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Instrument:	Coordination and Support Action
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Deliverable [1.2]
[Innovation Audit to measure the innovation potential of high-tech photonics SMEs]

Deliverable Name	Innovation Audit to measure the innovation potential of high-tech photonics SMEs
Deliverable Number	D 1.2
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Deliverable Lead Partner	Partner 1 - SEZ
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Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Table of Content

1. Introduction

The following deliverable reports about the questionnaire that the project consortium developed for the innovation audits that will be carried out in the first year of the project. The audit aims at **evaluating the innovation potential of high-tech photonics SMEs**. The development of the questionnaire required a detailed understanding and application of the Potential Innovation Index (PII) as introduced and developed by Boly[1]. While adopting Boly's proposed PII methodology, RespiceSME consortium has narrowed down the innovation practices to 7 **main areas for innovation practice** which have been adopted for the purpose of the project and identified as the most suitable to capture the innovation potential of high-tech photonics SMEs. The 7 main areas are: 1) Ideas creation and creativity, 2) Design and new product development, 3) Competence management, 4) Competitive technology intelligence, 5) Project Management, 6) Knowledge Management., 7) Value Chain analysis. The latest relies on the heat map tool developed in the project ASPICE in order to identify the gaps in the different value chains, so that the audit also tailors the current European market situation of the photonics industry.

2. The audit questionnaire – Characteristics of main areas for innovation practice

The list of characteristics and corresponding questions covering individual innovation practices to be used for the planned PII audit are presented in the table below.

Innovation practice area	Issues relevant for the high-tech photonic SMEs	Aspects to be analysed in the PII survey
1. Ideas creation and creativity	Need to formalize and streamline the idea generation for new R&D activities and planned products in specific, highly specialized areas, the need to use the brainpower scattered across different functions	• Ideas collection from staff from R&D and marketing functions • Creativity groups • Formalized procedures to collect ideas within the company • Meetings dedicated to idea generation involving staff from R&D and marketing functions • Dedicated resources to keep track of existing and new ideas • A formalized assessment process to evaluate new ideas
2. Design and new product development	Need to adapt practices, often introduced by external facilitators and experts, to design new products according to the set of rules in a highly complex and often much customized product pipeline, which is difficult to replicate or scale up especially in smaller companies working on customized solutions.	• Regular meetings to monitor new product development activities • Regular reviews of tasks of all project teams and managers • Use of facilitator groups or individual experts • Use of formalized design methodologies or tools for new product development • Availability of prototyping facilities (such as a laboratory or a test bed) in-house • Implementation of quality and assurance processes
3. Competency	Need to improve the skill base in the	• Technological training on a regular basis

[1] *Boly et al., Evaluating innovative processes in French firms: Methodological proposition for firm innovation capacity evaluation, Research Policy 43 (2014) 608–622*

management	company while keeping a track of what skills could be required within a short-term period given the fact that often the skills needed are extremely specific and their supply on the market is limited.	• Staff employment strategies according to skills needed, including future projects • Mapping of individual competences for use in innovation management • Formation of cross-functional teams to perform project-driven activities • Function of a human resource manager
4. Competitive technology intelligence	Need to keep an eye on the latest technological developments by incentivizing staff to gather and share information, by collecting data in a structured manner and using the internal organizational structures to transform those bits of information into potential leads.	• Incentives for employees to actively participate in the technology intelligence gathering • Internal process for gathering technology intelligence • Use of data collection methodologies and tools for the market survey • Meetings to transform collected information into innovation projects • Planning and preparation of visits (exhibitions, trade shows etc.) in advance
5. Project management	Need to keep on track with delivering projects while making sure that the project management process is flexible and adaptive to the changing demands of the customers and includes the risk mitigation measures in the case of highly customized solutions which have a strong service element attached.	• Availability of regular progress reports for each project • Availability of well-defined planning methodology for tracking project progress • Availability of an initial reference frame established (objectives, responsibilities, budgets) for each project • Continuous resource monitoring (materials, financial, personnel) assigned to each project • Use of project management and/or task tracking software
6. Knowledge management	Need to implement internal systems backed up by knowledge management processes in order to make available sensitive information for a safe retrieval and further use without jeopardizing the know-how by revealing it to competitors. Hence, the big question is what to make available and how, and what levels of access should be introduced.	• Use of a dedicated system or tool for recording know-how and re-use of previous knowledge • Processing of information (codification, classification) before storing • Implementation of procedures for creating and maintaining intellectual property • A regular staff appraisal procedure at an individual or team level • Use of knowledge management tools such as centralised intranet portals or repositories
7. Value chain analysis	Need to identify the value chains in order to better position oneself within the market space and create a more sustainable business model, which is challenging given the fact that photonics is a general purpose technology which has a wide variety of applications, so the company involvement in the value chains tends to be overstretched with a lack of a	• A clear understanding of the value chain which encompasses products, processes, or service • Analysis of the contributors (research partners, suppliers, advisors) that help you provide product, process, or service • Identification of the different stakeholders who could most effectively exploit or extract value from your product, process, or service?

	strategic depth. Hence, the need to have in-house capacities to constantly analyse different value chains and make strategic adjustments accordingly.	• Recognition of the technology readiness levels of the various elements of the value chain in which a specific product or process contributes • A systematic approach to identify what part of the value chain has the greatest potential for innovation or development

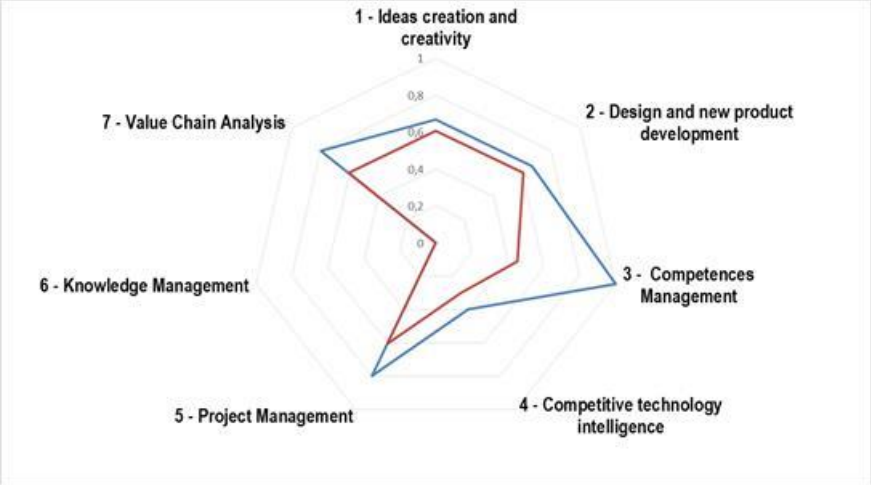
The PII index will be evaluated through a series of closed questions covering the innovation practices relevant to the photonics SMEs which will be scored and weighted using both standard and harmonic averages. The cumulative weighted scores will be used to define the overall levels that have acute need for support and intervention in order to boost the absorptive capacity of individual companies.

However, the section "Value chain analysis" also contains open questions that are directly linked with another questionnaire (tool) that has been developed by the University of Galway who is in charge of this task (T2.1). This additional questionnaire will be presented in detail in the deliverable 2.1.

3. The audit report

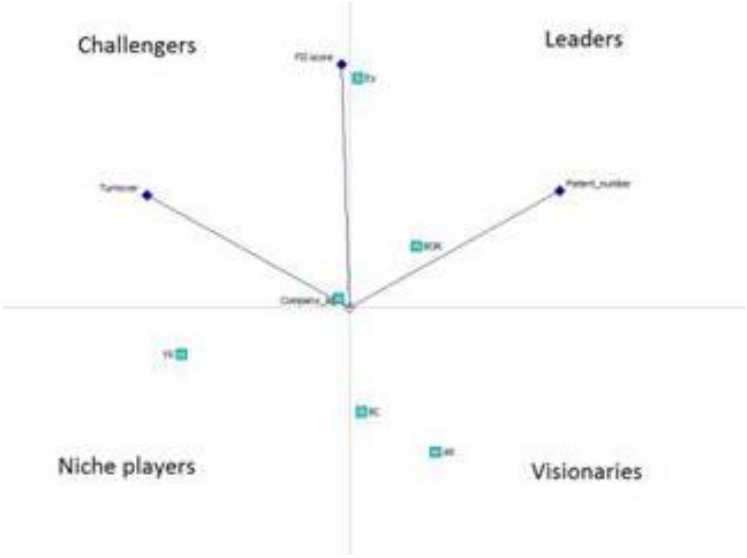
Following the innovation audits, the partners will have to analyse the results of the audits and produce a report that will summarize those results and present first recommendations for the implementation of the new business strategy. The report will then contain the following sections:

1. The analysis of the innovation capacity indicators related to the 7 dimensions of RespiceSME (1 – Ideas creation and creativity; 2- Design and new product development; 3 – Competence management; 4 – Competitive technology intelligence; 5 - Project management; 6 – Knowledge management; 7 – Value chain analysis): this analysis will contain the potential star showing the strengths and weaknesses of the company.



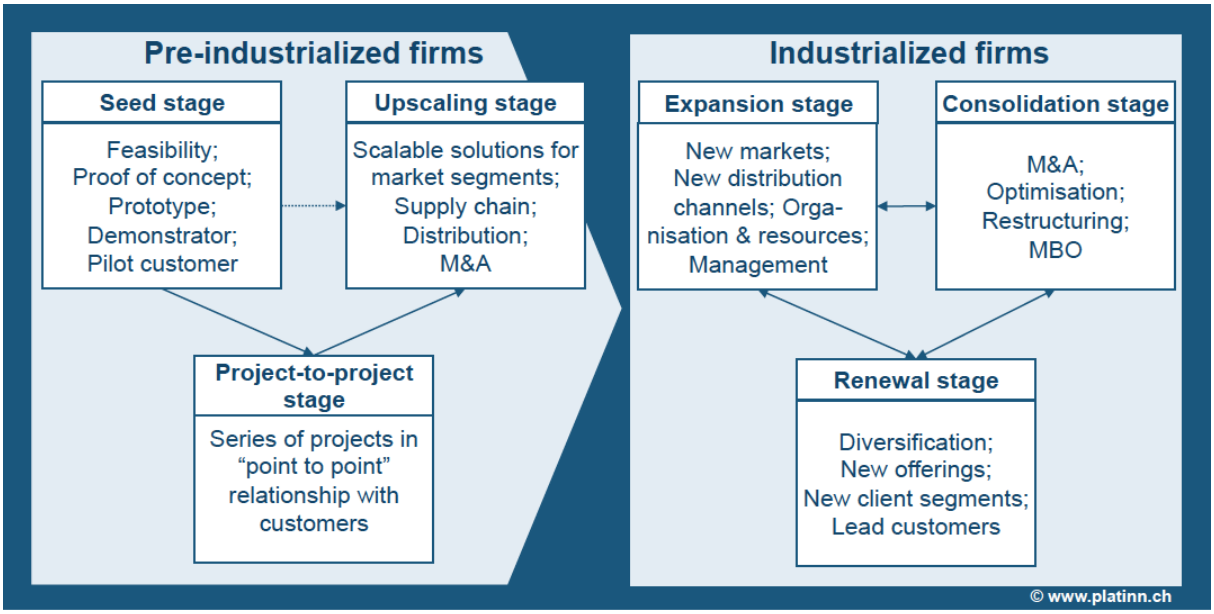
On the basis of these results, the RespiceSME partner/coach will elaborate recommendations for the company to support its enhancement of innovation potential and business development. The recommendations will be based on concrete measures to be implemented by the company.

2. The analysis of the competitive positioning (challengers, leaders, etc.) is generated through the ranking values of the PAPRIKA method that was used for the selection of SMEs to be audited.



Leaders execute well against their current vision and are well positioned for tomorrow.
Visionaries understand where the market is going or have a vision for changing market rules, but do not yet execute well.
Niche Players focus successfully on a small segment, or are unfocused and do not out-innovate or outperform others.
Challengers execute well today or may dominate a large segment, but do not demonstrate an understanding of market direction

3. The life cycle of the company: These values of the PII are only relevant if we want to benchmark the companies. Within RespiceSME, it is therefore foreseen to **analyse the current state of the company within its life cycle.** This will take place within the interview with the company besides the quantitative analysis related to the audit questionnaire.



4. Recommendations: On the basis of the audit results, the coach (RespiceSME partner) will elaborate a set of recommendations for the SME to be implemented. Those recommendations will address the identified needs of the SME and rely on the analysis of the value chains. Related to the 2nd dimension of RespiceSME "Stimulating business collaborations in & beyond photonics", the recommendations will initiate the creation of new business

collaborations in the photonics, but also in the non-photonics sectors addressed in the project (smart manufacturing, Energy/ Environment and Transport).

4. Implementation of innovation audits

As already mentioned in D1.1, the project partners selected 3 high potential SMEs in their respective regions with which they will conduct the innovation audits. Considering the low availability of the SMEs during the upcoming summer break, the audits should start in September at the latest and be closed in October 2016. However, the partners started already to contact the companies and intent to start with the first audits as soon as the SMEs have available resources.

Following the RespiceSME methodology, the partners will present the results of the audit to their respective SMEs within a ½ **day strategy workshop**. The analytical results need to be transformed into a coherent **action plan.** There is no methodology or golden rule how to generate an action plan from the assessment results. However, in most cases the needs for action become quite evident throughout the discussion between the RespiceSME partner carrying out the assessment and the company management team. It is recommended to re-group these into a portfolio of **key measures**, which may be implemented as projects. In order to generate a **business innovation strategy** the sequence of these measures is defined, and determined whether they can be implemented by the company itself or whether external support is demanded; in which case dedicated specialists (e.g. scientific partners, IP lawyers, coaches etc.) may be identified.

Following this workshop, the RespiceSME partners will **coach the SMEs** (10h-15h per SME) to initiate and support the implementation of the action plan. However, they might need external expertise to support the new projects generated (e.g. scientific experts in RTOs, IP experts, etc.) as long as the expertise is not represented by of the project partners (e.g. if the SME needs to identify funding opportunities to finance its new project, SEZ would provide its expertise in this field). **It is important to make clear that the project partners are not professional business developers, but mainly play the role of a spring board between the SME and the enablers** (RTO, end-customers, system integrators, etc.) for their new projects.

5. Annex: the innovation audit questionnaire and results' assessment

Confidential	**Potential Innovation Survey (v9.1)**
Cluster	
Company name	
Website	
Tel/Fax	
Email	
Website	
CEO	
Main Application markets (max 3)	
Products with the highest potential	
Type of activity:	**S/Se/R/C/Sys**
Respondent	

Introduction: a self-assessment of survey criteria	
Estimate the relevance of each criteria for your business innovation activities on a scale from 0 to 10 (lowest/highest)	
1 - Ideas creation and creativity	9
2 - Design and new product dev.	8
3 - Competence management	7
4 - Competitive technology intelligence	7
5 - Project Management	7
6 - Knowledge Management	7
7 - Value chain analysis	10

Date:

Name:

Signature:

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A RespiceSME survey	*Confidential*	Innovation Potential Assessment (1/4)

1 - Ideas creation and creativity

related to continuous tasks concerning the emergence of new ideas from research, marketing or employee suggestions in order to sustain future projects.

1.1 Ideas for new product development are gathered or created from staff from R&D and marketing functions

Answer:	Yes/Partially/No (1 / 0,5 / 0)	1,0	

1.1.1 Are other departments involved in gathering or creating new ideas?

1.2 Formalized procedures adopted to collect ideas within the whole company

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,0	

1.2.1 If YES, is there a reward system to encourage new ideas?

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,0	

1.2.2 If YES, is there a formalized agenda and a scheduled follow-up for the collected or created ideas?

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,0	

Please briefly describe the formalized procedures implemented in the company:

1.3 Dedicated resources are used to keep track of existing and new ideas

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,0	

1.4 There is a formalized assessment process to evaluate new ideas

Answer:	Yes/Partially/No (1 / 0,5 / 0)	1,0	

Please briefly describe the assessment processes implemented in the company:

2 - Design and new product development

related to tasks allowing an ongoing evaluation and improvement of the new product development process (methodologies, tools among others)

2.1 Regular meetings to monitor new product development activities take place

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

2.2 Top management regularly reviews tasks of all project teams and managers

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

2.3 Use of formalized design methodologies or tools for new product development

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

2.3.1 If YES, do you have customized or specially developed tools to assist specifically your product development efforts?

		0,5	

Please briefly describe the formalized methologies adopted by the company:

2.4 Facilitator groups or individual experts are used by the company

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

2.4.1 If YES, do they have to sign non-disclosure agreements?

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

2.5 Prototyping facilities (such as a laboratory or a test bed) are available in-house or are readily accessible externally

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

2.6 Quality and assurance processes and procedures have been implemented

Answer:	Yes/Partially/No (1 / 0,5 / 0)	0,5	

A RespiceSME survey	*Confidential*	Innovation Potential Assessment (2/4)

3 - Competency management

related to tasks of assessment and allocation of human resources for the innovation process in the company

3.1 Technological training is undertaken internally on a regular basis

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

3.2 Staff are employed according to skills needed, including future projects

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

3.2.1 If YES, do you host or subcontract consultants and/or researchers from universities and/or research institutes to get the skills needed for future projects?

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

3.3 Individual competencies are mapped out and used for innnovation management

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

Please briefly describe how the competencies are mapped in the company:

3.4 Cross-functional teams are formed to perform project-driven activities

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

If YES, are cross-functional teams managed by a specially designated manager?

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

3.5 A human resource manager is available in the company

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 1,0

4 - Competitive technology intelligence

related to tasks organized in order to open up the company to its external environment (technological, environmental, market analysis)

4.1. Meetings held to transform collected information into innovation projects

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

4.2 Data collection methodologies, tools or external paid resources are used for the market analysis

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

4.2.1 If YES, is the collected market information shared within the company?

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

4.3 There is internal process methodology in place for gathering technology intelligence

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

Please briefly describe how the technology scouting is taking place in the company:

4.4 Employees are expected to actively participate in gathering the technology intelligence

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

4.5 Visits (such as participations in exhibitions, trade shows etc.) are strategically planned in advance

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

4.5.1 If YES, is there a dedicated budget for the participation in such events regularly?

Answer: **Yes/Partially/No (1 / 0,5 / 0)** 0,5

5 - Project Management

tasks concerning the follow-up of each innovative project

5.1 Regular progress reports available for each project

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

5.2 Well-defined planning methodology available for tracking project progress

Answer: Yes/Partially/No (1 / 0,5 / 0) 0,5

5.3 *Are project tracking meetings planned on a regular basis?*

Answer: Yes/Partially/No (1 / 0,5 / 0) 0,5

5.4 An initial reference frame established (objectives, responsibilities, budgets) for each project

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

5.5 Continuous resource monitoring (materials, financial, personnel) assigned to each project

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

5.6 Project management and/or task tracking software is used

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

5.6.1 If YES, is the software used specific, customalized according to the company needs?

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

6 - Knowledge Management

survey tasks (technological, competitive, economic, etc.) organized inorder to open up the company to its external environment,

6.1 There is a dedicated system or tool for recording know-how and re-use of previous knowledge

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

6.2 Information is pre-treated (codification, classification) before being stored

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

6.3 There is a regular staff appraisal procedure at an individual or team level

Answer: Yes/Partially/No (1 / 0,5 / 0) 0,0

6.4 There are procedures for creating and maintaining intellectual property

Answer: Yes/Partially/No (1 / 0,5 / 0) 0,0

6.4.1 If yes, does the company has a dedicated person for managing the intellectual property?

Answer: Yes/Partially/No (1 / 0,5 / 0) 0,0

Please briefly describe how the intellectual property is managed within the company:

6.5 Knowledge management tools are used such as shared databases and repositories

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

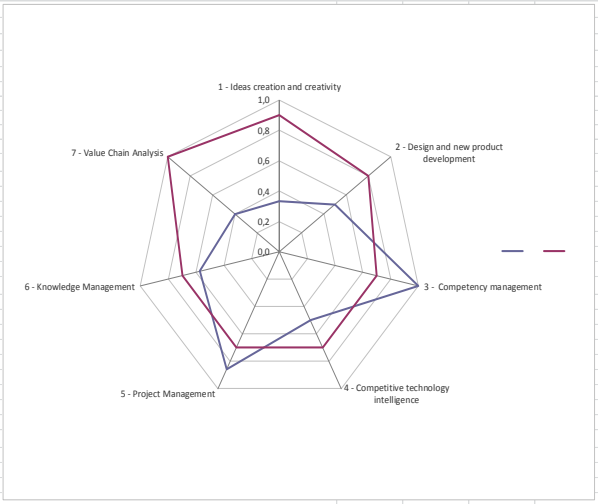
6.5.1 If YES, is there a dedicated person to update the databases or repositories?

Answer: Yes/Partially/No (1 / 0,5 / 0) 1,0

7 - Value Chain Analysis			
related to the assessment of the external environment			
7.1 . Do you have a clear understanding of the Value Chain which encompasses your products, processes, or service?			
Answer:	**Yes/Partially/No (1 / 0,5 / 0)**	0,5	
7.2 . Have you analysed the contributors (research partners, suppliers, advisors) that help you provide your product, process, or service within the previous 12 months?			
Answer:	**Yes/Partially/No (1 / 0,5 / 0)**	0,0	
7.3 Have you identified the different stakeholders who could most effectively benefit from your product, process, or service?			
Answer:	**Yes/Partially/No (1 / 0,5 / 0)**	0,0	
7.4 The technology readiness level of your product(s) is clearly recognised and understood			
Answer:	**Yes/Partially/No (1 / 0,5 / 0)**	1,0	
7.5 Do you have a systematic approach to identify what part of the value chain has the greatest potential for innovation or development?			
Answer:	**Yes/Partially/No (1 / 0,5 / 0)**	0,5	

7 - Value Chain (open-ended questions for additional analysis)
related to the assessment of the external environment
This section is directly related to the tool for value chain analysis!!! Please use the additional questionnaire!
7.6 In simple terms, please describe the technical value chain for your product, process, or service
Answers to be collected on a separate sheet indicating the key elements of the value chain: materials, processes, components, systems, products, applications, end users
7.7 What are the key market drivers or major societal challenges which are addressed by the value chain which encompasses your product, process or service?
Answers to be collected on a separe sheet listing up to 3 drivers and/or challenges
7.8 How have you attempted to identify and engage the stakeholders in the value chain you describe above?
Please indicate the most recent collaborations using a separate sheet

PII score (current):	0,59456			
PII score (a potential future):	0,85102			
PII CLASSIFICATION (current):	Preactive			
PII CLASSIFICATION (a potential future):	Proactive			
Total number of questions	47			
Total number of questions answered positively	38			
Percentage of positive answers from the total	**80%**			
1 - Ideas creation and creativity				
1.1 Ideas for new product development are gathered or created from staff from R&D and marketing fun	1,0			
1.2 Formalized procedures adopted to collect ideas within the whole company	0,0			
1.2.1 If YES, is there a reward system to encourage new ideas?	0,0			
1.2.2 If YES, is there a formalized agenda and a scheduled follow-up for the collected or created ideas?	0,0			
1.3 Dedicated resources are used to keep track of existing and new ideas	0,0			
1.4 There is a formalized assessment process to evaluate new ideas	1,0			
Total score per criterium 1	**2,0**	0,3	0,90	
2 - Design and new product development				
2.1 Regular meetings to monitor new product development activities take place	0,5			
2.2 Top management regularly reviews tasks of all project teams and managers	0,5			
2.3 Use of formalized design methodologies or tools for new product development	0,5			
2.3.1 If YES, do you have customized or specially developed tools to assist specifically your product d	0,5			
2.4 Facilitator groups or individual experts are used by the company	0,5			
2.4.1 If YES, do they have to sign non-disclosure agreements?	0,5			
2.5 Prototyping facilities (such as a laboratory or a test bed) are available in-house or are readily acces	0,5			
2.6 Quality and assurance processes and procedures have been implemented	0,5			
Total score per criterium 2	**4,0**	###	0,80	
3 - Competency management				
3.1 Technological training is undertaken internally on a regular basis	1,0			
3.2 Staff are employed according to skills needed, including future projects	1,0			
3.2.1 If YES, do you host or subcontract consultants and/or researchers from universities and/or resea	1,0			
3.3 Individual competencies are mapped out and used for innnovation management	1,0			
3.4 Cross-functional teams are formed to perform project-driven activities	1,0			
If YES, are cross-functional teams managed by a specially designated manager?	1,0			
3.5 A human resource manager is available in the company	1,0			
Total score per criterium 3	**7,0**	###	0,70	
4 - Competitive technology intelligence				
4.1. Meetings held to transform collected information into innovation projects	0,5			
4.2 Data collection methodologies, tools or external paid resources are used for the market analysis	0,5			
4.2.1 If YES, is the collected market information shared within the company?	0,5			
4.3 There is internal process methodology in place for gathering technology intelligence	0,5			
4.4 Employees are expected to actively participate in gathering the technology intelligence	0,5			
4.5 Visits (such as participations in exhibitions, trade shows etc.) are strategically planned in advance	0,5			
4.5.1 If YES, is there a dedicated budget for the participation in such events regularly?	0,5			
Total score per criterium 4	**3,5**	###	0,70	
5 - Project Management				
5.1 Regular progress reports available for each project	1,0			
5.2 Well-defined planning methodology available for tracking project progress	0,5			
5.3 Are project tracking meetings planned on a regular basis?	0,5			
5.4 An initial reference frame established (objectives, responsibilities, budgets) for each project	1,0			
5.5 Continuous resource monitoring (materials, financial, personnel) assigned to each project	1,0			
5.6 Project management and/or task tracking software is used	1,0			
5.6.1 If YES, is the software used specific, customalized according to the company needs?	1,0			
Total score per criterium 5	**6,0**	###	0,70	
6 - Knowledge Management				
6.1 There is a dedicated system or tool for recording know-how and re-use of previous knowledge	1,0			
6.2 Information is pre-treated (codification, classification) before being stored	1,0			
6.3 There is a regular staff appraisal procedure at an individual or team level	0,0			
6.4 There are procedures for creating and maintaining intellectual property	0,0			
6.4.1 If yes, does the company has a dedicated person for managing the intellectual property?	0,0			
6.5 Knowledge management tools are used such as shared databases and repositories	1,0			
6.5.1 If YES, is there a dedicated person to update the databases or repositories?	1,0			
Total score per criterium 6	**4,0**	###	0,70	
7 - Value Chain Analysis				
7.1 . Do you have a clear understanding of the Value Chain which encompasses your products, processes, or service?	0,5			
7.2 . Have you analysed the contributors (research partners, suppliers, advisors) that help you	0,0			
7.3 Can you identify the different stakeholders who could most effectively exploit, apply, or extract value from your product, process, or service?	0,0			
7.4 Have you analysed the technology readiness level of any specific aspect of the value chain in which your product or process contributes?	1,0			
7.5 Do you have a systematic approach to identify what part of the value chain has the greatest potential for innovation or development?	0,5			
Total score per criterium 7	**2,0**	###	1,00	
Calculation of weights (based on self-assessment):				
1 - Ideas creation and creativity	9	0,9		
2 - Design and new product dev.	8	0,8		
3 - Competence management	7	0,7		
4 - Competitive technology intelligence	7	0,7		
5 - Project Management	7	0,7		
6 - Knowledge Management	7	0,7		
7 - Value chain analysis	10	1		
TOTAL				



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