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Global Response Against Child Exploitation

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Innovation Management Strategy, Guidelines and Tools

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Table of Contents

Figures

1. Introduction

1.1. Overview

The DoA describes this deliverable as:

> *D1.6: Innovation Management strategy, guidelines and tools [4]*
>
> *Description of the detailed innovation management strategy, guidelines and tools to be followed within the duration of the project.*

This deliverable presents the detailed innovation management strategy, guidelines and tools to be followed within the duration of the project. The goal of this deliverable is to understand the market and the technical problems, in order to successfully implement appropriate measures and adapt creative ideas within GRACE.

The management of innovation in general, and the development of new products in particular, require expertise in all areas – research, innovation, finance, manufacturing, human resources, marketing and business strategy. Innovation performance is one of the key indicators for the success of the project and requires an understanding of both - market and technical problems, with a goal of successfully identifying and implementing appropriate creative ideas. It also allows the consortium to respond to an external or internal opportunity. Innovation management should be understood as a continuous evolving activity that will be adjusted and updated during the GRACE developments.

In WP1, T1.5 has been established in order to focus on innovation management and to use the project's creative efforts to introduce new ideas, processes or products. The innovation process will be regularly monitored and reported in the project periodic reports, during relevant meetings, teleconference calls and the EC's innovation questionnaire. It is necessary to have a clear idea of the type of innovation that will be introduced into the market, the timing that it will occur and what is planned after the project ends. Therefore, the partners already included foreseen innovations within the exploitation plans.

As part of the work to be undertaken in WP1 MANAGE, *Task 1.5 IPR and Innovation Management,* this deliverable focuses on the innovation management part. It will efficiently monitor market needs and technical evolutions throughout the project's lifetime. It will also make sure that the project work plan is adjusted as needed in order to ensure that the final results of the project are implemented in such a way that they best meet the needs of the market with the technologies available at the time.

When considering innovation management in the context of the GRACE project, there are many activities that should be addressed both at consortium level and at organisational level. The purpose of this document is to address the fundamental concepts related to innovation management, to serve as a basis for the establishment of appropriate procedures and tools. As a principle, the proposed approach is to keep these procedures as simple as possible and make them as complicated as needed.

Within GRACE, VICOM has been appointed as Innovation Manager (IM) and will report directly to the Project Management Team (PMT). The Innovation Manager, using the CEN/TS 16555 Standards Family as a reference, will:

- Work with partners and stakeholders to keep track of end-user needs and of the state-of-the-art of products and services available in the market (competition).
- Work with partners to make sure that the planned work is adjusted as needed so as to adapt to the

circumstances that will arise during the lifespan of the project

. Moreover, this deliverable is also highly related to the work to be performed in tasks *T10.3 – T10.4 GRACE exploitation plan and business models*.

Innovation management is a process, which requires an understanding of both market and technical problems, with a goal of successfully implementing appropriate creative ideas. The GRACE consortium sees corresponding business models and process innovations as an integral part of creating, adapting, and maintaining a product or service to operational maturity. These new business models and process innovations are very often triggered through technological innovations, which act as enablers, but also generate requirements for the development of technology.

1.2. Relation to other deliverables

This deliverable is related to the following other GRACE deliverables:

Receives inputs from:

Deliv. #	Deliverable title	How the two deliverables are related
D2.1 to D2.3	Use Cases, Process and Data Flows Refinement	D2.1 – D2.3 will provide D1.6 with the identification of innovative results/elements.
D7.9 to D7.14	Technical Validation Report	D7.9 – D7.14 will provide D1.6 with the identification of innovative results/elements.
D8.7 to D8.9	Report on Pilots' execution	D8.7 – D8.9 will provide D1.6 with the identification of innovative results/elements.
D8.10 to D8.12	Report on Pilots' evaluation & assessment	D8.10 – D8.12 will provide D1.6 with the identification of innovative results/elements.

Table 1 – Relation to other deliverables – receives inputs from

Provides outputs to:

Deliv. #	Deliverable title	How the two deliverables are related
D10.2	GRACE website, social media presence and dissemination materials	D1.6 will provide D8.10 – D8.12 with inputs for communication and dissemination materials.
D10.3 to D10.4	GRACE exploitation plan and business models	D1.6 will provide D10.3 - D10.4 with identified strengths, key messages, and innovative results of the project which can be exploited and included as important parts of the business models. Also, D10.3 will include the details about IPR management, which is the important goal of task T1.5, also closely related to innovation management.

Table 2 – Relation to other deliverables – provides outputs to

1.3. Intended audience

The dissemination level of D1.6 is public, therefore it will be available to anyone interested in it. The primary intended audience though are the beneficiaries of the GRACE project, as this document is intended to be an internal guideline for the appropriate innovation management of the project.

1.4. Structure of the deliverable

This deliverable includes the following sections:

- Section 2: In this section, fundamental background concepts and theoretical foundations on innovation management are provided.
- Section 3: In this section, an overview of the innovation management approach and tools to be used within the GRACE project is presented. Moreover, subsection 3.4 describes the specific plan for Innovation Management in the project.
- Section 4: In this section, a final summary and conclusion of the document is drawn.

2. Innovation Management

2.1. Literature Review

2.1.1. *Innovation*

With a view to addressing innovation management in collaborative environments such as the present project, the concept of innovation must be first understood. However, experts have yet not found the perfect definition for this term and, as a consequence, many significations have been developed. In the context of H2020, the Innovation Management Plan of GRACE will be based on the European Commission's (European Commision, 1995) definition for innovation, which is the *"successful production, assimilation and exploitation of novelty in the economic and social spheres"*. From this perspective, innovation offers new solutions to problems and responds to the needs of both the individual and the society.

Furthermore, innovation points organisations towards ambitious long-term objectives, leads to the renewal of industrial structures and fosters the emergence of new sectors of economic activity. Technological advances, changes in customer behaviour, intensified competition and the changing business environment are some of the key factors that are increasing the need for innovation (Goffin & Mitchell, 2010).

Innovation is also related to the organisations' ability to recognise opportunities in the market and to establish commercial relationships in order to make them economically viable. However, one of the biggest challenge organisations face is how to manage the innovation process. Innovative organisations are

influenced by their environment, as understanding and learning what is happening in the world outside your organisation allows to increase one's competitiveness. The fabric of economic and social activities in a region constitute the innovation systems, which dynamics are a complex matter. The concept of innovation system includes the flow of technology and information among people, firms and institutions as key to an innovative process. Innovation systems can be defined as *"the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge and are either located within or rooted inside the borders of a nation state"* (Lundvall, 1992).

2.1.2. *Types of Innovation*

A plethora of definitions and classifications for **innovation types** has resulted in an ambiguity in the way the term 'innovation' is utilised in the literature. The abundance of different typologies has resulted in the same word being used for different types of innovations and the same innovation being classified under different typologies, leading to inconsistencies in the literature.

In the context of this deliverable, the definitions provided by the Oslo Manual (OECD, 2005) will be considered. The manual, developed by Eurostat and the Organisation for Economic Cooperation and Development (OECD), provides a framework to enable innovation measurement and proposes the following types of innovation:

- Product (good or service);
- Process;
- Marketing methods; and
- Organisational method in business practices, workplace organisation or external relations.

Although the market centred approach to (technological) innovation is very relevant when analysing competitiveness at a firm or territory level (OECD, 2002), it does not cover all societal needs. Therefore, authors have described social innovation in the literature, particularly over the last years, both as innovations in relationships and social processes, or as innovations that respond to societal challenges. Nevertheless, the social and economic aspects of innovation are intrinsically linked (Moulaert, Martinelli, Gonzalez, & Swungedouw, 2007).

The definition of **technological innovation** addresses two important distinctions. First of all, the innovation process comprises a technological development combined with the market introduction to end-users through adoption and diffusion (Abernathy & Clark, 1985). Moreover, the innovation process is iterative in nature and includes the first introduction of a new innovation and also the reintroduction of an improved innovation (Ali, Krapfel, & Labahn, 1995). This iterative process implies varying degrees of innovativeness.

2.1.3. *Innovation Management*

The lack of a common definition for innovation is partly explained because of its multidisciplinary origin, and thus influences the theory on innovation management. Various models of innovation break down the innovation process into various stages (Palmberg, 2006). The innovation processes have some common basic

activities that support the generation of ideas for new product and process development and the management of the entire innovation process. These fundamental activities are as follows:

- Generation of ideas which potentially could become new products or processes after implementation;
- Acquisition of knowledge on the generated ideas; and
- Implementation and market monitoring to verify customer satisfaction and after sales.

Innovative firms have a number of characteristics that can be grouped into two major categories of skills: strategic skills (long-term view; ability to identify and anticipate market trends; ability to collect, process and assimilate technological and economic information) and organisational skills (mastery of risk; internal cooperation, and external cooperation with public research, consultancies, customers and suppliers; involvement of the whole firm in the process of change, and investment in human resources). The former category (strategic skills) allows firms to anticipate the changes and new endeavours it has to undertake to be one step ahead of what the Market demands. The latter category (organisational skills) allows for efficient time, cost, and quality management when producing and delivering the products and services that the Market will demand.

In fact, innovation needs to be part of the organization's culture. Areas such as Project Management, Research, development and the **use of new technologies** are key elements in innovation (Dosi, 1982); (Goffin & Mitchell, 2010). Nonetheless, those imply an organisational effort of adapting methods of production, management and distribution. **Human resources** are a very important aspect in this sense, since training plays an essential role in providing the necessary skills through the evolving process.

Advances in information technology are rapidly changing the market environment, and companies need to look elsewhere to identify new skills and knowledge. In this context, the ability to innovate, by combining internal and external knowledge, is becoming one of the most critical components that leads to a sustainable competitive advantage (Stanko & Calantone, 2001).

2.1.4. *Innovation Management Models*

According to the literature, the stages of development and pre-development activities belong to technology management (Specht, 2002). The field of R&D management is determined by adding upstream fundamental research, as well as product and process development. Finally, innovation management includes the final product and market introduction phase.

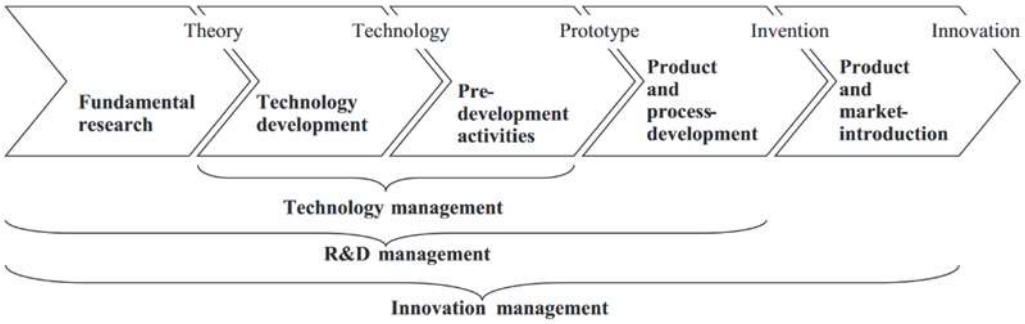

Figure 1 - Classification of management phases (Specht, 2002)

The models following the innovation management approach do not focus on the development of innovation itself, but rather on the evolution of companies' innovation management strategies under different social, economic and political circumstances. Traditional approaches to innovation management interpret innovation as linear process. However, over the last two decades evolutionary perspectives question this linearity of knowledge generation and propose a systemic interpretation of innovation. The classification based on the innovation generation (Rothwell, 1992), allows for the classification of all the existing innovation models into five different groups (Cagnazzo, Taticchi, & Botarelli, 2008).

Technology push model

The technology-push model was developed in the 1950's by observing technology evolutions. Organisations were able to evaluate technological opportunities and create innovative products based on available technologies. The innovation process was perceived as sequential, starting by internal research and development activities and capabilities.

Market pull model

The market-pull gained interest from the mid-1960's to early 1970's, when the ideas for innovation started within the market, among customers and their needs. Thus, the innovations' source is inadequately satisfied customer needs, which results in new demands for problem-solving.

Coupling model

The coupling model was defined in the 1970's as a coupled model integrating the technology-push and market-pull concepts. This is still a sequential model, but with feedback loops. The coupling model recognises the necessity of creating innovation by using both approaches, technological company readiness and customers' needs (Brem & Voigt, 2009).

Integrated model

The integrated model, also chain-linked model, starts considering Innovation as a fundamental process within firms (Kline & Rosenberg, 1986). R&D activities, engineering and production processes are integrated within companies and horizontal collaboration are developed with the leading partners. In the fourth generation the collaboration and networking concept emerges, and it appears an important task to pursue innovation.

Functional integration innovation model

The functional integration or networking model should enable companies to decrease both new product development time and cost by supporting the previous integrated model with sophisticated networking and computerised tools (Meissner & Kotsemir, 2016), by the integration of cooperating companies, the growing importance of information and communication technologies and the use of expert systems and networks.

Some authors include in the literature a sixth generation of innovation management, related to the open innovation paradigm, which highlights the use of inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation (Chesbrough, Vanhaverbeke, & Wet, 2006).

Open Innovation

Innovation occurs as a result of interactions between different actors, rather than being the result of an isolated genius (Von Hippel, 1988). In the current interconnected world, it is becoming impossible for organisation to remain isolated, making it necessary to integrate internal and external ideas and complementary technologies, as illustrated in the case of the GRACE project. This has shown to have a positive effect on the results of innovation activities and business profitability.

Chesbrough (2003) defined the concept of Open Innovation as a strategy that leverages internal and external sources of ideas and takes them to market through multiple paths. According to the author, collaboration allows for high innovation rates and efficient product development and the cooperation capacity of organisations through agreements lets ideas flow across organisational boundaries.

The term open innovation from the firm level is opposed to closed innovation (Chesbrough, Vanhaverbeke, & Wet, 2006), where the innovation process, from conception of the idea to marketing, happens internally in the organisation. One of the pillars of closed innovation is the profit generated by pioneering innovation in the market. In open innovation, not only the internal environment of the organisation is involved, but also the external environment.

Relying on external research and development, as opposed to simply relying on the organisation's internal R&D, increases flexibility and allows for the exploration of new markets. It also facilitates knowledge circulation, risk and resource sharing, and the cross-fertilization of ideas and practices. In this respect, **collaboration networks** represent a promising paradigm in a knowledge-driven society, also enabled by the current advances in Information and Communication Technologies (ICT).

However, there are also certain barriers to overcome when following an open innovation strategy, such as the dependence on the underlying value system, the difficulty in identifying the "added value" of each partner, or the complicated distribution of income and liabilities.

Some of the key factors that influence collaboration are the existing incentives schemes, the trust relationships established with other organisations, the management process, the ethical code and culture of the organisation, as well as the negotiation of contracts and collaboration agreements.

In the development of an open innovation model, several processes can be followed:

- Outside-in process: organisations invest in cooperation with other agents and integrate external knowledge.
- Inside-out process: to outsource internal knowledge and technology. This allows organisations to reduce fixed costs of the R&D activities, positions them as a reference in the market, sets their products or services as standards, and provides benefits from licenses and patents.
- Coupled process: the cooperation with other participants through strategic networks for an extended period. Greater benefits can be obtained, and success thus depends on choosing the right partners, and assimilating and integrating the external knowledge and skills (Gassmann & Enkel, 2004).

In order to develop these strategies, organisations need to build certain core capabilities (Smith, 2013). In the case of the outside-in process, they must rely on their absorption capacity to integrate sophisticated and costly technology. Moreover, they have to recognise the value of new external information, assimilate that information and apply it to the market, making use of efficient generation and integration processes. In the case of the inside-out process, organisations must rely on their multiplicative capacity to transfer internal

knowledge to their parties. They have to select the most appropriate partners and be able to code and share their knowledge. Finally, for coupled processes, organisations need to develop an effective connection capacity to build and maintain relationships with partners, particularly with complementary entities and competitors. This aspect is especially relevant in the case of GRACE.

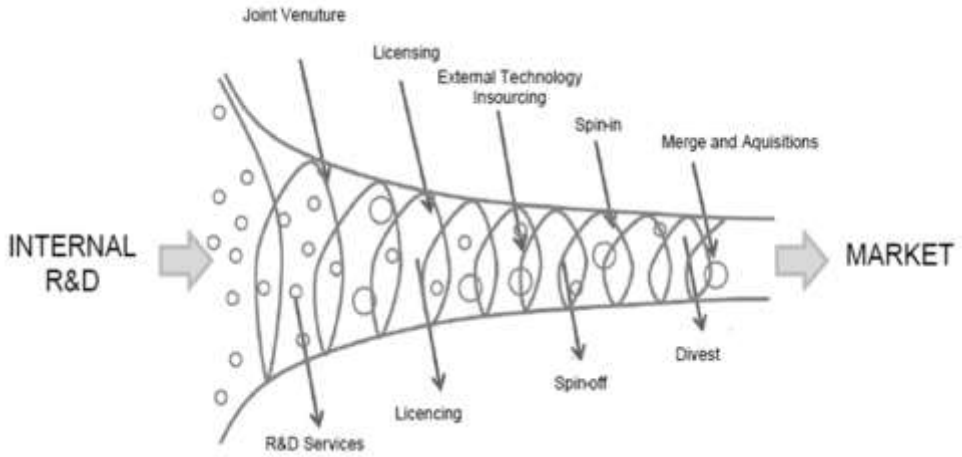

Figure 2 - Open Innovation Funnel modified from Chesbrough (2003)

2.1.5. *Distributed Innovation Management*

Distributed innovation processes are considered an option to handle the growing complexity of new products and services and the speed at which they need to be brought to the market, having a positive influence on the innovation cycle regarding quality and development times. A qualitative planning of collaboration intensities can support the management of innovation networks (Eschenbacher, Seifert, & Thoben, 2009), thus increasing its effectiveness.

Some authors in the literature have examined the role of collaboration for the development of new technologies, products, or processes (Tidd, Pavitt, & Bessant, 2001). Firms may choose to collaborate to reduce costs, to achieve economies of scale in production, to reduce time in development and commercialisation of new products, and mitigate the overall risk of technological development or market entry.

This said, a number of potential risks can arise throughout the lifetime of a collaboration, such as information leaks, loss of control or ownership of results, or the emergence of conflicting aims and objectives. In the context of the GRACE Project, these risks will be monitored and dealt with as part of the risk management activities to be performed under Task 1.1 Project Management.

Consortia consist of several organisations working together on a well-defined project, in order to share the risk and cost of the research activities, pool scarce expertise, resources or equipment, perform pre-commercial research and set standards. Some of the problems facing these consortia are how to coordinate research and innovation in member organisations, and how to manage technology transfer from the research partners to the member firms.

Organisational and managerial factors, both within partners and amongst them, also have an impact on the success of the GRACE Consortium. The characteristics of the technology of a beneficiary and the organisation's inheritance determine the outcome of the collaboration and knowledge acquisition strategy (Tidd & Trewhella, 1997). With regard to the characteristics of technology, the most relevant factors are those related to the competitive significance of technology, its complexity, codifiability, and credibility potential or political profile. When considering the organisation's inheritance, the factors include corporate strategy, overall capabilities and existing know-how, as well as managerial decisions on technical areas, and the culture of the organisation itself.

Collaboration is also an opportunity for each member to gain market advantage, develop technological know-how and long-term relationships. To account for these benefits, any measure of success should be dynamic, multidimensional and tuned to each member's expectations.

Collaborative projects require continuous consultation and communication between partners, which helps anticipate potential conflicts and issues with strategic divergence. According to some authors (Bruce, Leverick, & Littler, 1995), some of the factors that contribute to the success of alliances are:

- Alliance perceived as important by all members,
- Trust between partners,
- Clear project planning,
- Defined tasks and milestones,
- Frequent and effective communication,
- Actual contribution from all partners, and
- Benefits perceived as equally distributed.

Most of the collaborative projects (carried out by different organisations) are also geographically distributed, as it is quite exceptional that project team members from different organisations are located on the same premises. Thus, while distributed innovation offers many possibilities for partners to capitalise on the creativity of the community and customers, the management of distributed innovation requires organisations to re-examine their mechanisms for innovation governance (Sawhney & Prandelli, 2000), in order to find a balance between order and chaos. Traditional hierarchical governance mechanisms are efficient within firms or Research and Development departments, but they prevent the organisation from benefiting from the creativity, diversity, and agility of the partners, which is of significant importance in the case of international collaborative projects such as GRACE.

From an innovation policy perspective, and particularly in the case of Europe, ensuring that innovative ideas can progress and translate into potential market impacts is a core focus of the Europe 2020 strategy (EC, 2010) and its inherent Flagship initiatives such as The Innovation Union and Digital Agenda. In order to implement the strategy, the European Commission uses a number of tools, including financial support. For this reason, the value of innovation management in this type of international research, development and innovation projects needs to be analysed.

3. Innovation Management approach in GRACE

3.1. Innovation potential in GRACE

The main innovation potential of the GRACE project consists of a) novelties resulting in augmented operational and predictive capabilities on behalf of LEAs for case management, b) innovative collaboration schemes and secure exchange of information procedures among Europol and LEAs and c) straightforward ways to correctly, efficiently and effectively operate in the current ethical and legislative framework.

GRACE will make available an innovative, efficient, state-of-the-art set of tools, integrated in a user-friendly platform. Processing of visual information, sound and natural language, analysis and classification, deduplication and tampering-protection techniques, semi-automated annotation, as well as federated learning functionalities will progress, in the context of the project, leveraging the demanding characteristics of target cases and building upon the expertise of the technological partners.

The GRACE ecosystem provides innovative and robust solutions for effective collaboration and information exchange. The focus of GRACE is on the adaptation and implementation of both technologies and process that will provide maximum gain for the effort to be spent. GRACE novel approach respects the principle of LEA technological autonomy and, in order to ensure sustainability, it will be interoperable with existing platforms.

3.2. Innovation Management in GRACE

Some of the fundamental activities to be developed in any innovative process, such as the GRACE project, are as follows:

- **Generation of ideas** which potentially could become new products or processes;
- **Acquisition of knowledge** on the generated ideas; and
- **Implementation and market monitoring** to verify customer satisfaction and after sales.

Innovation management within European projects is a process which requires an understanding of both market and technical problems, with a goal of successfully implementing appropriate creative ideas. Corresponding business models and process innovations are hence an integral part of creating, adapting, and maintaining a product or service to market maturity. These new business models and process innovations are very often triggered through technological innovations, which act as enablers, but also generate requirements for the development of technology.

As part of the GRACE management structure, the Innovation Manager reports to the Technical Manager and also provides guidance to the Consortium with regard to best practices on innovation management, such as:

- ✓ Planning for innovation success, understanding and using innovation management techniques and processes during the lifetime of the project.
- ✓ Identifying and fostering innovation enablers/driving factors.
- ✓ Evaluating and improving the performance of the innovation management system.
- ✓ Identifying the “go to market” needs of high potential innovations.
- ✓ Systematically capture structured data on project innovations, related to innovation readiness, innovation management, and market potential (both TRL – Technology Readiness Level, and MARL – Market Adoption Readiness Level).

- ✓ Identification and exploitation of positive spill-overs.

Innovation does not just require new technologies and products, but also new Business Models (BM). In the European knowledge economy, production and services are based on knowledge-intensive activities. These activities contribute to an accelerated pace of technical and scientific advance. We will use existing business model tools and strategies in order to:

- Brainstorm and quick scan tooling for new BMs focused on formulating value propositions, branding and market segmentation in relation to organisational resources and capabilities and earning logics (examples: Canvas helps to structure the process of business model innovation and to early on deal with issues of business model implementation);
- Test Business Models in different scenarios;
- Define roadmaps on how to move to a new BM;
- Analyse impact for business process, applications and IT infrastructure when BMs are implemented;
- Align new BMs with relevant partners in the environment of the SME (their eco-system), but also with existing IT-systems, platforms and architectures; and
- Facilitate codification, transfer and adaptation of successful BMs from other sectors and countries.

The innovation process will be regularly monitored and reported in the **project periodic reports**, during meetings and telcos and the EC's innovation questionnaire. The innovation management plan is also clearly dependent on the work realised in all **technical work packages** which form the base of all innovations, as well as of the **Task 10.2 GRACE exploitation plan and business models** where a sustainable exploitation strategy for all GRACE's project results will be established in relation with licensing preferences and obligations of partners participating in the creation of the result.

3.3. Innovation Management Tools

In order to ensure an efficient innovation management within the GRACE project, dedicated tools and procedures, fitting all specific innovation management requirements have been proposed. These tools are placed under the responsibility of the Innovation Manager and the Technical Manager. Throughout the lifetime of GRACE, the tools described in this Section, as well as others not yet identified that might be of benefit for managing innovation in the project, will be implemented by the Consortium.

3.3.1. *S-curve framework*

A tool that can aid in the identification of technological innovations is the S-curve (Foster, 1986) that has been used to describe the origin and evolution of technologically discontinuous or radical innovations. The S-curve framework can also be used at the firm level for planning new technology development and has become a centrepiece in technology strategy. As depicted in the figure below, during early stages of technology the rate of progress in performance is relatively slow. Then the improvement increases, after been understood, controlled, and diffused. In a mature stage, technology will approach a limit.

Figure 3 - Technology/Marketing S-curve, adapted from (Foster, 1986)

3.3.2. *Stage Gate Model*

The "Stage Gate" model (Cooper, 1990) is the industry standard for managing new product innovation excellence. The widely implemented process integrates numerous performance-driving practices into easy to understand steps for success. Its design engages users of all decision-levels and functions, enabling quality execution, timely decisions, alignment and speed. This process allows products to reach markets faster and organisations to generate better profits.

The Stage-Gate business process and risk model designed to transform an organisation's new ideas into new product, fostering a culture of product innovation excellence: product leadership, accountability, high-performance teams, customer and market focus, robust solutions, alignment, discipline, speed and quality. The model takes the complex innovation process and divides it into smaller stages (project activities) and gates (where business evaluations and decisions are made).

Figure 4 - Stage-Gate Innovation Process

3.3.3. *Funnel Model*

The "Funnel" model (Wheelright & Clark, 1992), as well as the Stage Gate model, has become a reference model for innovation management. Many models that have emerged since are variations of these two models.

As represented in the Figure below, the overall innovation process starts with a broad range of inputs and gradually refines and selects from them, creating a reduced number of formal projects that can be completed and introduced in the market. The phases of the funnel are: input of ideas, development goals, project planning, project management, execution, learning, improved post-project. The limits of the funnel represent the boundaries of the organisation, in the case of GRACE, they represent the boundaries of the GRACE consortium.

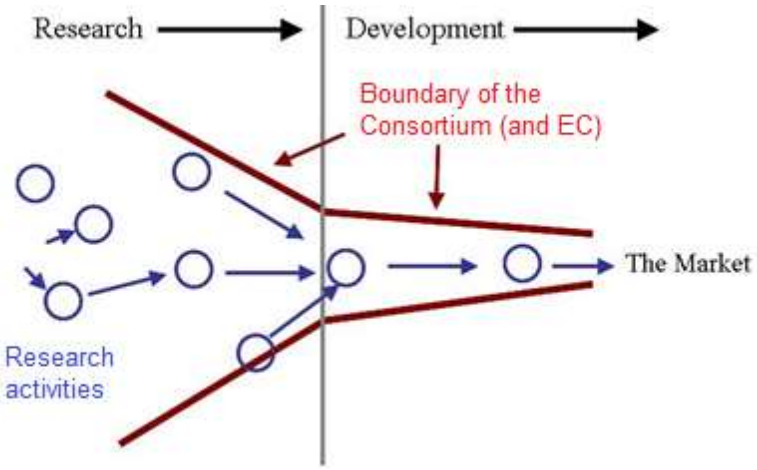

Figure 5 - Innovation Funnel (Wheelright & Clark, 1992)

3.3.4. *Risk Matrix*

To balance GRACE's innovation portfolio, the consortium needs a clear picture of how its activities fall on the spectrum of risk. The risk matrix employs a unique scoring system and calibration of risk to help estimate the probability of success or failure for each project based on how big a stretch it is: the less familiar the intended market (x axis) and the product or technology (y axis), the higher the risk.

A position on the matrix is determined by its score on a range of factors, such as how closely the behaviour of targeted customers will match that of the GRACE partners' current customers, how relevant their brands are to the intended market, and how applicable the technology capabilities are to the new product. The Innovation Manager together with the Technical Manager will conduct the evaluation, with the support of the WP Leaders and the development teams. Team members will rate each activity independently and then explain their rationale. They will discuss reasons for any differences of opinion and seek consensus. The resulting scores serve as the project's coordinates on the risk matrix.

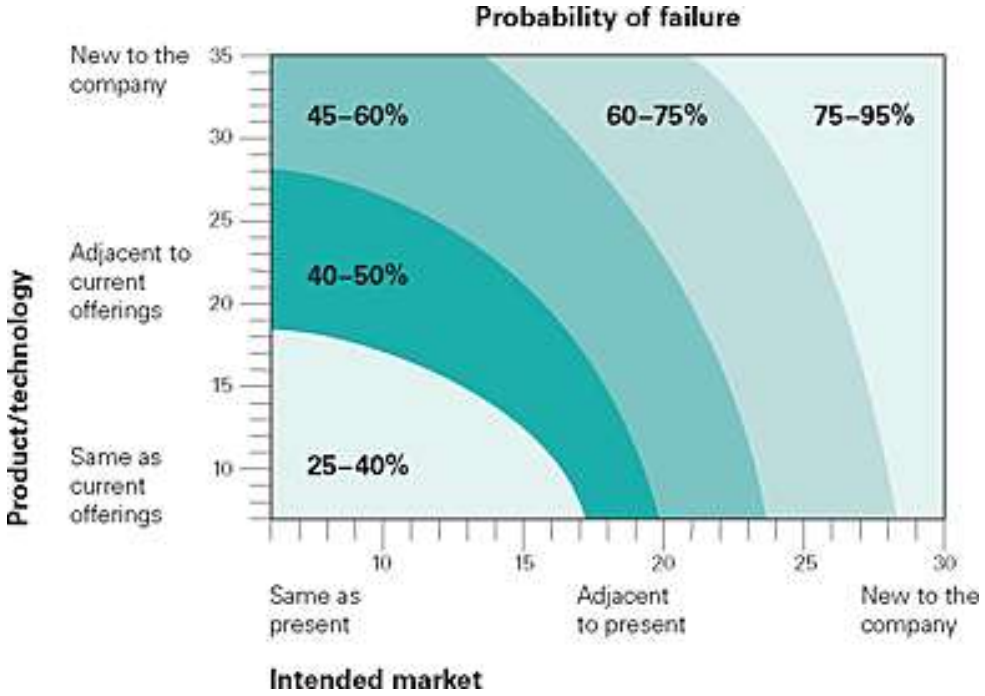

Figure 6 - Risk Matrix for innovations

3.3.5. *R-W-W Screen*

The Real-Win-Worth-It (R-W-W) screen, sometimes known as the Schrello screen, is a tool built on a series of questions about the innovation concept or product, its potential market, and the consortium's capabilities and competition. It is not an algorithm for making go/no-go decisions, but a disciplined process that can be employed at multiple stages of product development to expose faulty assumptions, gaps in knowledge, and potential sources of risk, and to ensure that every avenue for improvement has been explored. The R-W-W screen can be used to identify and help fix problems that are miring a project, to contain risk, and to expose problems that might lead to termination of an activity.

The R-W-W screen can be used to evaluate individual activities, concepts, or ideas by answering questions in three broad topic areas: "Is it real?" explores the nature of the potential market and looks at the feasibility of building the product. "Can we win?" considers whether the innovation and the company can be competitive. "Is it worth doing?" examines the profit potential and whether developing the innovation makes strategic sense (see Annex I).

3.3.6. *Monnier´s Innovation Matrix*

According to the literature reviewed, very few authors have addressed the problem of managing collaborative innovation projects. The Monnier's Innovation Matrix (Monnier & Zolghadri, 2010) is a tool aimed at measuring the level of innovation of an offer or an organisation. The study suggests a method for measuring innovation in seven levels that can be applied to most industrial companies. The tool is composed

of a two-dimensional matrix where the "X" axis represents the market level and the "Y" axis the new idea. This matrix will serve as a means to evaluate the technical level of the products or the relevance of a new service based on this new idea.

This tool could be considered as an efficient collaborative work platform, for the benefits of an innovation project management. Moreover, the Matrix could be used for evaluation of the innovation level for an offer, a supplier, for the evaluation of the innovation capability of the main outputs of a research study, as a strategic tool for decision making (e.g. patents), etc.

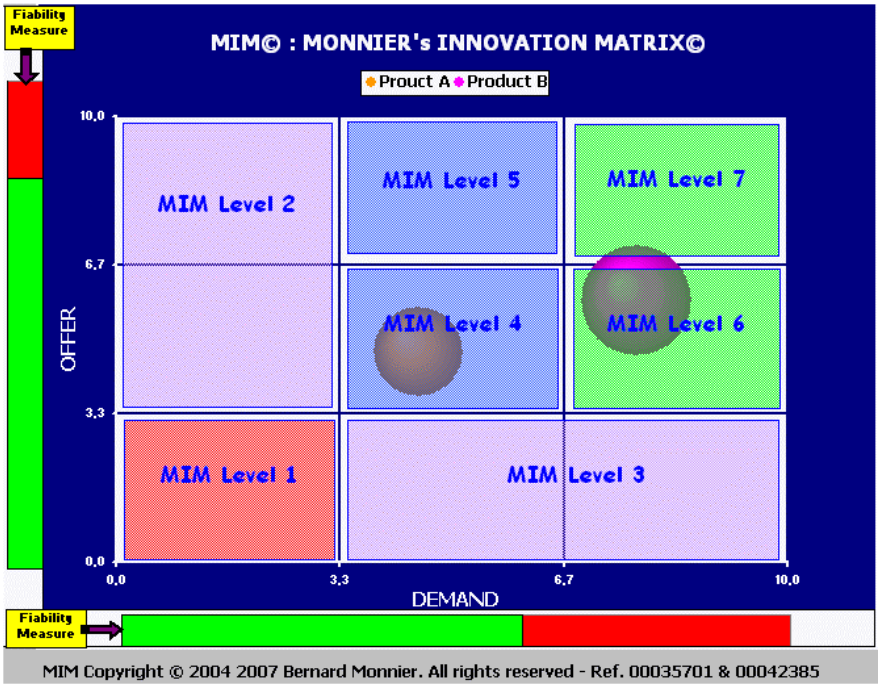

Figure 7 - Monnier´s Innovation Matrix

3.3.7. *Innovation Radar*

The Innovation Radar is an initiative of the European Commission focused on the identification of high potential innovations in FP7, CIP and Horizon 2020 projects. It supports innovators by suggesting a range of targeted actions to assist them in fulfilling their potential in the market. This initiative involves:

- assessing the maturity of innovations developed within the projects and identifying high potential innovators and innovations;
- providing guidance during the project duration in terms of the most appropriate steps to reach the market; and
- supporting innovators through entrepreneurship initiatives to cover specific needs concerning networking, access to finance, Intellectual Property Rights, etc.

According to De Prato, Nepelski, and Piroli (2015) the market potential and innovation readiness are among the strongest dimensions of the ICT innovations developed in the projects analysed in the report, while innovation management has the most room for improvement. In the context of GRACE, the structured

questionnaire that is used to review projects with respect to their innovative output by the innovation radar can be used to perform an internal qualitative evaluation of the potential innovations developed within the project (see Annex II).

3.4. Innovation Management Plan for the GRACE project

In this section we present a high-level plan of the activities planned to manage innovation throughout the project. It is important to note that the plan could be revised in relation to changes that may occur during the development of the GRACE programs.

The GRACE project will adapt and implement the innovation management processes defined in CEN/TS 16 555-1:2013:

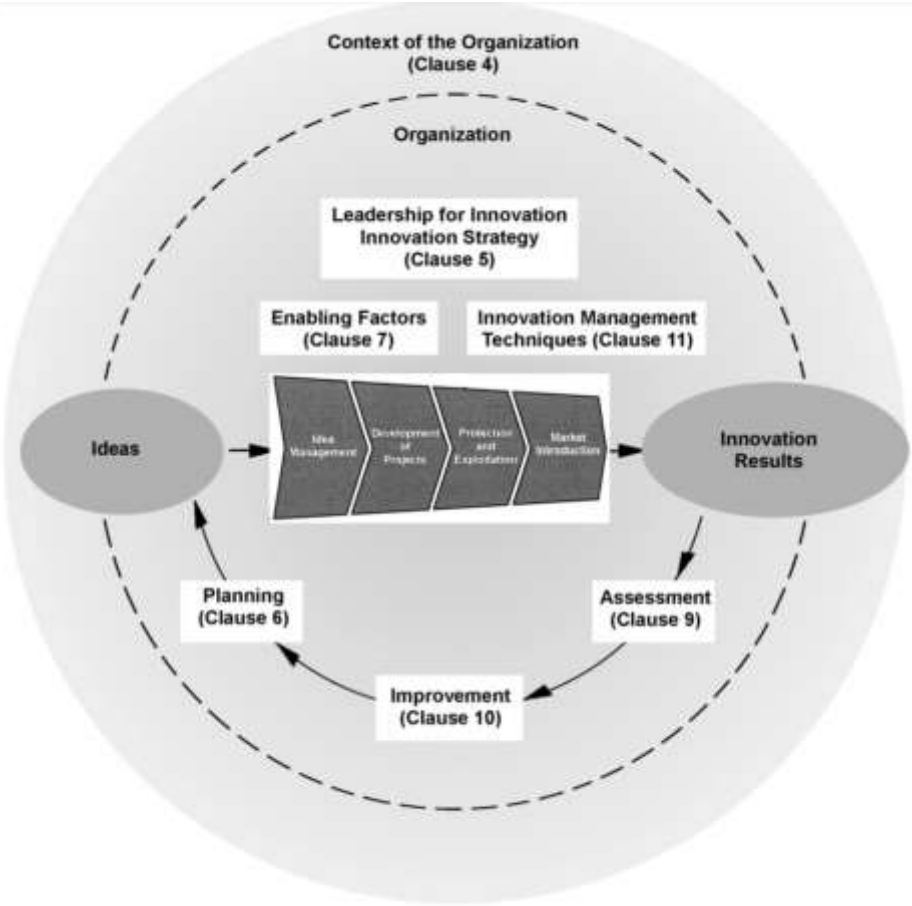

Figure 8 - Key elements of the innovation system (source: CEN/TS 16 555-1:2013)

During the initial months of the project, the innovation management tools described in the previous section were presented and discussed at the General Assembly, Executive Board, and WP1 Project Management meetings. As a result of these discussions, and considering the feedback obtained, an initial innovation

management work plan for the GRACE has been established and is presented below. This plan will be revised and, if needed, adjusted at least every six months during the lifetime of the project.

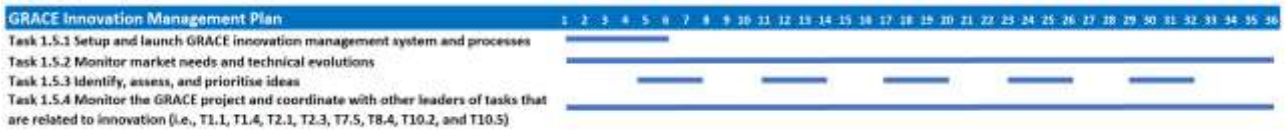

Figure 9 - Innovation Management work plan

Below we present a brief explanation of the work to be carried out in each of the innovation management work plan activities.

Task 1.5.1 Setup and launch GRACE innovation management system and processes

Within this task, the GRACE innovation management system and processes, based on CEN/TS 16 555 family of standards, will be presented by the Innovation Manager to the whole Consortium members. This will include things such as:

- Identification of the most relevant sources to conduct market and technological monitoring
- Setup of the market and monitoring tools (e.g., RSS feed aggregator) and processes
- Allocate project resources to conduct market and technological monitoring

Task 1.5.2 Monitor market needs and technical evolutions

This task includes the continues monitoring of the market and technological data sources identified in task 1.5.1. It also includes the identification of new relevant data sources, as well as filtering and distribution of the relevant information within the project stakeholders. It is important to avoid distributing too much or irrelevant information, therefore special care will have to be put on this matter. A publish-subscribe pattern[1] will be applied, so that project stakeholders will be able to produce and or consume relevant information based on their specific needs and interests.

To achieve this, a registry of relevant data sources (websites, social networks accounts such as Facebook, Twitter or LinkedIn) will be created by the Innovation Manager. For each entry in the registry, at least the following information must be provided:

i URL
ii source's name
iii source type; choose from:

1. **Media**, print newspapers, magazines, radio, and television from across and between countries.
2. **Internet**, online publications, blogs, discussion groups, citizen media (i.e. – cell phone videos, and user created content), YouTube, and other social media websites (i.e. – Facebook, Twitter, Instagram, etc.). This source also outpaces a variety of other sources due to its timeliness and ease of access.

[11] https://en.wikipedia.org/wiki/Publish%E2%80%93subscribe_pattern

3. **Public Government Data**, public government reports, budgets, hearings, telephone directories, press conferences, websites, and speeches. Although this source comes from an official source they are publicly accessible and may be used openly and freely.
4. **Professional and Academic Publications**, information acquired from journals, conferences, symposia, academic papers, dissertations, and theses.
5. **Commercial Data**, commercial imagery, financial and industrial assessments, and databases.
6. **Grey literature**, technical reports, preprints, patents, working papers, business documents, unpublished works, and newsletters.

iv Keywords; as for example: "Market", "Technology", ...
v credibility; score from 1 to 5 (1 being very low and 5 being very high)
vi reliability score from 1 to 5 (1 being very low and 5 being very high)

For each of the entries in the register of relevant data sources, a data acquisition system will be put in place, automating the processes when possible with tools such as RSS feeds, and RSS aggregators.

Then, a publish-subscribe model will be implemented. This will allow GRACE project members and stakeholders to subscribe to the "thematic feeds", and therefore, receiving on regular basis the information that they have chosen to receive. The credibility and reliability fields for each data source, along with other filtering options, will also allow subscribers optimizing the information they receive and reducing noise and undesired data.

The Innovation Manager will put in place the aforementioned data sources register, the data acquisition system, and the publish-subscribe model-based information dissemination system. The Innovation Manager will then inform all project members about these register and systems so that they can make use of it, updating the register as appropriate, informing the Innovation Manager of the changes, and subscribing/unsubscribing to the “thematic feeds” of their interest.

Task 1.5.3 Identify, assess, and prioritise ideas

All project stakeholders will be able to identify and report new ideas (e.g., new activities, scope changes), which will be submitted to the Innovation Manager. Initially, the R-W-W, Innovation Radar and Risk Matrix tools will be used, although they can change and evolve during the project.

The Innovation Manager will work on the ideas so that they are assessed and presented to the appropriate governance bodies of the project for consideration and, if approved, so that they can be implemented.

Task 1.5.4 Monitor the GRACE project and coordinate with other leaders of tasks that are related to innovation

As part of this task, the innovation manager will participate at different management level bodies and meetings in order to monitor the work being conducted in the project and to make sure that the innovation activities are aligned and on sync with the rest of the project activities. Special attention will be paid to tasks: T1.1, T1.4, T2.1, T2.3, T7.5, T8.4, T10.2, and T10.5.

4. Summary and Conclusion

4.1. Summary

This deliverable presents the detailed innovation management strategy, guidelines and tools to be followed within the duration of the action. The goal of this deliverable is to understand the market and the technical problems, in order to successfully implement appropriate measures and adapt creative ideas within GRACE.

As a conclusion, the innovation management plan is intended to serve as conceptual framework and supporting document for successfully creating value from project results. The innovation management process will be monitored and reported in project periodic reports and in any relevant web/tele-conference or face to face meetings throughout the duration of the project (see section 3.4 for further details).

4.2. Evaluation

These innovation management strategy, guidelines and tools have been created using successful previous experiences in various H2020 research projects. There have been no issues and it is not foreseen any major risk in the implementation of the proposed plan.

4.3. Future work

The implementation of the innovation management plan is still to happen during the duration of the project. This document is not expected to evolve. Therefore, though there might be the need to slightly change the implementation plan, future reporting of the innovation management in the project will be done via the period and final reports to the European Commission and in deliverable D10.3.

List of Abbreviations

Abbreviation	Translation
BM	Business Model
CIP	Competitive and Innovation Framework Programme
EC	European Commission
GA	Grant Agreement
IM	Innovation Manager
OECD	Organisation for Economic Cooperation and Development
PMT	Project Management Team
R-W-W	Real-Win-Worth it

Table 3 - List of Abbreviations

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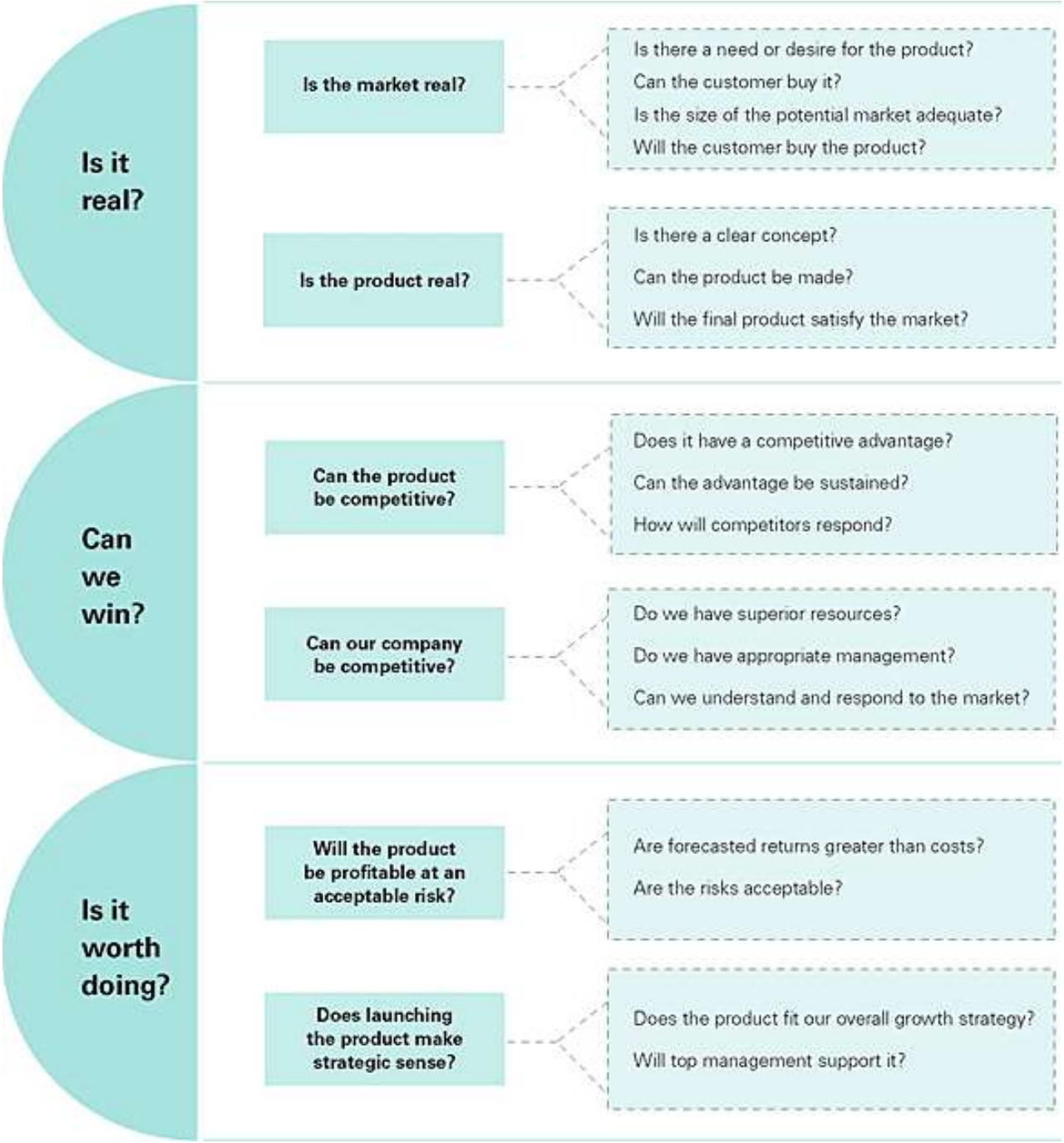
Annexes

Annex I: R-W-W Questionnaire



Annex II: Innovation Radar Questionnaire

Innovation Radar Questionnaire by EC DG CONNECT

Note: the first 16 questions below are to be answered for **each** innovation the project develops (up to a maximum of 3 innovations).

1) **Describe the innovation (in less than 300 characters, spaces included):**

2) **Is the innovation developed within the project…:**
   a) Under development
   b) Already developed but not yet being exploited
   c) being exploited

3) **Characterise the type of innovation (only to be answered if 2b or 2c is selected)**
   - Significantly improved product
   - New product
   - Significantly improved service (except consulting ones)
   - New service (except consulting ones)
   - Significantly improved process
   - New process
   - Significantly improved marketing method
   - New marketing method
   - Significantly improved organisational method
   - New organisational method
   - Consulting services
   - Other

4) **If other, please specify:**

5) **Characterise the macro type of innovation (only to be answered if "under development" is selected for Q2):**
   - Product
   - Marketing method
   - Organisational method
   - Process
   - Service (non-consulting)
   - Consulting service
   - Do not know yet

6) **Will the innovation be introduced to the market or deployed within a partner:**
   a) Introduced new to the market (commercial exploitation)
   b) Deployed within a partner (internal exploitation: Changes in organisation, new internal processes implemented, etc.)
   c) No exploitation planned

7) **If no exploitation planned, please explain why no exploitation is planned (answer only if 6(c) is selected)**

8) **Is there a clear owner of the innovation in the consortium or multiple owners?**
   - A clear owner
   - Multiple owners

9) Indicate who is the "owner" of the innovation: …

10) Indicate the step(s) already done (or are foreseen) in the project in order to bring the innovation to (or closer to) the market (answer only if 6(a) is selected)

	Done	Planned in project	Not Planned	Desirable
1. Technology transfer				
2. Engagement by Industrial research team of one of their company's business units in project activities				
3. Pilot				
4. Capital investment (VC, Angel, other)				
5. Investment from public authority (national, regional)				
6. Business plan				
7. Prototyping				
8. Market study				
9. Demonstration or Testing activities				
10. Feasibility study				
11. Launch a start-up or spin-off				
12. Other				

11) If other, please specify

12) Indicate which participant(s) (up to a maximum of 3) is/are the key organisation(s) in the project delivering this innovation. For each of these identify under the next question their needs to fulfil their market potential.

Org1:
Org2:
Org3:

13) Indicate their needs to fulfil their market potential

	Investor readiness training	Investor introductions	Biz plan development	Expanding to more markets	Legal advice (IPR or other)	Mentoring	Partnership with other company (technology or other)	Incubation	Startup accelerator
Org 1									
Org 2									
Org 3									

14) When do you expect that such innovation could be commercialised? (answer only if 6(a) is selected)

- Less than 1 year
- Between 1 and 2 years
- Between 3 and 5 years
- More than 5 years

15) Have any of the project partners…

(only to be answered if "Done" or "Planned in Project" is chosen for 10.5 "Investment from public authority")

a) already applied for support from private investors

b) already applied for investement from public authorities
c) Planning to start discussions with private or public investors

16) Which partners are in discussion with investors (or are planning such discussions)?

(the above questions are to be answered for **each** innovation developed by the project, up to a maximum of 3 innovations)

General Questions

(questions below are to be answered once in the project review, not for each innovation)

1) How does the consortium engage end-users?
- End user organisation in the consortium
- An end user organisation outside of the consortium is consulted
- No end user organisation in the consortium or consulted

2) Are there in the consortium internal IPR issues that could compromise the ability of a project partner to exploit new products/solutions/services, internally or in the market place?
- yes
- no

3) Please provide specifics of the IPR issues:

4) Which are the external bottlenecks that compromise the ability of project partners to exploit new products, solutions or services, internally or in the market place?
- IPR
- Standards
- Regulation
- Financing
- Workforce's skills
- Trade issues (between MS, globally)
- Others

5) Indicate how many patents have been applied for by the project: _____

6) Does the review panel consider the project performance in terms of innovation?
- Exceeding expectations
- Meeting expectations
- Performing below expectations

7) General observations of innovation expert on this project's innovation performance:

8) How would you rate the level of commitment of relevant partners to exploit the innovation?
- Very low
- Low
- Average
- High
- Very High
- None