



D2.1.1

ExtremeFactories

Methodology Workbook v1

WP 2

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Summary

The ExtremeFactories project is about enhancing the innovation management process in globally acting networked SMEs. This is done by means of creating a new innovation methodology, based on Agile Practices, and a collaborative internet-based platform for adoption of a systematic innovation process. The platform will support SMEs to manage and implement the complex innovation processes arisen in a networked environment, taking into account their internal and external links, by enabling an open multi-agent focused innovation (i.e. a customer/provider/supplier/employee focused innovation). The solution will be specifically focused on the needs of manufacturing companies and will observe both product and process innovation.

This document, deliverable D2.1.1 'ExtremeFactories Methodology Workbook', deals with the first version of one of the critical parts of the project: the Methodology. It contains the ExtremeFactories Innovation Process Model (activities, techniques, inputs, outputs and actors of the whole innovation process life-cycle: identification of innovative ideas, prioritization, implementation and follow-up), which has been produced by the RTD partners based on state-of-the-art techniques in innovation management and agile software development. It also contains the main methodological topics. The document will go through several versions along the project. In future versions, the deliverable will be oriented to the end-users following a case-based approach (i.e. the concepts of the methodology will be illustrated with real cases), thus every technical reference to the origin of the practices will be eliminated.

Chapter 2 presents the fundamentals of the ExtremeFactories Methodology, e.g. the specific innovation process proposed by ExtremeFactories, the types of Innovation taken into account in the methodology (Service, Product and Process Innovation) or how Agile Practices are going to be incorporated in the Methodology.

In **Chapter 3** the reader can find the full description of the ExtremeFactories Process, which comprises five phases: Preparation, Inception, Prioritization, Implementation and Follow-up. Each phase is detailed in its own subchapter, also containing the Agile Practices which could be applied on it. The chapter remarks one of the main characteristics of the methodology imported from agile practices: the **iterative approach**. ExtremeFactories will apply iterations not only in the whole life-cycle of Innovation but also in each of the stages (*Preparation, Inception, Prioritization, Implementation and Follow-Up*).

Chapter 4 presents the six stakeholder groups taking part in the corporate innovation process (as identified by the Consortium members). These groups are: The Management, The Employees, The Customers, The Sub-contractors and Suppliers, The Reviewers and The Process Owner. They can also be considered as the customers of the ExtremeFactories platform. It is important to note that they have different roles in the five phases of the innovation process. These roles as well as the customer value propositions are described in this chapter.

The last part of the document contains a table including the traceability of the Methodology with respect to the requirements identified in the first phase of the project (see **Chapter 5**); and, some Annexes with the key Factors for Innovation and several Creativity Techniques which can be applied in the Inception phase (**Chapter 6**).

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Abbreviations

SME	Small and Medium Sized Enterprises
RTD	Research and Technological Development
ICT	Information and Communication Technologies
e.g.	Exempli gratia
p.o.v.	Point of view
KIB	Knowledge Intensive Businesses
KIBS	Knowledge Intensive Business Services
IT	Information Technologies
EFF	ExtremeFactories
FIP	Fast Idea Prioritization
CIP	Comprehensive Idea Prioritization
T/O	Turn Over
CoS	Cost of Sales
MS	Microsoft
InInS	Innovation Inception Services
InPrS	Innovation Prioritization Services
InImS	Innovation Implementation Services
InFoS	Innovation Follow-Up Services
LPM	Lean Project Management

1 Introduction

This document is deliverable D2.1.1 'ExtremeFactories Methodology Workbook' developed in the first phase of the ExtremeFactories project.

1.1 Overview

This document presents the first version of the ExtremeFactories Methodology Workbook, which has been produced based on the results obtained from tasks T1.1 'State of the Art Analysis', T1.2 'Specification of Business Cases', T1.3 'Specification of Requirements' and T1.4 'Definition of the ExtremeFactories Concept'.

In the tasks mentioned above, a close scrutiny of the industrial SMEs that are the consortium partners in the form of a detailed document of Business Cases has been carried out, as well as a thorough compilation of the State-of-the-Art of methodologies and approaches. The RTD partners have worked on these applying the lens of their specific expertise, therefore extracting critical knowledge to guide the selection of the most fitting methodologies and the technical requirements of the platform.

1.2 Approach Applied

The RTD partners have elaborated the ExtremeFactories Innovation Process Model (activities, techniques, inputs, outputs and actors of the whole innovation process life-cycle: identification of innovative ideas, prioritization, implementation and follow-up) based on state-of-the-art techniques in innovation management and agile software development. The model and the main methodological topics are contained in this document that will go through several versions along the project. The present document contains the first version of the methodology produced by the Consortium. This version explains the main concepts behind the different practices proposed by ExtremeFactories. In the future versions the methodology will be oriented to the end-users, thus every technical reference to the origin of the practices will be eliminated and the following elements will be added:

- Case-based approach: Identification of real cases that illustrate the application of the practices proposed by the methodology.
- Script like instructions for end-users to easily implement the methodology.
- Printable format to be used in non-ICT environments, such as manufacturing plants.

2 Fundamentals of the ExtremeFactories Methodology

2.1 About the format

The ExtremeFactories Methodology for managing innovation processes is a deliverable that will be subject to several updates along the project (3 versions will be delivered in months 12, 24 and 36).

The present version of the document will be focused on explaining the main items of the methodology. It will shortly explain the origin of the methodology (based on classical approaches as identified in *D1.1. State of the Art*, that will include agile practices) and then it will describe the proposed new concept including:

- the stages, sub-processes and the agile practices used in each of them
- the rationale for the selection of the different agile practices that will be used in each stage
- incomes and outcomes,
- the actors involved,

The final objective of the ExtremeFactories Consortium is to edit and publish a book to be usable by any type of target user. In the following versions of the document the consortium will elaborate a book written in a non-technical language so SMEs will be able to easily integrate the methodology within their processes. This means that the second and final versions of the deliverable:

- will eliminate the references to technical aspects of the methodology
- will focus on the guidelines for the end-users to successfully apply the methodology
- will illustrate the concepts with real life cases
- will have a format that can be handled in rough conditions, e.g. main practices can be formatted in a way that can be printed out and plastic-covered so as to be used in manufacturing plants as a support to the daily activity.

These new versions will include clear case proofed instruction for the end-users of the Methodology. The description will observe the p.o.v of the different actors (management, suppliers, customers, staff...) and the reference to technical aspects (e.g. agile methodologies) will be avoided. It will be a script-like text supported by diagrams and drawings for end-users to follow the methodology.

2.2 Innovation shortly

There are many definitions for Innovation (as stated in *D1.1 State of the Art*), though the definition that best suits ExtremeFactories' approach is the one proposed by Dr. Paul Trott, i.e. "*Innovation is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or improved) product or manufacturing process or equipment*" [P. Trott, 2008].

This definition already identifies 2 types of Innovation:

- Product Innovation, i.e. the innovation process which goal is to create a new product.
- Process Innovation, i.e. innovation process which goal is to create a new manufacturing process or improve an existing one.

Innovation can also be catalogued depending on the novelty of the product, process or service. In that sense, 4 categories of Innovation can be found:

1. Incremental Innovation,
2. Breakthrough Product or Technology,
3. New Business Model and
4. New Venture.

It can be added that an Innovation Process is usually triggered when:

1. The company identifies new demands of products or services in the market (“Market Pull”).
2. The company creates a new product or service that introduces in the market (“Technology Push”).

As it can be observed there are many ways to make front to an Innovation Process; existing as many methodologies as combinations of the aforementioned elements.

In ExtremeFactories the consortium is trying to put all these concepts together and create a methodology for SMEs to choose the most adequate practices and tools to tackle their Innovation Processes within the company.

Some specific elements of the ExtremeFactories Methodology are:

- *The inclusion of a new type of Innovation: Service Innovation*, i.e. innovation process which goal is to offer a new or improved service to the market. Despite this type of Innovation can be considered to be very close to Product Innovation, there are some features that make Service Innovation different and worth to explore for companies not used to deliver services such as manufacturing SMEs.
- *The consideration of new triggers for Innovation* such as:
 - a. the resolution of defects, since innovations in products may come from the imaginative resolution of defects and
 - b. the improvement of processes, since innovation in processes may come from the imaginative redesign of processes.

ExtremeFactories does not understand the Innovation Process as an event that happens in a time lapse due to new market needs or the obligatory nature of a problem in the manufacturing process or a product. Furthermore ExtremeFactories aims at creating the ideal context for Innovation within the companies so Innovation becomes an attitude of the company for overcoming every day tasks.

Another conclusion from Trott's definition is that there are 3 neat stages in the Innovation Process: Idea Generation, Implementation (technology development and manufacturing) and Marketing of the product. The Innovation Process proposed by ExtremeFactories has variable number of stages depending on several factors: the experience of the innovator, its degree of preparation to start an innovation project, the type of innovation to overcome, etc.

These stages (which will be fully explained along the document) are:

1. *Preparation*. Transversal stage that aims at leading the company to a state where it can proceed with the innovation process with more probability of success, including the creation of a clear Innovation Strategy.
2. *Inception*. First stage of the innovation process where the actors involved in the innovation process generate ideas to solve a problem, create a new product/service, improve a process, etc.
3. *Prioritization*. Once the ideas are generated, in this stage the actors involve in the process will select the most promising ones to be implemented.
4. *Implementation*. During this stage the candidate ideas become projects with specific tasks and those responsible. Implementation may imply several activities: from design and manufacturing to the marketing of a product.
5. *Follow-Up*. The final stage of the ExtremeFactories Methodology consists of evaluating the degree of success of the implemented ideas in order to learn from past errors or replicate previous success stories.

2.2.1 Innovation in Services and Products

2.2.1.1 Innovation in Products

'The development of a new or improved product' is a very simple definition of *Product Innovation*. The term *Innovation (in Products)* also embrace radical alterations to what is produced and/or supplied. If we consider a product has many dimensions we can say that a product is 'new' whenever a newness appear in any of its dimensions, such as packaging, price, features, technology, level of service, brand name and quality specifications [Paul Trott, 2008].

Product Innovation is often linked to Process Innovation, many times an innovation in a product has been obtained through an innovative process. In this document we try to separate these two concepts in order to understand all the implications they have.

2.2.1.1.1 Classification of Product Innovations

Trying to classify the different Product developments (innovations), many analysts have divided product development into 'old product development' (product improvements) and 'new product development' (products with greater development challenges). However, the commonly accepted categories of Product Innovation have been explained by Booz, Allen and Hamilton (1982), who classify new products dependent on level of newness.

Their classification is presented below [Paul Trott, 2008]:

Table 2-1- Typologies for Products Innovations (Booz, Allen & Hamilton (1982))

Typology	Description
New-to-the-world products	New products that not only represent a major new challenge to the supplier, but which are also seen to be quite new in the eyes of customers.
New product lines	New products which represent major new challenges to the supplier.
Additions to existing product lines	New products that supplement a company's established product lines, so rounding out the product mix.
Improvements and revisions to existing products	New products that provide improved performance and so replace existing products.
Repositionings	Existing products that are targeted to new markets or market segments.
Cost reductions	New products that provide similar performance at a lower cost of supply.

Since this classification is considered as the most complete up to date referring to Product Innovation, ExtremeFactories Methodology and Platform will take it into account when performing the prioritization activities. As it will be stated later on, settling an idea into this classification will help decision-makers to evaluate the risk of implementing the idea with determined resources.

2.2.1.2 Innovation in Services

Innovation literature has traditionally viewed services as different from products because 'innovation theory' has been developed around science and technological development. For the traditional view is difficult to understand innovation within services because of the intangibility of them. But the growth in ICT during the 1980s and the development of the Internet in the 1990s started to produce an enormous change in the developed economies around the world, and a massive increase in the amount of specialized business services appeared, meaning critical inputs for the firms in all sectors. The new information communication technologies continue nowadays making big changes in the way of offering services, even new necessities of services emerge, no existing before, so that it is clear a new type of innovation has appeared: *Service Innovation*.

Innovation in Services, as it has been mentioned, is becoming very important nowadays, especially for those organizations which activity is knowledge-intensive. The Knowledge-intensive business services (KIBS) have become the key behind the development of the service side of economies. These include traditional professional business services, such as ac-

countancy and law, but also a new generation of KIBS. Furthermore, we are witnessing the rising of new business models out of the mix-up of new services and technology (as Amazon, iTunes, IKEA...). There is also a trend towards wrapping the product in new services to add more value to the client, as equipment’s predictive maintenance, remote maintenance or own equipment calibration, for example.

From all the above we can conclude that the inclusion of this Service Innovation point of view in ExtremeFactories will be very useful for its end-users, and mainly for those traditional manufacturing companies that focus their attention only on product innovation rather than exploring this new way. It’s important for innovators to understand that the creation of a new service is a complex process. ExtremeFactories will provide to them the key for gaining a significant competitive advantage.

Service Innovation is treated separately from Product Innovation since Product and Services have different characteristics, although they often appear very close each other. The three characteristics that distinguish services from products are identified as intangibility, heterogeneity and simultaneity (services are produced and consumed simultaneously by several users or consumers).

2.2.1.2.1 Classification of Service Innovations

In much the same way as new products are classified dependent on level of newness, services have been classified depending on the level of change, as Paul Trott says in his book “Innovation Management and new Product Development” [Paul Trott, 2008]. The most widely known in that sense is the Lovelock’s classification, which usefully illustrates the different levels of change than can occur within service innovation:

Table 2-2- Typologies for Services Innovations (Lovelock (1984))

Typology	Description
Major innovation	New services for markets as yet undefined; innovations usually driven by information and computer-based technologies.
Start-up business	New services in a market that is already served by existing services.
New services for the market presently served	New service offerings to existing customers of an organisation (although the services may be available from other companies).
Service one extensions	Augmentations of the existing service line such as adding new menu items, new routes, and new courses.
Service improvements	Changes in features of services that are currently being offered.
Style changes	The most common of all ‘new services’; modest

Typology	Description
	forms of visible changes that have an impact on customer perceptions, emotions and attitudes, with style changes that do not change the service fundamentally, only its appearance.

The above classification of Service Innovation can be compared with the classification of Product Innovation; in fact they have equivalent levels:

Table 2-3 - Product vs. Service Innovation

Typologies for Products Innovations (Booz, Allen & Hamilton (1982)) – <i>Level of newness</i>	Typologies for Services Innovations (Lovelock (1984)) – <i>Level of change</i>
New-to-the-world products	Major innovation.
New product lines	Start-up business
Additions to existing product lines	New services for the market presently served
Improvements and revisions to existing products	Service one extensions
Repositionings	Service improvements
Cost reductions	Style changes

On the other hand, the classification presented by Booz, Allen & Hamilton (1982), is the most extensively applied in the context of both new services and new products.

Similarly to Product Classification, this one will be applied in ExtremeFactories for supporting the decision making process.

2.2.2 Innovation in Processes

Despite Service and Product are the most common types of Innovation, there are authors that identify up to 15 different variations. One recurring type that will be included as part of the ExtremeFactories Methodology and Platform is *Innovation in Processes*, which implies the design and implementation of a new or improved production or delivery method.

This type of innovation is really important for the initial target companies of ExtremeFactories, i.e. manufacturing SMEs. Many of these enterprises are constrained by regulations and customers’ requirements not being able to innovate in product or services, but they constantly improve their manufacturing processes in order to gain efficiency.

ExtremeFactories will provide guidelines for tackling this type of innovation, which is similar to an iterative approach to *Processes Improvement*, where:

- initially the current processes are modeled;

- secondly the current performance indicators are identified and measured to be assessed once the new process is implemented;
- thirdly new objectives are set for the performance indicators;
- finally, it enters an iterative path where first of all the process is redesigned, its repeatability and stability are verified and it's validated until the desired performance indicators are met.

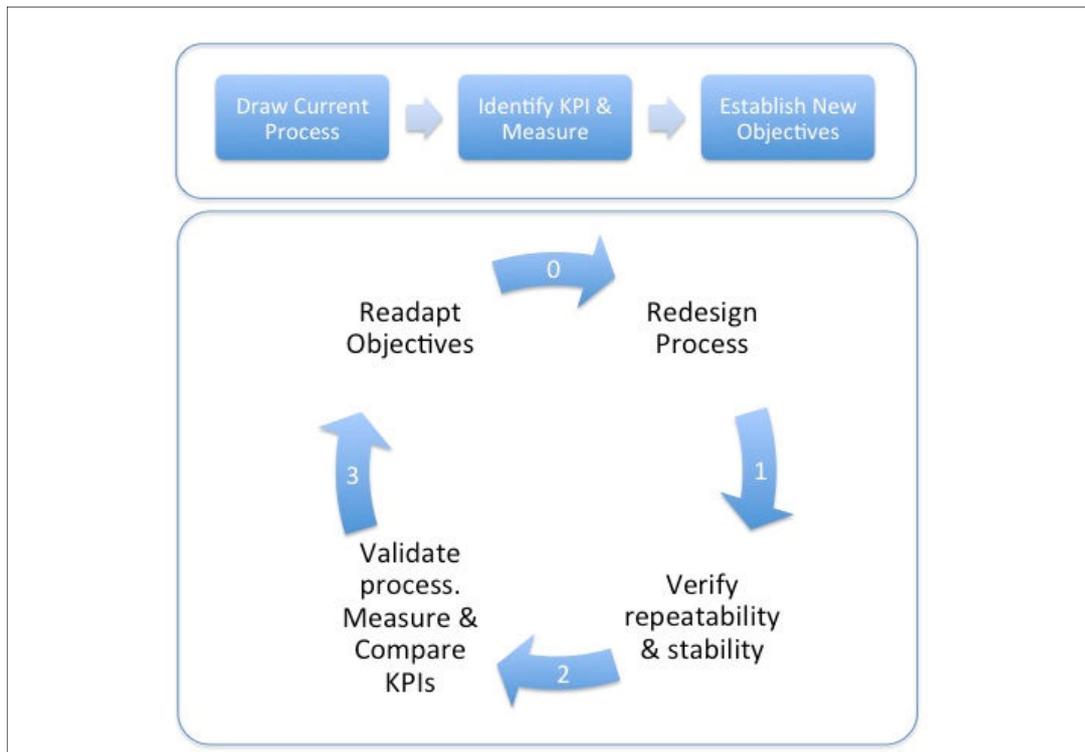


Figure 2-1 – Innovation in Processes

2.2.2.1 The implementation of “Agile” Practices

As described in *D1.1 State of the Art*, the concept of “Agile” is used in Software Development to identify methodologies opposed to traditional heavy weight approaches such as RUP, METRICA3 or others. The main Agile Methodologies identified in D1.1 are Extreme Programming, SCRUM, Lean Development or Kanban.

These practices are a set of engineering best practices that allow for rapid delivery of high-quality product/services, and a business approach that aligns development with customer needs and company goals in an efficient manner. In project management terms, it generally promotes a leadership philosophy that encourages teamwork, self-organization and accountability. Agile practices are applied in many disciplines and are very popular in project management applications.

Agile methods are a family of development processes, not a single approach to product/service development where the emphasis is on creating products/services in a lighter, faster, more people-centric way.

One of the key objectives of ExtremeFactories is creating an agile methodology, so its main target users (manufacturing SMEs) can rapidly and efficiently implement an Innovation Process. ExtremeFactories proposes to use many of the agile practices as part of the Innovation Process. The main source of agile practices for ExtremeFactories is ExtremeProgramming since it's considered as the origin of all the current agile methodologies, though concepts used in SCRUM will also be applied for the management of the Innovation Process.

The ExtremeProgramming practices to be used in Extreme Factories are: *Small Releases, Planning Game, Refactoring, Testing, Pair Programming, Sustainable Pace, Team Code Ownership, Coding Standards, Simple Design, Metaphor, Continuous Integration* and *On-site customer*. Most of SCRUM's management concepts and roles such as Backlog, Sprint Process, Product Owner will also be used shifted to the field of Innovation (detailed description of each practice can be obtained from *D1.1 State of the Art*).

One of the main characteristics of the Agile methodologies is their **iterative approach**. ExtremeFactories will also apply iterativity, not only in the whole life-cycle of Innovation but also in each of the stages (*Preparation, Inception, Prioritization, Implementation* and *Follow-Up*). The main practices of ExtremeProgramming to manage this iterative approach are *Planning Small Releases (or Sprints), Testing* and *Refactoring* and will be applied as follows:

An Innovation Strategy may be composed of a number of strategic lines, comprising several innovation objectives. Achievement of each innovation objective will be an iterative process. This process starts with the scheduling or planning of a number of activities and milestones in a short period of time (*Small Releases*). These activities (proposal of ideas, elaboration of prototypes, etc.) are performed and validated (*Testing*) and the feedback is used to rework the ideas, prototypes or whatever action that has been previously validated ensuring it still fulfils the original requirements (*Refactoring*).

Iterativity can also be applied at a stage-level by:

- a. *Proposing & Prioritizing ideas* in an iterative fashion until the most promising candidates are selected to become projects.
- b. Applying the iterative approach in the *Implementation* of the idea by proposing prototypes until a final version of the product, service or process improvement is validated.

2.2.2.2 SME point of view

Business' Innovative spirit does not really depend on company size, no matter how small or big a business is. Being innovative is, in many cases, a state of mind and this has little to do with neither business size nor technology but to having adequate teams supported by the necessary tools. In the end it is the market which will determine the failure or success of an innovation.

Presently, companies' innovation capacity is being "tested" by global competition with increasing intensity. To succeed in the long term, any business needs to be able to offer, at increasingly short notice, newer, better, more complex and more individualized services/products. This competitive pressure, added to fast changing customers' needs, makes

innovative capacity a strong decision factor which, in many cases, determines product/service commercial success or failure.

By the end of last century, a company could maintain its leading position in the market just by safeguarding its business secrets. Presently the amount of information produced worldwide, the knowledge generation speed and the access channels to such info grows by the second making it difficult to be safe just keeping things as used-to-be.

Today, things have changed, business are in pressure to be able to continuously discover or combine ideas and know-how to profitably offer new products/services to the market. In this sense the future profitability of a business is determined by three major competences such as: fast recognition of product/market competitive trends' changes; quick identification of customers' needs (and fast problem-oriented solutions) and good knowledge of technologies in place.

These are all challenges which most business can hardly face on its own in the long run. Although innovation spirit is not limited by company size, several practical limitations are more evident when dealing with smaller companies.

A number of drawbacks may be highlighted when it comes to innovation in SMEs:

- Limited number of workers with competences or skills in process and /or product innovation.
- Limited number of projects being able to be developed simultaneously thus limiting the balance of economic risk.
- Limited resources/funds to face projects or activities with long preparatory/development phases.
- Lack of information and knowledge.

Although in many cases SMEs argue that innovations are only for big businesses due to costs, one can also say that innovativeness is not exclusively coupled with the use of the most exquisite, expensive and complex technologies. In fact, in many cases innovativeness has little to do with the technology used (as one can see in this report many simple & inexpensive tools – brain posting, pictures, nominal methods, etc. are extremely useful supporting innovation process).

To help SMES to overcome identified limitations, new, easy to acquire, easy to operate, user oriented methodologies are necessary and most useful. ExtremeFactories one is a specific methodology designed for SMES, which intends to help small organizations to overcome these barriers obtaining full potential of major SMEs advantages.

Smaller businesses, if well supported (e.g. EFF Methodology), will benefit of their major advantages in terms of shorter decision making processes, faster response times to new ideas (short time to market), team commitment and motivation and closer relation to customers, and cost-effective structures.

Avoiding so-called examples of the big world class companies (IKEA, AMAZON, IDEO, etc.) ExtremeFactories will include specific SME business-cases in order to show small companies how others have succeeded in the innovation process.

2.3 The ExtremeFactories Process

2.3.1 General

ExtremeFactories proposes an iterative process of 4+1 phases (Inception, Prioritization, Implementation, Follow-Up + Preparation). As it will be explained in the sections below, during the Preparation Stage a number of practices and assessments will be proposed for the management to trigger the Innovation Process. Furthermore, this extra phase deals with the continuous generation and provision of knowledge for the 4 main stages, as illustrated in the drawing below:

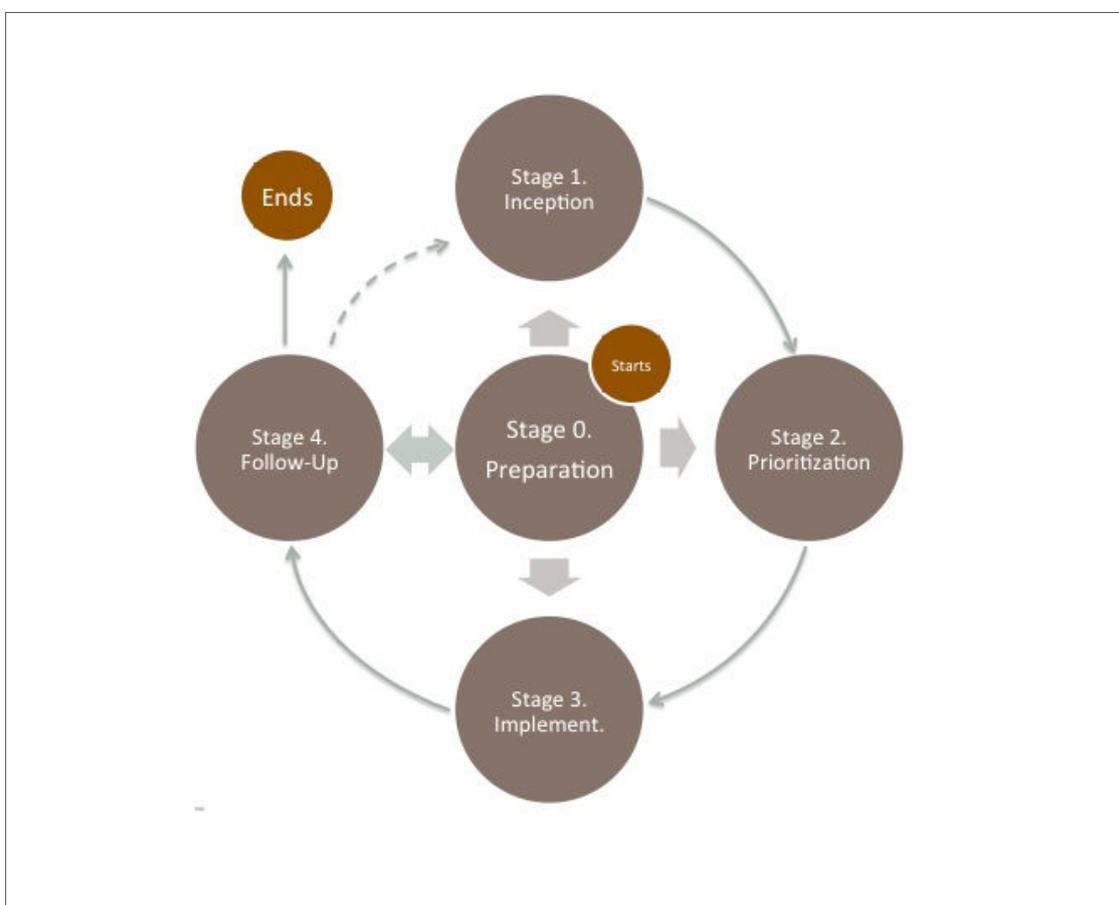


Figure 2-2 - ExtremeFactories Innovation Process

As it will be explained in the following sections, the main actor responsible for launching the Innovation Process is Management and the rest of identified stakeholders will be able to participate in all the stages depending at some extent.

2.3.2 Preparation

2.3.2.1 Description of the Phase

The innovation projects/processes are tightly connected to risks what is often one of the main hurdles in starting innovation processes. It is argued that risk-averse corporate culture and lengthy development times, are the two biggest forces holding down return on innovation spending.

This preparation phase is exactly that one in which the ability to adapt to change/innovation, to view change as opportunity rather than threat should be demonstrated.

The innovation projects tend to start with loosely defined objectives which become clear only after a period of time and that the processes used are more experimental and seldom follow strict linear guidelines, what emphasises importance of a structured approach to the first innovation phase, provided by the ExtremeFactories platform.

This first innovation phase will be a set of transversal activities that will deal with the preparation of the management and staff of the company to tackle with a successful Innovation Process. Preparation has to deal with the creation of a sound *Innovation Philosophy* in the company, starting by acquiring the required knowledge about the company's context for innovation or introducing training and communication strategies.

In that sense, at the very beginning of an innovation process the innovation team should define:

- A list of innovation **governance responsibilities**:
- Roles **and ways of working** around the innovation process
- Decision **power lines** and **commitments** on innovation
- Key **responsibilities** of the main players
- Set **of values** underpinning all innovation efforts
- Decision that define expectations
- How **to measure** innovation
- **Innovation budgets**
- Orchestrating, balancing and prioritizing innovation activities across divisions
- Management routines regarding communications and decisions.

This list provides a good first description of the scope of innovation governance. But to see how it applies in your company, it is worth going a bit further and asking: What questions does innovation governance address? Broadly speaking, it deals with both the "content" and the "process" sides of all innovation activities taking place in a company.

These issues should be collected in a document entitled *Innovation Strategy* or *Innovation Plan*. It will be a short document elaborated by the management of the company with the contributions from pre-selected groups of the staff. It's recommended to elaborate this document with the support of external experts in Innovation Management since they can adapt the Strategic Plan to the characteristics of the company.

The document will contain the following items:

- **Slogan.** Slogan for the Innovation Strategy of the Company.
- **Values.** Definition of the values that will encourage innovation within the company, including dissemination activities to create awareness among staff.
- **Innovation Process.** Definition of the Innovation Process (i.e. adaptation of the ExtremeFactories general process to the company's needs).
- **Roles & Responsibilities.** Identification of the main actors participating in the Innovation Process clearly identifying their responsibilities. Innovation is a cross-functional and multidisciplinary activity that needs to be steered at the top, with each member of the top team contributing his/her specific competence. ...but the composition of these groups of top managers varies greatly from company to company. For example, most of the adopters of this have limited the membership of their dedicated innovation group to those senior leaders most directly involved with innovation activities, i.e. typically a mix of technical and commercial or business leaders. Chief human resource officers, chief financial officers and other senior staff functions may not be part of the innovation governance group.
- **Innovation Context.** Thinking broadly about the goals and the key trends in society and technology, in order to define the strategic intent. Thereby detailed models of risk and reward are developed as it pertains to the uncertainty of innovation development, and all this gets translated into "innovation portfolios" of innovation investments. **How to proceed?** Audit the innovations your firm has introduced over the last five years and look for the patterns (Which types have you introduced, and what does that tell you about your firm's innovation practices?) Furthermore, the company should be aware of the Industry's trends so make an Innovation Table for your industry (Which companies introduced which innovations? What does this tell you about what the future might hold? **Innovation Network, The 'fifth-generation innovation' concept sees innovation as a multi-actor process, which requires high levels of integration at both intra- and inter-firm levels, and which is increasingly facilitated by IT-based networking. It's necessary then to identify the main members of the company 'Strategic Lines for Innovation.** Identification of the main lines where innovation should be tackled, indicating the expected results.
- **Innovation Objectives.** For each Strategic Line, a short number of innovation objectives shall be defined. These Objectives will be expressed in a short and quantifiable way so as to allow future measurement of the degree of success of the Strategy.
- **Budget & Resources.** Identification of the main resources required for the implementation of the strategy and their cost. Identification of a budget threshold for the implementation of the strategy. Identification of financing sources.

As a separate element in the Innovation Strategy Document, the company will perform a **Self-Assessment**, evaluating its capacity to deal with a successful implementation of the Innovation Process following the template used in the deliverable *D1.2 Business Cases (See Annex 1 – Key Factors for Innovation)*. This assessment will be periodically performed in order to analyze the evolution of the company. ExtremeFactories platform will support its users in the elaboration of the Innovation Strategy since its existence will be mandatory to evaluate the effectiveness of the innovation projects that have been carried out within the company.

2.3.2.2 Agile Practices

The Preparation Phase applies no particular agile practice.

2.3.3 Inception

2.3.3.1 Description of the Phase

The managed innovation process, as a cross-functional and multidisciplinary activity, is assumed to begin with ideation which should be based on a strategic perspective, taking into account goals, trends in technology, risks and other different aspects before launching an innovation project¹.

Elaboration of the innovation inception phase i.e. innovation starting phase in the ExtremeFactories methodology is focused on the process of ideation provided company's strategic intents defined, whereby the ability to accept and adapt to change/innovation, and to view change as opportunity rather than threat should be demonstrated. Within this confined observation as triggers of the inception phase mainly observed are customer requests (market-pull) and technology development in areas which fit the a.m. companies' strategy (technology-push). Under the innovation process triggers will be observed also the requirements for products/processes improvement from certification bodies (as demand-pull) as well as continuous improvement of products/processes based on the identified reoccurring problems (as technology-supported).

Actually the a.m. innovation triggers are multi-dimensional and should be considered complement to each other whereby there are a number of positive interaction effects, meaning that both must exist simultaneously.

Whatever the trigger is, a very important source for creating ideas that address quite specific interests and needs is research exposing state-of-the-art knowledge. The research ideas are ideas collected from different sources where the news on RTD results and technology development are regularly published. These sources include scientific journals, university bulletins, research organisations' bulletins, publications of leading technology development companies and others, whereby market requirements and new products on the market are also monitored.

Quite simplified the output of research is the input to ideation and in turn the innovation inception phase should create as output innovation ideas which are then used as input to the next innovation process stage – ideas prioritization. In any case the inception phase requires high level off creativity to be exercised in corresponding activities starting from the innovative idea submission over e.g. brainstorming technique in meetings, with mind mapping, TRIZ, etc. (*See Annexes to learn more about Creativity Techniques*) Idea generation,

¹ Permanent Innovation

as well as the whole innovation process as a multi-actor process, is increasingly outcome out of a work process related to a group of people working together in networks. It requires high levels of integration at both intra- and inter-firm levels of often distributed teams where collaborative working environments support the communication between workers and provide shared access to contents which is increasingly facilitated by IT-based networking), allowing distributed actors to seamlessly work together towards common goals..

The generated ideas are elaborated and developed further in more detail in the prioritization and concept generation phase.

The two initial phases of an innovation process, inception and prioritization, are often named Fuzzy Front End of innovation, which can be described as searching for and systematic filtering of multitudes of new ideas, applying processes for identifying best ones to turn into innovations. Quality, costs, and timings are mostly defined during the fuzzy front end.

Keeping in mind the high complexity of the innovation process and particularly of the inception phase it is clear that it cannot be observed as a linear process. The innovation process comprises a number of different steps carried out iteratively in several feedback loops.

One of the most important tasks in the innovation process is definition of the team to work in an innovation project. Members of innovative teams should represent a diversity of disciplines, competences, perspectives and mind sets, assuring multiple points of view (customers, competitors, evolution of technology), what will stimulate learning and creativity.

Teaming Up however is more than identifying the right team members. It's about preparing the team for the open ended task, creating work structures that accelerate learning and keep the working atmosphere at the high level. One of the first things the team should do after reflecting on the project frame is to make own success criteria explicit enabling a shared agreement on what counts as success and what failure is. Such a team needs to be steered at the top, with each member of the team contributing his/her specific competence.

The team members should among others visit own customers or competitors' customers and get innovative ideas.

The relevance of Creativity in the Inception Phase:

Creativity is the attribute or capability to see or do things in a new or different way, and the expressive ability to conceive of and make new and different ideas and things. An idea can be an expression of creativity but, in order to be considered as an innovation, it must developed into a product or service with economic value. At root, creativity is inherently a behavioural or cognitive process whose outputs are ideas, while innovation is inherently an economic process whose outputs are products and services.

Creativity can be expressed or accomplished by individuals or groups, by organizations and even entire cultures, and it can happen consciously or spontaneously and unexpectedly. Innovation, however, and particularly in large companies, is almost always a process involving groups of people working together with specific intention, systematizing the generation of ideas by applying specific Creativity Techniques. Hence, the tools and practices used to manage innovation-seeking groups are critical elements of both innovation methodology and the innovation culture.

Due to its relevance, ExtremeFactories Methodology proposes a set of practices to boost creativity within organizations. ExtremeFactories Platform will also provide support to its users for implementing such *practices*. (See *Annexes to learn more about Creativity Techniques*).

Support of ICT in the Inception Phase:

This phase can be significantly supported by dedicated ICT systems. To assure an immediate reaction to the technology-push trigger a **continuous monitoring** of important information sources combined with a semantic reasoning engine is necessary in the Inception phase of an innovation process. Such a monitoring requires relatively sophisticated ICT mechanisms.

Besides monitoring company external systems the monitoring should **include access to legacy systems in each company** to import new data relevant for the innovation in process.

2.3.3.2 Agile Practices

The inception phase, as described above, deals with a number of uncertainties where the agile approach offers significant advantages. Actually, the activities carried out during the inception phase are very suitable for application of the agile principles. Incremental ideas development and their timely adaptations along the process are the right approach for this phase, particularly in collaborative environments of the geographically distant process participants. IN fact, Inception Phase adopts naturally the “Small Releases” practice, since the process starts with the minimum bit of information of the Innovation Process which is the Idea. These ideas will slowly evolve becoming more elaborated concepts. Once these concepts are validated they become prototypes and finally a project. This iterative approach also includes other agile concepts such as:

- “Testing” (or validation), which will be carried several times in each phase and at the end of it.
- “Refactoring”, which means that ideas can mutate due to the contribution of the participants, but there will still be mechanisms to ensure its validity thanks to the Testing or Validation.

At the end of the Inception Phase, the organizations will have a huge repository of valid and invalid ideas. This repository of valid ideas can be considered as the “Innovation Backlog” (similar to SCRUM’s Product Backlog). The ideas in this backlog will be prioritized by popular voting and participants will be able to select those ideas they want together with other participants to collaboratively develop the concept behind the proposed idea.

Specifically during the inception phase the importance of cross-functional teams as in the agile techniques, is very high. It will be important to involve the maximum number of profiles from the very beginning allowing them to freely contribute to others’ ideas (“Collective Ownership”).

2.3.4 Prioritization

In this hyper competitive economic environment, it is extremely difficult for companies to decide which ideas are simply the best and how they decide which to investigate further, let alone which one to implement? An effective prioritization method/tool to prioritise their ideas is the one good answer to this question.

The basic concept of prioritization is the ability to determine which idea will be the “next blockbuster” and which idea will be a flop. But the most important stages require the classification of the type, category and potential impact of the idea (in terms of profits, quality of product or service, company’s image and so forth) if implemented. The performance indicators should be identified before the idea is selected. Actually, it is known for sure how well an idea will be received until it is appraised by the public or by the intended users.

2.3.4.1 Description of the Phase

Development and implementation of novel ideas and innovation and turning them into new products/ processes requires **a careful assessment of the organisation capabilities and risks involved in implementing the idea** and, primarily due to the resource implications and investments. In virtually all organisations, particularly in SMEs, the budget allocated for innovation projects is fairly limited with expenditure on these activities usually targeted to ensure maximum value at minimise cost. Thereby, the need **for effective prioritization system(s)/service(s)** is of critical importance to achieve the required results and a good return on investment. It is the selection that triggers the implementation and all the subsequent processes and investments.

Prioritization, provides **a transparent route in idea assessment and selection process**. It enables the stakeholders and senior management to make effective decisions leading to calculated risks in uncertain world. Thus, they will require a systematic approach/methodology with a clear overview of the opportunities, market needs and the organisational capabilities. Management and stakeholders need to be fully aware of the strengths, weaknesses, opportunities and threats of considering an idea for implementation, and thus the need to enhance their **understanding and knowledge at an early stage of the idea/product/service** lifecycle process. This clear understanding and awareness of the idea’s attributes and features by management can support the decision making process in the application of Agile methodologies in the product(s)/service(s) development process.

To separate the wheat from the chaff, **every idea needs to be transformed into a full concept** based on and supported by a solid business case. The more data is collected, the better the chance of success. There is also a fine line between success and failure and clearly an effective decision making process such as applying other classification methods in the prioritization approach could reduce the risks. Prioritization methods will require a list of criteria to be created to help innovators to prepare and evaluate their ideas **but it is the management of a company that will ultimately have to assess the risk and make the final decision** after each stage of selection. The preparation of the actions and tasks for each stage after the various classification activities and capability assessments are crucial stages of the prioritization of an idea. It is also important to reduce the risk as source by making sure that generator of the idea is well informed and is given the opportunity to validate her/his

idea. Once the ideas are generated and after the classification processes as identified in the **Common Depositories**, various ideas are ranked based on the value as well as the nature of the proposed or perceived transformation.

Risk Reduction:

- The classification of a user to **'Normal User'** or **'Innovator'** would help in reducing the risk by relying more on innovators in the organisation over the new comers or those with previous record of weak or rejected ideas.
- The simultaneous **search for sources of funding** to help with various stage of selection could also help in reaching the right decision.
- Keeping a **record of previous success stories** could also help in reducing the risk.

The Selection process:

What is considered significant in the selection process is the assessment of company's capabilities. Do we have the resources in implementing the idea as planned? It is also crucial to apply lean and agile techniques to reduce the cost of idea implementation and assuring its future sustainability through means to reduce waste and hence cost.

The prioritization process is usually triggered by the Inception phase. While setting up priorities, all the actors such as senior management, customers and each and every person in the organisation must collaborate. Developers or members of personnel involved do not always know which ideas are the most important to the customers, and customers cannot judge the cost and technical merits/difficulties associated with specific ideas. Therefore, a cross-functional discussion group, with participants from every, or relevant, department(s) should be involved (design, production, sales, marketing, etc.) in the decision making process.

In some markets, every 9 out of 10 new products are a failure, but one can minimise the risk and maximise the chances of success by applying an effective prioritization method/process based on perceived performance indicators and ultimately on potential return on investment.

Considering the complexity and risks in prioritization, the process should be decomposed into 2 categories:

- **Fast Idea Prioritization (FIP):** Ideas will be assessed using Anonymous Voting technique or the senior managers will make the decision. The idea(s) with highest number of votes, or the one selected by the management team, will be move forward to the Implementation stage.
- **Comprehensive Idea Prioritization (CIP):** It incorporates a synergy of most popular prioritization techniques i.e. Prioritization Matrix, Dot Voting and Simple form of Nominal Group Technique. It will provide a systematic approach for idea evaluation and selection and will involve a number of sub-phases as described above:

1. In the initial phase of this latter approach, the ideas will be assessed using **Anonymous Voting** to select most popular ones. This is most simple and widely used prioritization technique for selecting among many ideas. It starts with list of ideas from idea generation process, which are visible to all participants. This technique requires a leader (administrator) who manages the whole selection process. Every participant has to select 10-15% of ideas (Leader can decide how many ideas every participant has to select from the list) from the total list of ideas and rank them from A (most preferred) to the least (least preferred). Members individually and privately rank them according to their significance. Leader gets lists from all participants and shuffles lists to get anonymous responses.
2. The ideas, one selected during last phase, will then go through the **Prioritization Matrix**. Every participant will be asked to choose 3 ideas, with each falling under a specific timescale, i.e. Short, Medium & Long-Term benefit to the organisation. The participants will first analysis all the ideas and then they will select one idea for each of the 3 categories. Every participant will be required to add a short explanation about the idea, with a reason(s) why the selected idea will deliver high returns/value and score it against each of the provided value criteria (such as Global Market Size, Value/Margin and Strength of Competition). Similarly, each participant will describe how the selected idea builds on strong company capability and will score it against each of the provided capability criteria.
3. After receiving all the possible ideas from the participants, a **Group Discussion** should be arranged. All the chosen ideas should be presented to group members by individuals. It would provide an excellent opportunity for each participant to elucidate how the idea he/she selected is better than others. Moreover, listening to other people's opinions of the different idea's, may influence other's selections and lead them to consider changing their mind and vote for a different idea in the next stage, **Dot Voting** Phase.
4. After the discussion phase, final voting will take place with the user requested to vote for the best ideas. Dot Voting technique will be applied to gain consensus from the selection team. Finally, the most popular idea(s) will be sent for implementation.

The following diagram shows how idea(s) can/are processed in idea selection and prioritization process:

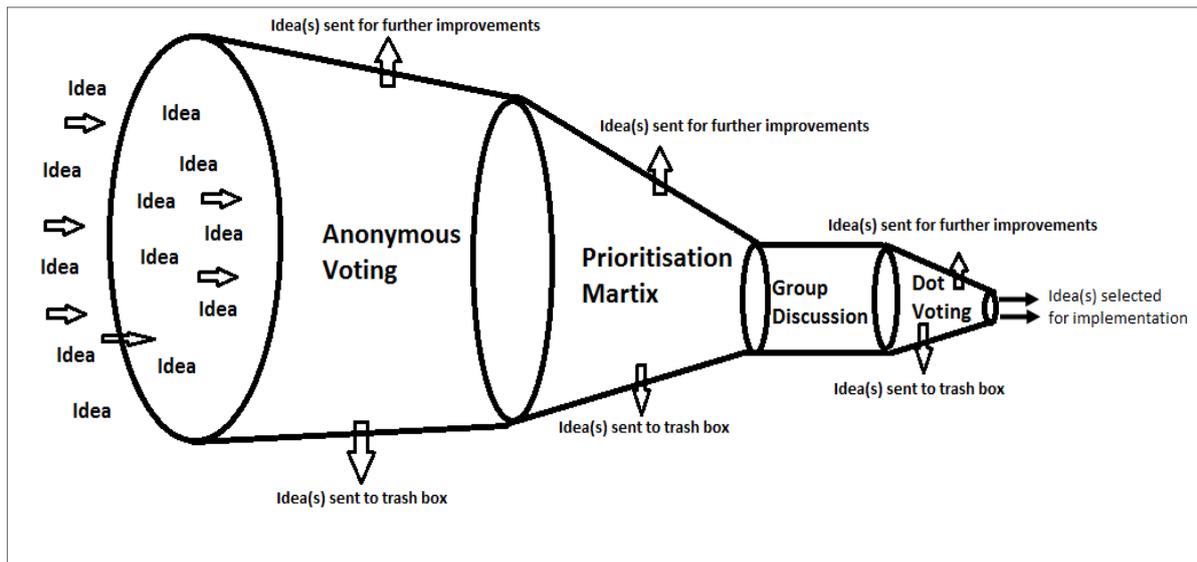


Figure 2-3 - Prioritization funnel

Key success factors:

There are several key success factors for an Idea to get higher priority among other on the list. These include:

- Organisational capability
- Organisation alignment
- Benefit assurance
- Input from all the actors in the organisation and the associated business units and customers (if feasible)
- Risks addressed/assessed (Strengths, weaknesses, opportunities and threats)
- Rewarding, motivation and personnel development
- Management leadership and support
- Pre-project planning
 - Clear realistic goals and objectives
 - Clear implementation strategy
 - Business unit and technical involvement in pre-project planning
- Project resources
 - Adequate budget
 - Cross-functional team consisting of a mix of internal personnel and external expertise (if deemed necessary)
 - Experienced and adequately skilled project team (team should have both business and technical competence)
- Stakeholder management support
- Project management standards

Impact attributes:

Some of these attributes could be used as means of giving the identified key success factors a value for comparison purposes. Examples of some of the main attributes are as follows:

Impact on:

- **Profitability Markers**
 - Turnover ((T/O)
 - Cost of Sales (CoS)
 - Return on Capital Employed
 - Gross Profit Ratio
 - Mark-up Value
 - Net profit Ratio
- **Liquidity Ratios**
 - Current Assets Ratio
 - The Acid Test (Ratio)
- **Efficiency Metrics**
 - Productivity
 - Lead-time(s)
 - Throughput
 - Stock Turnover Ratio
 - Organizational Management
- **Quality Dimensions**
 - Product/Service performance and features
 - Competitiveness/ranking
 - Image

The following diagram (Figure 2) shows two approaches of idea prioritization and selection process:

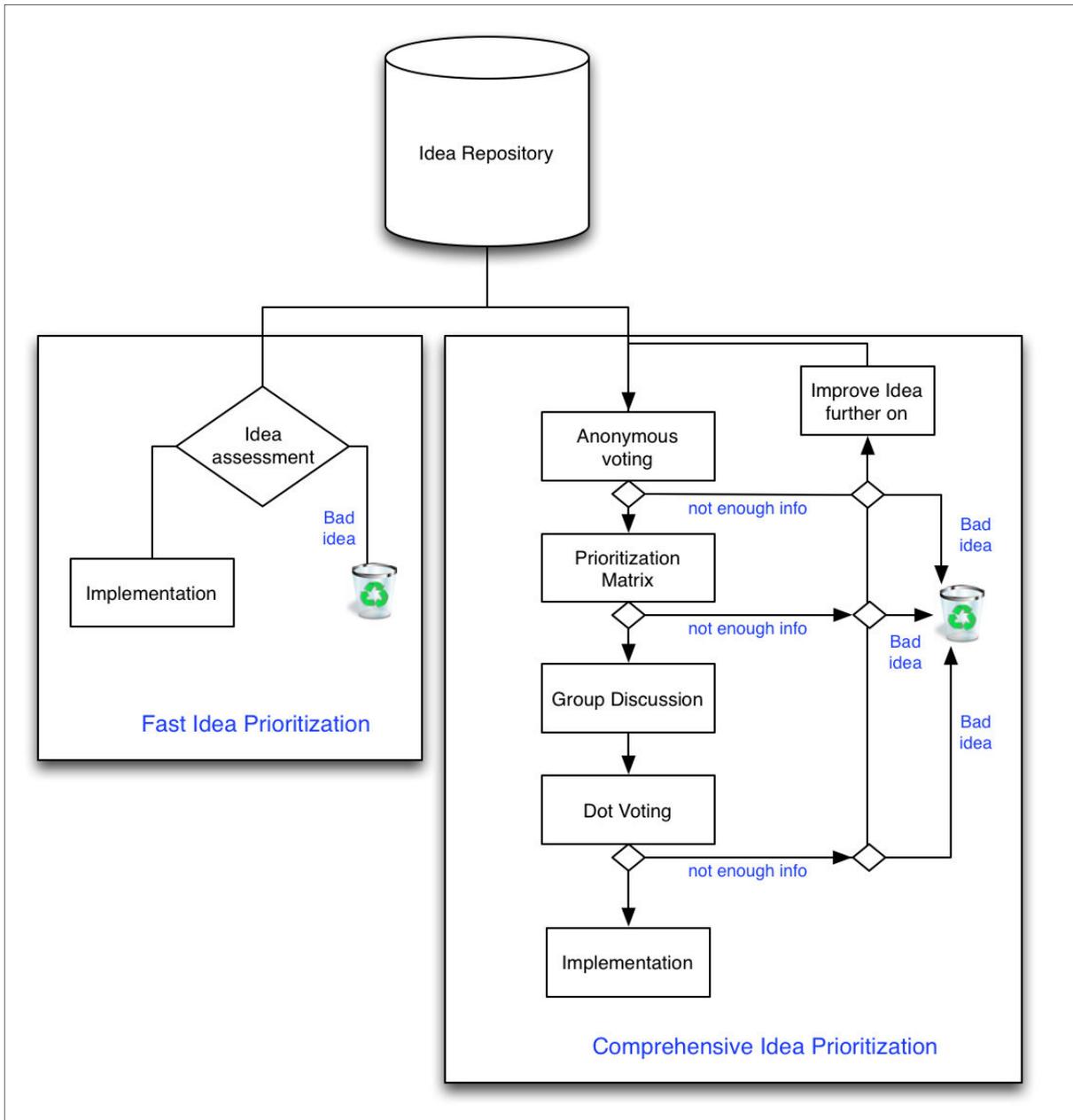


Figure 2-4 - Prioritization algorithms

2.3.4.2 Agile practices

ExtremeFactories proposes 2 different approaches to Prioritization (FIP and CIP). FIP, despite being a more developed approach requiring more resources for its execution, as well as CIP are based on *Collective Ownership* proposed by ExtremeProgramming. Collective Ownership is a practice that “encourages everyone to contribute new ideas to all segments of the project. Any developer can change any line of code to add functionality, fix bugs, improve designs or refactor. No one person becomes a bottle neck for changes”. The aim of ExtremeFactories is shifting this philosophy to the Innovation Methodology so anybody will propose ideas and improve them freely. In that sense the prioritization methods used are designed avoiding critical thinking, ensuring the widest participation as possible and establishing mechanisms so everybody will feel comfortable with the results obtained, understanding that the selection of ideas will be the best possible.

The other practice that is widely applied in the ExtremeFactories Methodology is the LEAN APPROACH, characterized by producing valuable products (by means of measuring the previously identified attributes) in short iterations. Prioritization will be applied iteratively until management can take the best decision. The following Diagram represents this approach.

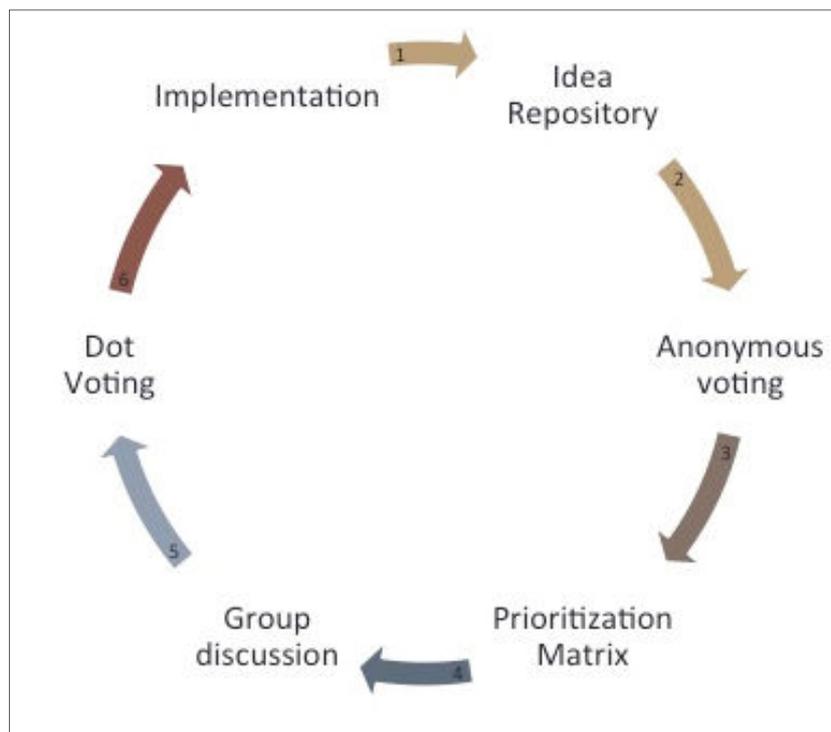


Figure 2-5 - Prioritization circle

2.3.5 Implementation

2.3.5.1 Description of the Stage

In the Implementation stage, the company gets to work on taking the selected innovation/s (service or product) from drawing board to market.

By this time, it has already set the strategic direction and priorities and has undergone the process of prioritization, which includes evaluating and defining the winning innovation/s to implement. By this point, not only winning innovations have been selected, but also, in so far as possible, their impact on short, mid and long terms plans of the organization should have been looked at, even if at high level.

Support transferring the concept design to final design (Corresponds with rFun InImS 01):

This includes concept development (prototyping) and evaluation. This transfer step should **always include customer input**, in order to gauge their reactions and adjust to real market expectations. **Internal testing** should be an inherent part of this step.

Early Business Analysis & Early Market Analysis (This is an early rationality check from a business risk perspective)

- Agile project management functions to handle the organization of the innovation project/s
 - Implement “flexible product development” practices. To speed up development of a product or service, we avoid using a linear process. This means that some steps can be worked on simultaneously while others may be skipped. Agile project management practices, including SCRUM, are proposed to handle this non-linear process in the implementation stage
- User support in the identification of knowledge areas required for the development of the innovation project:
 - Communication systems (including social media, on-line or in-room meetings) and a dedicated communication framework should provide an internal (private) platform in which to interact and share knowledge related to the different areas of the project
 - This can also be used to share expertise (it will be posted by internal project members) requested from external parties with other project members when such consultations are made
- Calculation of costs and risk of implementation
 - Risk Mapping & Management tools will include a framework for risk categorization, e.g. high, medium and low probability and impact matrix
 - Some risks will be predicted further away in time than others based on probability, so that attention may be focused on the more immediate ones
 - Numerical cost estimation templates that cover a period between 1 to 5 years, including at least three scenarios (ideal, expected, worse) will be created to measure financial risk
- Project planning and management tools
 - The whole project will be supervised in compliance with agile project management practices and with a clear assignation of resources, tasks and time/cost

- A project manager will be directly responsible for the elaboration of the project plan and its ongoing updates and completion
- Depending on the company and the current project management tools used inside it, different project management tools might be used, including simplified cloud-based and free ones (Basecamp) for companies unfamiliar with more expensive and complex professional solutions such as MS Project
- Business analysis & modeling
 - Framework for business model identification will include economic feasibility and potential profit implications.
 - At this stage, this framework includes demand analysis, revenue projections, cost analysis, operational feasibility. This stage will include preliminary assumptions on cost of staff recruitment and training, system enhancements or facility changes or any other operational costs. The business analysis will be reviewed and approved or rejected by the Management

Transferring the final design into a final product (Corresponds with rFun_InImS_02):

Service development and testing include prototyping construction and testing for consumer / customer acceptance. This testing is limited to a relevant customer group as well as other selected third parties as well as internal representatives of various functional departments

Market testing. This is done in limited market areas (but in real market conditions, not simulated ones as above) to gauge real consumer / customer acceptance as well as other marketing mix variables (e.g. promotions, pricing or distribution systems)

- Design the operative business organization
 - Organizational sizing and planning, including skills and needs analysis to identify gaps
 - Job/task descriptions and re-deployment of resources, hiring (if needed)
 - Organizational structure design and communication to stakeholders
- Subcontractor access to support implementation (**this is optional, let's omit it if it causes too much havoc**)
 - Two-way communication channel with those sub-contractors engaged in the innovation project
 - Communication platform establishment
 - Communication role defined and made responsible to manage the regular flow along this external line
 - Confidentiality contracts and rules established in advance
- Templates to set up key performance indicators for the implemented innovation
 - Critical outputs will be measured in numerical time-series as well in qualitative means where needed

Only critical information collected to avoid information overload or heavy handed monitoring, which becomes a burden and may have a paradoxical outcome, obfuscating rather than shedding light on performance (We will come to a granular description of these as the previous Implementation Stage elements become sharper in later iterations of this document)

2.3.5.2 Agile Practices

The Implementation Stage should be managed in line with Agile practices and thinking as described in the SOTA (*D1.1. State of the Art*). More specifically, it will follow LEAN THINKING principles. The goal of lean thinking is “the creation of a continuous stream which delivers customer value with the least waste of resources within the minimum possible time”. In this sense, we will focus on lean, short and iterative practices, dynamic in nature, to guarantee that Implementation is conducted in the optimal way.

As an overall vision, we will apply the [12 principles](#) of the Agile Manifesto, with special focus on:

- Business and technical teams working together throughout the process
- Welcoming change requirements even late in development
- Making short and precise in-roads towards the project goal (like the “sprints” commonly used in SCRUM)
- Making sure all project members can sustain their pace indefinitely
- Focusing on SIMPLICITY: the art of maximizing the amount of work **not** done

In terms of specific project management tools, we will apply the principles of Lean Project Management (LPM) to the Implementation Phase and propose a constellation of tools that suit these

LPM Principles

- Eliminate waste
- Empowerment, respect, integrity
- Decide later, deliver fast
- Amplify learning
- See the whole
- Risk management

2.3.7 Follow-up

2.3.7.1 Description of the Stage

Follow-Up, the last of the phases in the ExtremeFactories Methodology has to deal with 2 main issues: keeping track of all the events occurred during the whole Innovation Process and validating the success of the innovation process.

Tracking the events of the Innovation Process:

Using an IT tool like ExtremeFactories Platform that integrates all the activities performed during an Innovation Process ensures its full traceability. Tracking all these events is important in order to keep records of all the actions that led to successful or unsuccessful ideas so the user and the platform itself will build up a knowledge base that will support future decision processes. In the case that an IT system is not used within the company it's important to keep trace of all the events by other means. It would be recommendable to create specific templates for each of the stages of the process making a clear reference to the Strategic Power Lines and Innovation Objectives of the Company. These documents should contain:

- Identification of the campaigns or activities organized for each of the objectives.
- Records of all the ideas proposed (selected and discarded), including the proposer or proposers, proofs of concept, etc.
- Files for each of the projects, making reference to the concept or idea that generated the innovation project.

Validating the success of the Innovation Process:

Validating whether a new product or new venture is successful mainly depends on the perception of the customer or end-user and its financial results. Though there are objective indicators that might be evaluated depending on the type of product, e.g. revenue versus operational costs, number of visitors per day, number of registered users, etc.

In the case of a new or improved process validation will follow these steps:

- The definition of key indicators for the process, e.g. number of defective units, mean time between failures, time to finish a specific process, time to fix a defect, etc.
- Recording indicators before the process is renewed.
- Introducing the changes in the process and perform a new evaluation.
- Compare the previous and new results.

Finally the projects catalogued as successful will become part of the success stories of the company and this knowledge will be used to overcome successful Innovation projects in the future.

2.3.7.2 Agile Practices

In the Follow-Up Stage there will be no remarkable practice to apply, rather than the iterative approach and the concept of Small Releases of Lean development or ExtremeProgramming. In fact, the recording of every event and its validation will occur incrementally in every phase of the process.

3 Stakeholders of the Innovation Process

There are six distinguished stakeholder groups taking part in the corporate innovation process. The groups are: The Management, The Employees, The Customers, The Sub-contractors and Suppliers, The Reviewers, The Process Owner

These groups can also be considered as the customers of the ExtremeFactories platform. It is important to note that they have different roles in the five phases of the innovation process. These roles as well as the customer value propositions are described in this chapter.

3.1 The Management

The Management in this context refers in general to the group of people who are responsible for setting the strategic course of the company and leading the operations. Their main responsibility is to guarantee the company’s sustainable growth.

Regarding ExtremeFactories Platform the Management is mostly engaged with Preparation, Prioritization and Implementation phases.

Table 3-1 - The Tasks of The Management within the ExtremeFactories Framework

Phase	Tasks
Preparation	<ul style="list-style-type: none"> Setting and communicating the strategy Communicating the requirements for innovation and business development Setting the acceptance criteria for innovation Composition of the reviewer team.
Inception	<ul style="list-style-type: none"> Preparing and disseminating innovation campaigns, including the definition of its scope (limited or open). Composition of the participant teams. Composition of a review team (if necessary for the revision of proposed concepts).
Prioritization	<ul style="list-style-type: none"> Reduction of uncertainty by classifying the proposed ideas. Final decision over prioritized ideas that are moved to implementation based on risk analysis Composition of the review team
Implementation	<ul style="list-style-type: none"> Final decision over implementation and execution of strategic pro-

Phase	Tasks
	jects
Follow-up	Supervisory role over sustainability of the results Overall responsibility over the success of the innovation process Decision making power over adjustments to innovation process

3.2 The Employees

The *Employees* refers to people working in any level at the organization. Their responsibility areas vary from supportive administrative tasks to sales and from maintenance and production line work. In the ExtremeFactories framework the role of this user segment is mainly focused to Inception and Implementation.

Table 3-2 - The Tasks of The Employees within the ExtremeFactories Framework

Phase	Tasks
Preparation	Participating the discussion on strategic direction. Getting introduced to the innovation needs and acceptance criteria Learning about business models
Inception	Submitting new ideas for product or service. Developing the idea in collaboration with the colleagues. Elaborating the provided idea by request of the reviewers, the management or the process owner
Prioritization	Elaborating reports so Management can analyse the risk of implementation. Voting for the most promising ideas
Implementation	Participating the implementation process
Follow-up	Providing feedback on the implemented innovation

3.3 The Customers

The Customers should be split into 1) direct customers and 2) users (or indirect customers).

Direct customers are the ones who pay and use the service and product. They can be also re-sellers that distribute the product or service to the users.

Table 3-3- The Tasks of The Customers within the ExtremeFactories Framework

Phase	Tasks
Preparation	Provide answers to consultation or surveys to gauge the innovativeness of the company, as perceived from Customer or End-User perspective E.g. How do they feel about the company's innovative profile
Inception	Provide answers when asked to provide specific or unstructured feedback on product and service improvements Be allowed to provide open improvement and innovation proposals, (e.g. via a feedback form) with no specific areas or questions prompted to them
Prioritization	Be invited to vote in a prioritization process, if the company decides to open it to external parties
Implementation	Participate in several areas of the development such as requirements definition , design and validation
Follow-up	Provide feedback to evaluate the success of the results of a certain action, if the company decides to engage them thus

3.4 The Sub-contractors and Suppliers

This group is composed of services, materials and components providers to the company. They may provide anything from raw materials to services or specific skills based on project needs. They may hold short, mid or long term relations with the company, either sporadic or regular.

Table 3-4- The Tasks of The Sub-contractors and Suppliers within the ExtremeFactories Framework

Phase	Tasks
Preparation	Provide feedback on the areas where they share knowledge and know-how of the company's innovation needs and processes
Inception	Formulate ideas on improvements to innovation process, products or specific processes which they are familiar with inside the company
Prioritization	Elaborate external reports about the validity of an idea in terms of profitability or technical viability

Phase	Tasks
Implementation	Provide feedback on specific areas where their know-how and experience is specifically relevant
Follow-up	Their feedback will be requested to evaluate the success of the results of a certain action where their experience and expertise is relevant

3.5 The Reviewers

This group is composed of a heterogeneous taskforce of people (experts, company insiders and external reviewers), who have a specific or relevant understanding of different aspects of the company (including business, process, core competencies, technologies, etc.) and its current and future needs for sustainable growth. The composition of the review team constellation will vary depending on the area of the innovation or the company that is being reviewed.

Table 3-5- The Tasks of The Reviewers within the ExtremeFactories Framework

Phase	Tasks
Preparation	Innovation Coaching for managers Training to staff
Inception	Creativity facilitators
Prioritization	Apply prioritization criteria (provided by the Management) to review ideas and formulate evaluations Propose changes, discard ideas and make in-depth comments to their decisions
Implementation	Periodic verification/validation of milestones
Follow-up	Elaborating reports about Market Research or impact on the Internet and Social Networks

3.6 The Process Owner

This person is responsible for coordination of the innovation process within the company. The resource might be dedicated for the process or do it alongside other tasks within the company. Inside SMEs the latter is more likely. The role is to ensure that all actions related to the innovation process and all parties involved meet their duties to the highest possible standards.

Table 3-6 - The Tasks of The Process Owner within the ExtremeFactories Framework

Phase	Tasks
Preparation	Prepares and publishes the schedule and key milestones set by the Management for all stakeholders Prepares the internal communication plan of the project
Inception	Answers or handles possible questions of this part of the process Sets up (if needed) collaborative development teams to handle issues of the prioritization process (e.g. handling of overlapping ideas)
Prioritization	Manages the schedule of the Reviewers Coordinates any further information or clarification needed by the Reviewers from submitted ideas
Implementation	Coordinates resources Analyzes and Controls budget Verify fulfilment of milestones Validates intermediate and final results
Follow-up	Collects and publishes success stories of the innovation process Collects feedback and proposes to the Management improvements to the innovation process

4 Requirements Traceability

Table 4-1 - Requirements traceability

Req_ID	Requirement	D2.1.1 Section
rMet_01	Innovation Theory basics in a way understandable to SMEs, Terms and definitions	Next versions of D2.1.1 (see Section 2.1)
rMet_02	Methodology to set-up and maintain a collaborative working environment – safety and security issues, knowledge sharing among different participants in the innovation process	Section 3
rMet_03	Parts dedicated to SMEs, large companies and RTD performers	Full document
rMet_04	Introduce incentives – stimulate different employees to put ideas into the system	Section 2.3.3.
rMet_05	Parts dedicated to SMEs to comprise clear instructions how to implement the ExtremeFactories system on their own, with minimum external support	Next versions of D2.1.1
rMet_06	Support the companies in understanding the context for innovation	Section 2.2, Section 2.3.2
rMet_07	Guidelines to SMEs to perform a self-assessment of favourability of a company’s context (including e.g. necessary skills and capacities) for innovating	Section 2.3.2
rMet_08	Support the companies in the preparation of a plan to establish / improve the context for Innovation	Section 2.3.2
rMet_09	Guidelines for carrying out the Innovation Management process stages of innovation: <i>Inception, Prioritization, Implementation</i> and <i>Follow-Up</i> , with detailed description of each stage.	Section 2.3
rMet_10	Guidelines for application of Agile practices for each of the a.m. stages of innovation	Section 2.3
rMet_11	Guidelines for identification and gathering of knowledge necessary for different innovation stages and ExtremeFactories services	Section 2.3
rMet_12	User Manual as guidelines for application/usage of the ExtremeFactories ICT system – as a part of D2.1.3 ExtremeFactories Methodology Workbook vREV.	Next versions of D2.1.1

5 Annexes

5.1 Annex 1 – Key Factors for Innovation

Table 5-1 - Key Factors for Innovation

Key Factors	Questions for the assessment	Score (1 to 5)
Organizational policies and practices W:20	<ol style="list-style-type: none"> 1. The quality and quantity of an organization’s efforts to train organization’s members to use new technology 2. User support - the provision of technical assistance to technology users 3. Rewards, such as promotions, praise from supervisors 4. Effective communication regarding the reasons for the implementation of the new technology 5. The provision of time for users to experiment with the new technology 	
Implementation climate W:10	<ol style="list-style-type: none"> 1. Employee’s shared perceptions of the importance of innovation implementation within the organization 	
Management Support W:20	<ol style="list-style-type: none"> 1. Do management support and promote innovation activities? 	
Financial Resource Availability / Accessibility W:10	<ol style="list-style-type: none"> 1. Does the company have financial resources available for innovation projects? 2. Does the company know about the existence of regional, national, European or international initiatives to promote and fund innovation activities? 	
Learning Orientation W:10	<ol style="list-style-type: none"> 1. Does the teams perceive the risk of innovation projects? 2. Learning attitude? 	
Managerial Patience W:30	<ol style="list-style-type: none"> 1. Are managers committed to the long-term results of the innovation and understand a short-term decline of the productivity during its implementation? 	
	TOTAL:	

5.2 Annex 2 - Creativity Techniques: BrainStorming

Type of Technique: Collective, Paradigm preserving.

Space Requirements: Room with no specific distribution

Materials: No specific materials for participants. A facilitator takes note of the ideas in post-its or in a flipchart. She/he can use post-its or markers of different colors for the analysis of the ideas.

Characteristics: Small groups of people (around 5) answer freely to a determined issue, question or dilemma. The group is headed by a facilitator who launches the question, records the ideas and act as a referee if needed.

Procedure:

1. Previous to the BrainStorming an issue or question is carefully prepared.
2. If there's a big amount of people, it's desirable to create small groups (up to 5 people). One of the participants is named as the "facilitator".
3. The facilitator launches the question.
4. Participants expose their ideas freely, with no restrictions nor preconditions. The facilitator acts as a referee if needed (avoiding critical thinking).
5. Facilitators register the ideas of the group and then they are exposed to the whole group.

5.3 Annex 3 - Creativity Techniques: BrainWriting

Type of Technique: Collective, Paradigm preserving.

Space Requirements: Room with tables big enough to allow the distribution of 5 to 8 people around them.

Materials: Pencil and a block of paper per participant.

Characteristics: Small groups of people (5 to 8) answer individually to a determined issue writing an idea in a paper. These papers are then shared with the group, adding comments to each idea.

Procedure:

1. The participants are placed around a table, each with a pencil and a pad of paper.
2. A leader is named and presents a problem/question to the group. The problem/question is written and placed in a visible place to everybody.
3. The group discusses about the question to ensure that all the participants understand it.
4. Each participant individually answers to the question writing an idea in a sheet of paper. One idea per paper and, in a first instance, up to 4 ideas per participant.
5. The papers are stacked in the center of the table.
6. Each participant takes a sheet from the stack, makes contributions to it and stacks the paper in the center again. The participant takes another paper proceeding in the same way.
7. New sheets with new ideas can be added.
8. After 20-30 minutes the process is finished and the ideas are collected to be evaluated later on.

5.4 Annex 4 - Creativity Techniques: Mind Mapping

Type of Technique: Individual, Paradigm stretching.

Space Requirements: No specific requirements.

Materials: Big sheet of paper and markers of different colors. There are IT tools that support mind mapping (e.g. Visio, OmniGraffle, Mindmap...).

Characteristics: Small groups of people (5 to 8) answer individually to a determined issue writing an idea in a paper. These papers are then shared with the group, adding comments to each id

Procedure:

1. Write the main topic inside a globe in the center of the sheet.
2. Find related topics and draw lines from the central theme, placing a name to each line, to the new topic.
3. Do a personal brainstorming.
4. Avoid critical thinking and work as you see fit.
5. Colors can be used using a specific code, e.g. Blue for Human Resources, Yellow for Finance, Green for Environment, etc.
6. Study the map, paying attention to the relationships between the lines.
7. After several days of creation, check the map and verify that it's still valid.

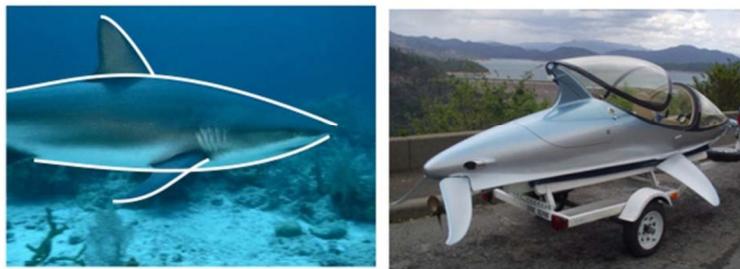
5.5 Annex 5 - Creativity Techniques: Bionic

Type of Technique: Individual, Paradigm stretching.

Space Requirements: No specific requirements.

Materials: Pen and paper.

Characteristics: This technique is an implementation and monitoring process itself, since it deals with the discovery of analogies between nature and daily life objects. The process followed in this technique is finding analogies and grouping them. It's mainly used in new product development. The following picture illustrates the concept. This technique can be used individually in a Brainstorming or Brainwriting session.



5.6 Annex 6 - Creativity Techniques: SCAMPER

Type of Technique: Individual or Collective.

Space Requirements: No specific requirements.

Materials: No specific material

Characteristics: SCAMPER can be used in a BrainStorming or BrainWriting session as an individual technique to enrich the result of the session

Procedure:

1. First of all the problem or topic to think about must be isolated.
2. Give a response to the problem applying the SCAMPER mnemonics:

Substitute	What else instead? Who else instead? Other ingredients? Other material? Other time? Other place?
Combine	How about a blend? Combine purposes? Combine materials?
Adapt	What else is like this? What other idea does this suggest? How can I adjust to these circumstances?
Modify / Minify / Magnify	Modify: Different order, form, shape? Minify: What to make smaller? Slower? Lighter? What to do with less frequency? Magnify: What to make higher? Longer? Thicker? What to do with greater frequency?
Put to other uses	New ways to use as is? Other uses I modified? Other places to use an item or movement?
Eliminate	What to remove? Omit? Understate?
Rearrange / Reverse	Rearrange: Other layout? Other sequence? Transpose cause and effect? Transpose positive and negative? How about opposites? Reverse: Interchange components? Other pattern? Backwards? Upside down?

Source: Steven A. Henkel

2. Finally, evaluate the compiled ideas, which can be fitted into several categories.

Some examples of daily products that fit into any of the SCAMPER's categories are:

Substitute	Veg burgers
Combine	Heinz Mexican Ketchup
Adapt	Teflon, Aluminum paper
Modify / Minify / Magnify	Playmobil 1.2.3
Put to other uses	Smart phones
Eliminate	Wireless technology
Rearrange / Reverse	Flip-flop bushings vs. Fixed wheel

5.7 Annex 7 - Creativity Techniques: Storyboarding

Type of Technique: Individual or Collective.

Space Requirements: No specific requirements.

Materials: 3x5 cms Cards (preferably magnetic cards and a magnetic board) and markers.

Characteristics: Storyboarding can be used for different purposes, e.g. for planning activities, for illustrating concepts or ideas or for sketching an organization. The objective of the technique is to illustrate with drawings or sketches a solution to a given topic.

Procedure:

1. Write the topic on a card and hung on the board.
2. On the board, the cards are sorted into three categories:
 - a. Issue Card
 - b. Statement card, used for the general issues or categories.
 - c. Statement related cards for ideas that fall within the scope of a header, details, ideas to develop ...
3. For planning purposes the board can include a timeline where the cards can be placed.

5.8 Annex 8 - Creativity Techniques: Nominal Group

Type of Technique: Individual and Collective activity

Space Requirements: Room with separate tables. Flipchart, scree- board or other space to fix Post-it notes.

Materials: Regular size Post-it notes, Small colored Post-it notes and Pen.

Characteristics: Highly structured group dynamics and specially designed to generate ideas and identify factors of a problem, explore solutions and set up priorities. Particularly appropriate for groups where it is necessary to neutralize the differences between status and the verbal dominance among group members. 7 to 15 people is an adequate number of participants.

Procedure:

1. Carefully elaborate a question to evoke responses among participants at the desired level of specificity.
2. Select a group of people with different perspectives and relevant expertise to generate solutions.
3. Name a master or group leader that knows the process and is willing to act as process facilitator, not a substantive expert.
4. The process starts exposing the question to the group and clarifying it, if necessary.
5. Participants are given 10 minutes to write a fixed number of ideas (one idea per post-it).
6. Every participant exposes the ideas in public and fix them into the wall.
7. The ideas are grouped collectively. Participants agree with the categories to create and group the ideas into those categories.
8. Finally, each participant vote for the ideas. Each participant is given a fixed number of votes (e.g. 5, 3, 1) and they vote.
9. Ideas are listed ordered by number of votes.

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