followed by the main body and conclusions.
- Main body: the main body, as the name suggests, is the most important part of the document.
- Conclusions: this chapter is obligatory.

- **References:** a reference is a previously published written work within academic publishing which has been used as a source for theory or claims referred to, which are used in the document. References contain complete bibliographic information, so the interested reader can find them in a library. References are added either at the end of each document or at the end of the relevant section.
- **Annexes:** These sections may contain a collection of supplementary material.

Internal communication should be based on clear guidance to deliver information, with use of selected tools and agreed templates, deliverables and master presentations.



Types of information	Decision	Principle/ guidelines	Observation	Planning
Use of tools				
Use of templates				

Figure 16. IECEU internal communication

The figure presents the overall understanding of IECEU internal communication. Defining the different information types help the project participants to understand the key information features. The information in the IECEU project is categorised into types of decisions, principles/guidelines,

observation and planning. For sharing the information, the set of used tools must be agreed. In the IECEU project, the main tools are email, conference/online calls, arranging meetings, social media and online tools (e.g. secured website). Moreover, the project participants agree on the use of common templates for presenting the information. Within the IECEU project, there are three distinct documents types envisaged:

- documents for the Commission: these documents include deliverables, interim and final progress reports and cost statements.
- PowerPoint presentations for internal and external use: e.g. for project meetings, reviews, presentations during workshops, exhibitions, conferences, etc.
- Word documents for internal use: e.g. agendas, minutes, technical contributions, other contributions, etc.

5.2 DISSEMINATION/EXTERNAL COMMUNICATION

By *dissemination* we refer to activities being aimed at the broad spreading of information and knowledge regarding some issue, which includes mainly information provision and raising awareness among a well-targeted wider audience. Efficient dissemination is a fundamental activity in any CSA, research, innovation or implementation project, since the success of these dissemination activities contributes decisively to the short- and long-term success of the project. Since the dissemination activities are executed throughout the duration of the whole project, the initial dissemination strategy is to be revised and updated and shall be conducted in such a way that benefits the project until its completion, with successful results and delivered products. The external communication/dissemination management of the IECEU is constructed from four separate actions:

- 1) the development of the IECEU dissemination plan (focusing on external communications);
- 2) the distribution of the final plan between partners via a secured website;
- 3) the implementation and use of defined methods, means/tools, and devices of dissemination;
- 4) the collection of recording of dissemination by each partner every three months.

Since dissemination concerns the development of communication strategies for creating project visibility, the development of an effectively elaborated strategy is critical. It aims at diffusing the

results of the project to its various target groups. Usually the dissemination plan constitutes five main aspects of the dissemination process, namely WHAT will be disseminated, WHO will disseminate it, TO WHOM will it be disseminated, HOW will it be disseminated and WHY will it be disseminated. In order to organise successful dissemination, all partners of the consortium shall participate in the dissemination activities.

Although the dissemination and exploitation actions are often planned separately (as separate documents), near to the project end, dissemination activities shall be directed towards exploitation purposes agreed by the consortium partners with the intention of raising interest among long-term target groups of the project, who might be interested in using the final project solution. Therefore, the dissemination strategy has been planned to support the successful exploitability of results by the end of the project. Effective external communication adapted to the needs of each stakeholder will take place throughout the project's life. The main target groups remain the same, with the connections and collaborations further developed. Some new target can also be identified during the progress of the project and will be actively involved in communication, dissemination and networking activities.

The dissemination means/tools can be divided into two main groups:

- **Dissemination material** – ‘products’ created in order to more easily identify the project (e.g. project's logo or presentation template) and to spread the project's current achievements and updates (e.g. brochure or flyer)
- **Dissemination activities** – particular actions aiming at disseminating information on the project (end user integration workshops, advisory meetings, etc.)

The basic rule is agreed in the GA between the project consortium and the EC: the visibility of EU funding needs to be ensured. The projects that have received EU research and innovation funding via H2020 should *‘aim to demonstrate the ways in which research and innovation is contributing to a European “Innovation Union” and account for public spending by providing tangible proof that collaborative research adds value by:*

- *showing how **European collaboration** has achieved more than would have otherwise been possible, notably in achieving scientific excellence, contributing to competitiveness and solving societal challenges;*
- ***showing how the outcomes are relevant** to our everyday lives, by creating jobs, introducing novel technologies, or making our lives more comfortable in other ways;*

- **making better use of the results**, by making sure they are taken up by decision-makers to influence policy-making and by industry and the scientific community to ensure follow-up.⁵¹

In the IECEU project, we included strategic external communication planning in the dissemination work package, more specifically part of dissemination plan (D8.1 Dissemination Plan). In order to achieve communication objectives effectively, the IECEU dissemination plan provided an overall framework for managing and coordinating communications. The dissemination plan defined on a detailed level:

STAKEHOLDERS: who are the target groups of the IECEU?

INFORMATION: what messages does the IECEU want to convey to each target group?

TOOLS: how will the message be communicated?

CHANNELS: who will communicate the messages and how?

SCHEDULE: when will the messages be communicated?

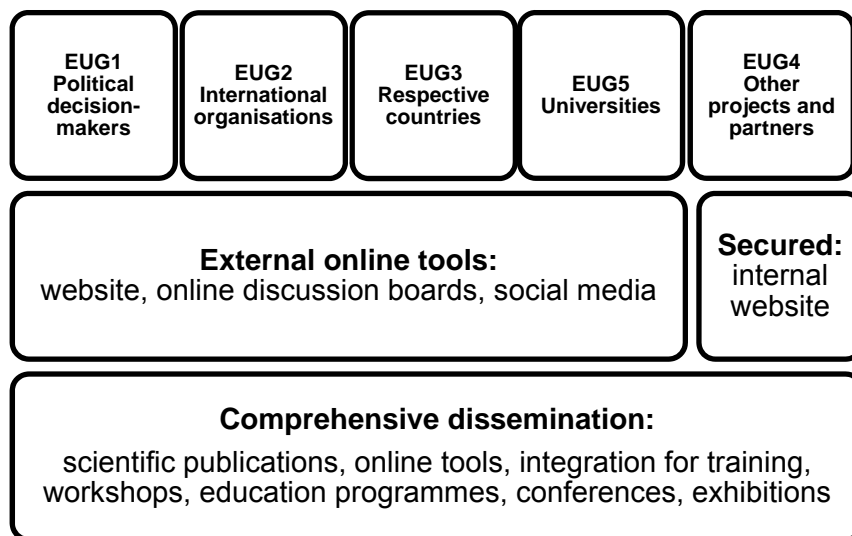


Figure 17. IECEU dissemination

IECEU dissemination combines the key end user groups, external and internal dissemination tools and other means to ensure comprehensive dissemination, such as scientific publications, conferences and workshops. The key stakeholders as target groups must be identified at an early stage of the project. In the IECEU, we identified five different end user groups, which are: political decision-makers, international organisations, respective countries, universities, and other projects

⁵¹ European Commission, (2014) *Communicating EU research and innovation guidance for project participants*.

and partners. In order to reach target groups with valid information, the stakeholder needs must be determined.

Depending on 1) the stakeholders and 2) stakeholder needs, the methods, products and final dissemination plan must be created. In order to successfully share the information of the project, the content of disseminated material (e.g. deliverable, flyer and product) needs to be adaptable, functional and logical. In the IECEU, we decided to reach the target groups via multiple use of online tools, integration to training, arranging workshops, and attending scientific conferences.

Depending on the key message and the target group regarding the product, findings or report, the selection of the parts should be made by those responsible for dissemination. In the IECEU project, we prefer the use of a **deliverable dissemination note**, which defines the key message and key target group(s). Depending on the dissemination phase, different target groups may be addressed by different dissemination activities and material. Research conferences and journals will attract mainly research and academic communities, while thematically related workshops/conferences may be directed to end users and administration employees. Ideally, the dissemination note would respond to Horizon2020 recommended questions:

- **How does the deliverable demonstrate European collaboration?**
- **How are the outcomes of the deliverable relevant to our everyday life?**
- **How will it be ensured that the outcomes of the deliverable are taken up by political decision-makers, industry or the scientific community?**

6 ETHICS

It is recommended that ethical dimensions are followed for the duration of the whole project. As a driver of research excellence, ethics form an integral part. All EU H2020-funded projects shall comply with ethical principles and relevant national legislation.⁵² Ethics issues can be divided into two categories:

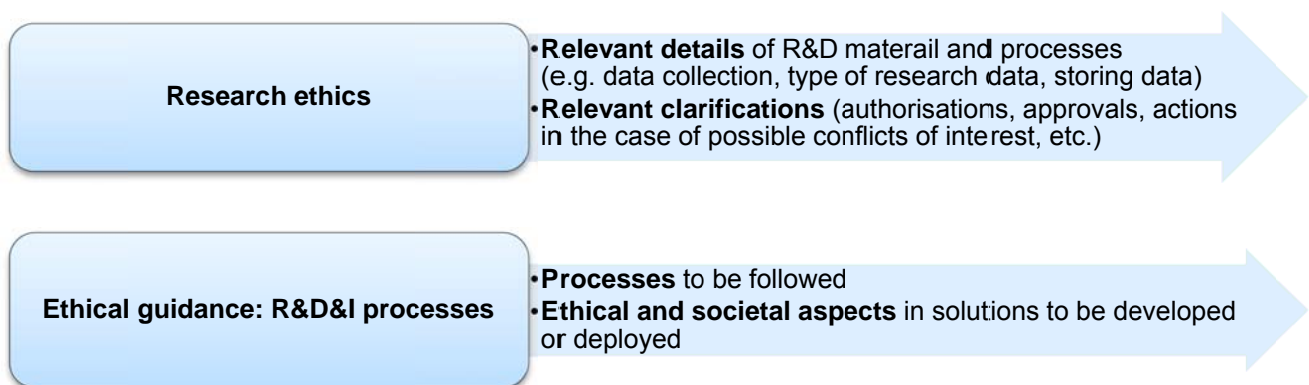


Figure 18. Ethics issues

In almost every project case, the beneficiaries are requested to provide the necessary details regarding relevant ethical issues. Accordingly, the ethical and societal issues concern the use of data and the integration of ethics to research and technology processes, cases or business models. Projects shall define the key ethical principles they will follow for the duration of the project. The funder may request specific information related to data collection, type of research data, approvals for the collection of personal data, details on the material to be handled in research processes, relevant authorisations in case data is not publicly available, and approvals by the competent ethics committee in order to ensure ethical issues are addressed in project implementation.

The ethical guidelines provide the overall guidance to be followed when conducting research, developing new tools and systems, and innovating processes and solutions. Each researcher is

⁵² European Commission, (2014) 'Horizon2020 in brief – The EU Framework Programme for Research and Innovation',

responsible for performing the implementation of the research by following the guidelines and research integrity (e.g. the European Code of Conduct for Research Integrity). The ethical guidelines shall include all relevant parts of ethical issues, such as:

- 1) Fundamental requirements and human rights;
- 2) Data collection and analysing processes;
- 3) Privacy and data protection;
- 4) Code of conduct; key principles, drawing boundaries for conduct;
- 5) Ethical considerations and possible sensitive issues;
- 6) Legal, moral and cultural issues;
- 7) Quality criteria.

According to the Societal Impact Expert Working Group Report,⁵³ **fundamental rights** should be a necessary requirement, which could and should lead to drawing boundaries on what is and what is not acceptable in EC-funded research initiatives. Rights can be organised under the corresponding basic values: dignity, freedom, equality, solidarity, citizens' rights and justice.

Data collection and analysis processes must be clear and well-defined according to selected fundamental requirements and human rights. In cases where the research involves human participants, the researchers should provide informed consent forms with an information sheet specifying the nature of the research. The research must comply with the applicable international, EU and national law. In research, there must be clear control of the collection, analysis, storage and usage of the data. It might be relevant to define the physical platforms where the data is stored and analysed. After the data has been collected, data analysis techniques come into play and may generate an increasing problem with privacy issues. Data fusion occurs when data from different sources are brought into contact and new facts emerge. Individually, each data source may have a specific, limited purpose, but their combination may uncover new meanings.⁵⁴ Such new information, used appropriately, may often bring benefits to individuals and society.

A common ethical challenge is **privacy and data protection**. Personal data is any information relating to an individual, whether it concerns his or her private, professional or public life. It can be anything from a name, a photo, an email address, bank details, posts on social networking websites, medical information, and/or a computer's IP address. EU data protection rules apply when a person can be identified, directly or indirectly, by such data. The EU Charter of

⁵³ Societal Impact Expert Working Group (2012). *Societal Impact Expert Working Group EC DG ENTR Report*.

⁵⁴ Executive Office of the President (2014), *Big data: seizing opportunities, preserving values*.

Fundamental Rights states that everyone has the right to personal data protection in all aspects of life: at home, at work, whilst shopping, receiving medical treatment, at a police station or on the internet.⁵⁵ In terms of privacy, data protection and personal data protection, it is recommended to follow the ongoing research and legal framework.

A code of conduct includes the principles that are to be further specified and applied during the project work. A code of conduct is especially relevant in cases where development or innovation activities take place. The code must be planned in close collaboration with end users, stakeholders and/or developers and/or innovators. Moreover, a set of quality criteria is highly recommended in order to execute each and every project to guarantee reliability and effectiveness.

A conflict of interest (COI) is very important for all projects and organisations. The OECD has defined that '*in government and the public sector, conflict-of-interest situations have long been the focus of specific policy; legislation and management approaches intended to maintain integrity and disinterested decision-making in government and public institutions.*' Conflicts of interest in both the public and private sectors have become a major matter of public concern worldwide. A conflict of interest is not corruption, but there is increasing recognition that conflict between public duties of public officials and the private interests can result in conflict.⁵⁶

According to McDonald,⁵⁷ a conflict of interest is '*a situation in which a person, such as a public official, an employee, or a professional, has a private or personal interest sufficient to appear to influence the objective exercise of his or her official duties.*' The types of conflict of interest are identified as⁵⁸:

- ***Real or actual:*** an individual is in a situation where her official duties can be influenced by her 'private or personal' interests
- ***Apparent or perceived:*** an individual is in a situation where his official duties appear to be influenced by his 'private or personal' interests
- ***Potential or foreseeable:*** an individual is in a situation where her official duties may be influenced in the future by her 'private or personal' interests.

If any real, perceived or potential conflicts of interest exist, it is important to acknowledge it and deal with them in a fair and transparent manner. In potential conflict of interest situations, the

⁵⁵ European Commission (2012). *Why do we need an EU data protection reform?*

⁵⁶ OECD (2005). *Managing Conflict of Interest in the Public Sector – A Toolkit*. p. 96.

⁵⁷ McDonald, M. (1999). *Ethics and Conflict of Interest*.

⁵⁸ CCIC (2008). *A Practical Introduction to Managing Conflict of Interest Situations*. p. 2.

project members shall follow the national legislation, agreements and organisational procedures. Generally, public bodies must implement the relevant policy standards for promoting integrity, processes for identifying risks, external and internal accountability mechanisms and management approaches.⁵⁹ Nevertheless, there may be situations which are recognised during or are related to project working. Resorting to the guidance on ethics is recommended, as this provides practical examples of concrete steps to be taken for resolving conflict of interest situations.

Everyone has an ethical responsibility regarding conflict of interest issues in order to take the necessary actions in various ways. A first step to be followed is to declare the situation. Secondly, full dialogue with group and decisions to be made by e.g. chairperson needs to be addressed. Thirdly, the measures to mitigate or eliminate the conflict of interest shall be implemented according to what is appropriate. Finally, it is important to produce proper documentation about what has been done for relevant actors and stakeholders.⁶⁰ The practical guidance procedures in conflict of interest situations in the IECEU project are presented in figure below.

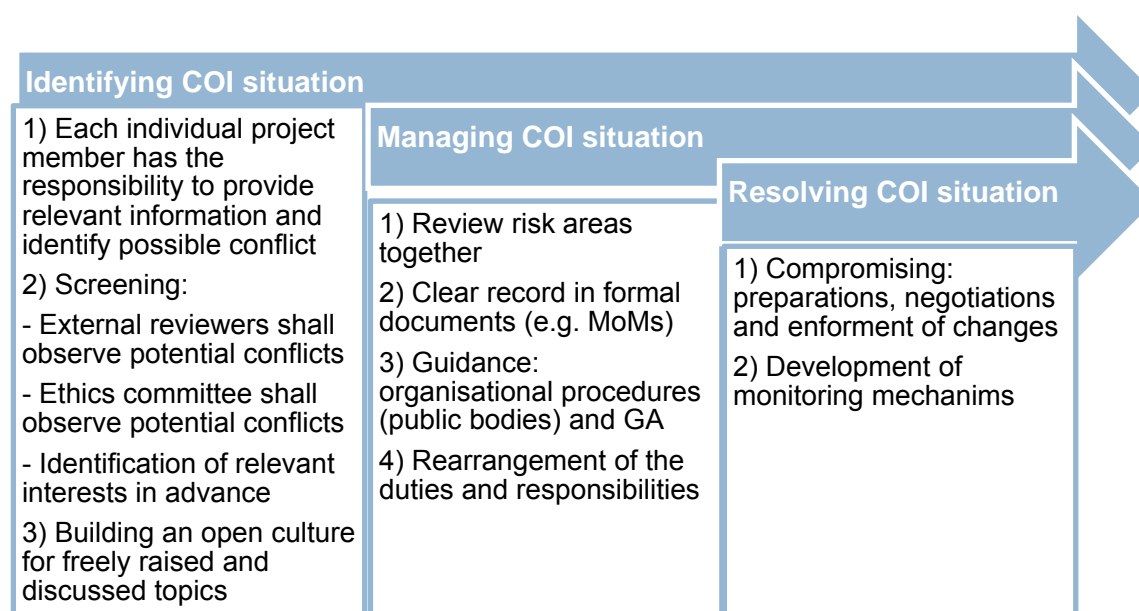


Figure 19. IECEU procedures in conflict of interest situations

In project implementation, the establishment of an ethics committee is highly recommended, so that external members can analyse, review and approve ethical issues and ensure that they are

⁵⁹ OECD (2005) *Managing Conflict of Interest in the Public Sector – a Toolkit*. p. 97.

⁶⁰ Ibid. p. 3-6.

addressed effectively in the project implementation. It is recommended that the ethics committee includes external committee members with relevant expertise and different core ethics backgrounds. In order to understand the whole process of ethical issues, a societal impact assessment (SIA) should be launched before, during and after the project implementation. Particularly targeted at security research, the ASSERT project has demonstrated the SIA method, implemented in three phases:⁶¹

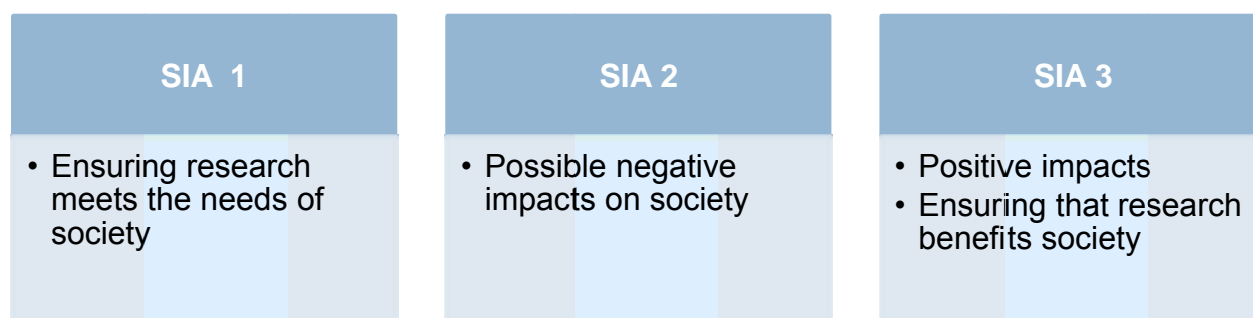


Figure 20. Societal impact assessment method (ASSERT project)

6.1 SAFETY AND SECURITY ISSUES

The possible risks and risk mitigation plans shall be identified, updated and maintained throughout the duration of the project. Risks and risk mitigation plans are actions that form part of risk management processes. Moreover, the relevant safety and security issues shall be considered in project management. Security issues may become necessary in cases like research conducted in high-risk areas (human safety) or where confidential documents or information are used. Good safety and security practices can reduce injuries and accidents, thus improving performance.

PMBOK proposes three processes that should be established parts of project safety management: safety planning, the execution of safety and security management and safety records. A key document related to safety and security in project management is a security plan that provides guidelines for reducing accidents and increasing property protection. These guidelines should provide details such as individual safety equipment, collective items, first aid supplies, telephones

⁶¹ ASSERT project (2014) *D3.2 Toolkit for Societal Impact Assessment in Security Research*

and addresses useful in the event of emergency.⁶² To tackle the safety and security issues, the IECEU recommends that partners follow the practical safety steps in order to successfully conduct research in high-risk areas. Moreover, in the IECEU project, partners must take all measures prescribed by their National Security Authority/Designated Security Authority (NSA/DSA) for safeguarding classified material. §

STEP 1: Follow EU, national and own organisational guidelines and procedures

STEP 2: Follow the national safety and security regulations (e.g. information provided by the Ministry of Foreign Affairs)

STEP 3: Always conduct a risk management assessment beforehand by analysing the situation with use of security situation awareness reports

STEP 4: Consult Security Advisory Board and Project Security Officer

STEP 5: In cases where decisions are needed regarding security concerns, please contact the Steering Committee or the Project Coordinator

Figure 21. IECEU safety steps

The establishment of a project security advisory board (SAB) may ensure that security concerns are taken into proper consideration. The SAB should appoint a chairman, who carries out the tasks of a project security officer. The safety and security of human life is always the top priority.

⁶² Rocha, B. & Hippert, M. (2014) *Integrated management systems in civil construction-based PMBOK* guide extension.

7 CONCLUSIONS

The main contents of this Project Management Handbook (PMH) is formed of the theoretical background of project management itself, project implementation guidance, and considerations regarding quality assurance, communication protocols, ethics, safety and security to be applied in the IECEU (Improving the Effectiveness of the Capabilities in EU conflict prevention) project and other future projects.

The PMH creation followed the selected principles set for the handbook: for it to offer appeal (by providing a generic background), flexibility and practicality (by providing practical examples), accessibility (by providing suitable ideas and instruments to be adapted) and a privacy policy (by protecting personal data and information). This PMH aims to be a fundamental working tool that people working on projects can benefit from. The target audience of this PMH is defined into two categories; IECEU consortium partners, and a wider public audience. The aim is to see this deliverable reaching a wider audience, such as higher education students, project managers, people participating in project implementation, decision-makers and organisational management.

Johnson⁶³ suggests that project management as a definition first appeared in 1953 in the US defence and aerospace sector. The common project management models, cycles and approaches are introduced and lessons learned are provided. Nevertheless, in research are we still lacking deeper analyses focused specifically on project managers' perspectives. The key features defined in this PMH regarding project management are: the project management cycle, knowledge management, work breakdown structure (WBS), and project organisation structure. Moreover, project implementation analyses the practices regarding the legal framework, administrative and financial matters, the coordination system, communication protocols, and ethics and safety issues. This PMH emphasises communication protocols covering both project internal communication and external dissemination. This emphasis was agreed because projects too often fail due to a lack of communication.⁶⁴ In conclusion, planning (also updated) is always key for good project implementation and management. This PMH functions as basic material for managing and implementing project management successfully. Nevertheless, the actions need to be applied and adapted in practice.

⁶³ Johnson, S.B. (2013) *The Secret of Apollo: Systems Management in American and European Space Programs*. The Johns Hopkins University Press, Baltimore

⁶⁴ JISCinfoNet Service. (2010). *An Introduction to PRINCE. Project Management Methodologies*.

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