

Erasmus + KA2: Cooperation for innovation and the exchange of good practices

## Knowledge Alliances



Enabling SMEs to gain competitive advantage from the use of HPC

### Adjusted HPC Benchmark Audit Instrument

Prepared by: P3 FIS

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## 1. Introduction

The [Adjusted HPC Benchmark Audit Instrument](#) is the tool, which is used for the regional HPC benchmark reports for collecting data on HPC awareness, usage and infrastructural development in the pilot regions of Ireland, Romania and Slovenia. This generic tool has the aim to assess the level of awareness and usage of HPC in the business sector and to provide feedback in order to reflect the requirements and particularities of the HPC landscape in the pilot regions. The aim of the audit instrument is to collect data from a representative number of enterprises (small, medium, large, indigenous, foreign owned) about the level of knowledge, understanding and use of HPC skills and processes. This tool has been adjusted taking the input from stakeholders located in pilot regions into account in cooperation with all consortium partners.

This document is structured in the following way:

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The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

- The Adjusted HPC Benchmark Audit Instrument, both Desktop research and Interview guidelines, represent the changes made to the Regional HPC Benchmark Audit Instrument (D 3/1) based on the stakeholders' feedback.
- The Adjusted Template for HPC Benchmark Audit Instrument, both Desktop research and Interview guidelines, represent the tool that will be used for D 3/3.

Considering the feedback received feedback for different stakeholder regarding the Regional HPC Benchmark Audit Instrument (D 3/1), Adjusted HPC Benchmark Audit Instrument has several improvements. As a result, in the following chapter there are presented the changes,

which were made. The questions/ statements that are underlined have been changed in line with the received feedback. Additionally, if the question/ statement is underlined and has a strikethrough (e.g. ~~strikethrough~~) it means it was omitted for Adjusted HPC Benchmark Audit Instrument.



## 2. Adjusted HPC Benchmark Audit Instrument

### 2.1 Desktop research report

REGION:

COMPLETION DATE:

General appraisal of usage and applicability of HPC in your country (explain which institutions deal with HPC, which is the leading institution in the area of HPC in your region (summary is expected to be in total of 300 words of length).

Assessment of the Business sector in the pilot region, including market orientation and needs, thematic focus, available infrastructure. Identify the relevant business sectors for HPC development. (approximately 1000 words)

Availability of HPC hard infrastructure and soft competencies in the pilot region, including experience, thematic focus, available infrastructure etc. Identify the relevant institutions. (approximately 1000 words)

Main applications for which HPC is used in the business sector in your country/region (approximately 1000 words):

- good practices
- level of technological development
- other relevant aspects

Applications of HPC in the industry for R&D (approximately 1000 words)

- good practices
- level of technological development
- other relevant aspects

HPC cooperation between academia and industry in your region (approximately 1000 words):

- assess the current situation
- good practices
- applications of HPC
- other relevant aspects

Other pilot region-specific aspects relevant for HPC development (approximately 500 words)

References & data sources

## 2.2 Interview guidelines

### Introductory questions

1. Which are the institutions/organizations responsible for high performance computing (HPC) in the pilot region?
2. What is the general situation regarding the presence and use of HPC in academia and in the business environment in the pilot region?
3. How developed is the application of HPC in different spheres?
4. Who are the main organizations/sectors that make use of HPC? How many people are involved in these organizations that deal with HPC?
5. What are the main areas where you see the possibility of applying HPC?

### Questions on High Performance Computing and Innovation Profile

#### Question 1

Please assess the level of application of HPC in the business sector in your region.

What is the capacity of HPC in your region, and what is its percentage of usage? What are the main applications for which HPC is used in your region?

#### Additional questions

1. Are HPC processes part of the business R&D?
2. In your region, to what extent do companies have the capacity to access HPC?
3. Are the stakeholders able to identify needs and opportunities for innovation and entrepreneurship?
4. Is there a coherent, structured information management system/process that covers collecting, processing, disseminating and monitoring needs concerning HPC relevant information such as funding opportunities, potential partners, available know-how, technologies, etc.?
5. What is the situation concerning planning the development of new areas in the field of HPC: 'soft' plans (procedures have to be started or are on-going) as well as 'hard' plans (procedures that are successfully finished)?

#### Question 2

What are the strengths and weaknesses concerning collecting, processing and disseminating High Performance Computing information (such as applicability, funding opportunities, potential partners, available know-how, technologies, etc.) in the region?



### Additional questions

1. What information is available on know-how, national/ EU subsidies, technology, market information, etc.?
2. Do the relevant persons, groups, organizations and networks have access to the right information?
3. Is this access part of a structured (organized) approach?
4. Are the right stakeholders involved in processing information on HPC (based on need: representatives of authorities, enterprises, universities, education, etc.)?
5. How can this process be improved?

### Question 3

What are the strengths and weaknesses concerning applications of HPC in different enterprises?

### Additional questions

1. Are there individual enterprises with a high dependency on Research Technology Development (RTD)?
2. Are there specific (potential) RTD high-performers of sectors or clusters?
3. Are there any specific / dominant types of innovation?
4. What have been the innovation trends over the last decade?

### Question 4

Is the existing HPC application in the region oriented towards in-company R&D?

### Additional questions

1. Is the usage of HPC oriented toward ~~national level~~ the others' needs outside of the region?
2. Is it in accordance with the main objectives of the development strategies and plans?

### Questions on Institutions

### Question 5

What are the strengths and weaknesses concerning the role of the public authorities and/or intermediary organizations (e.g. technology transfer offices) for HPC?

### Additional questions

1. Have the authorities identified (potential) strong sectors, clusters and enterprises?
2. Is the support offered coherent, complete and consistent?
3. Does the support address the specific needs of new entrepreneurs effectively?





4. Which stakeholders (e.g. universities, intermediary organizations) involve the authorities actively in these support-processes and what are their roles?
5. Do state institutions actively facilitate and stimulate the search and development of R&D opportunities based on synergy: win-win situations? E.g. to search for and develop R&D opportunities
6. Do they effectively support identifying and addressing opportunities?
7. Do they provide formal/informal training?

#### Question 6

Does your region have the capacity to attract talented people, including – but not exclusively – those with HPC competencies?

#### Additional questions

1. Does your region provide human capacity for process management or specialised expertise?
2. Which are the mechanisms through which the region attracts talented people?
3. How can these mechanisms be improved?
4. Who are the actors that contribute to attracting talented people in the region?

#### Question 7

Does your region have the capacity to retain talented people, including those - but not exclusively - with HPC competencies?

#### Additional questions

1. Which are the mechanisms through which the region retains talented people?
2. How can these mechanisms be improved?
3. Who are the actors that contribute to retaining talented people in the region?
4. How effective is the support for finding spaces/locations for the expansion of companies or new enterprises?
5. Does the region have a good housing policy?

#### Question 8

What are the strengths and weaknesses of regional enterprise support? (Also take into account ~~conductiveness for~~ the HPC applications.)

#### Additional questions

1. Do regional authorities have ~~Is there~~ an explicit business vision or is such a vision part of other documents?



2. Which business objectives are formulated?
3. If long-term objectives are formulated: are short and medium-term objectives formulated for project phases as well?
  
4. To what extent are the SMART (Specific, Measurable, Acceptable, and Realistic) objectives specified in time?
5. Are plans covering all relevant innovation issues?
6. Which (other) plans (technological, industrial, science, spatial) are relevant to RTD issues and RTD performance?
7. Are all regional, national and international weaknesses/bottlenecks, strengths and/or opportunities addressed?
8. Which organizations are involved (national, regional, municipal authorities, clusters/sectors of industry, individual companies, other stakeholders) in the planning and/or the decision-making process and how?
9. How strong is the protection of intellectual property?
10. How would you assess the quality of research institutions?
11. What do you think do HEIs need in order to provide HPC skills to industry or stakeholders in the region (e.g. increased investment, awareness and support)?

## Questions on Networks

### Question 9

How are networks organized (e.g. multi-sectoral, enterprises only or sector only, regional, cross-border etc.) and to which extent could these networks contribute effectively to the implementation of HPC in business R&D?

#### Additional questions

1. Are the networks considered effective concerning power symmetry, openness to new actors and ideas, creation of knowledge spill over and transfer to allow informal learning processes?
2. Are there big differences between different clusters, sectors or individual enterprises concerning how well they are linked/bonded to the region; why, and what are the consequences for the development of HPC?
3. Who has the leading role in organizing various network alliances?

### Question 10

What are the strengths and weaknesses concerning the cooperation between stakeholders active in the support environment?

#### Additional questions

1. Are PPP (Public Private Partnership) arrangements facilitated and/or used?
2. How well (based on satisfaction and output) do enterprises cooperate with knowledge institutions, authorities, higher education and intermediary organizations?
3. Which stakeholders are leading specific modes of cooperation (science led, policy led, industry led) and how effective are these designs for innovation performance?
4. Are new cooperations developed on the basis of the principle of added value and best solution, i.e. are partners chosen/involved because they have a clear added value for innovation development and actually represent the best option for cooperation?
5. Have key actors (individuals and organizations) been identified?
6. Are key actors representing all the main innovation relevant stakeholders such as universities, authorities, enterprises or civil participants?
7. Do key actors operate within different contexts (mix of informal contacts and strong attachment, different networks) to allow quick identification of HPC needs and market opportunities?

#### Question 11

What are the strengths and weaknesses concerning the cooperation between stakeholders active in the business environment and actors outside your region?

#### Additional questions

1. Are new cooperations developed on the basis of the principle of added value and best solution, i.e. foreign partners chosen/involved because they have a clear added value for an innovation development and actually represent the best option for cooperation?
2. What significant differences are there between different clusters, sectors or individual enterprises concerning national and international cooperation and what are the consequences for innovation performance?
3. How does cooperation with others e.g. universities and intermediary organizations stimulate and facilitate the access of enterprises, clusters and sectors to international collaborations?

#### Question 12

Do stakeholders/entrepreneurs active in innovation and technological policy trust each other?

#### Additional questions

1. What is the role of trust for the interaction between the stakeholders? Does it encourage or hinder cooperation?
2. Can the trustful relationship between the relevant stakeholders/entrepreneurs be perceived as an important or not so important component for HPC?



3. How can a trustful relationship between the relevant stakeholders/entrepreneurs be improved?
4. Can technology create trust between people?

#### Questions on Cognitive Frames

##### Question 13

What are the strengths and weaknesses of the culture and attitude of the population concerning creativity, entrepreneurship and new technologies? (Take into account its conduciveness for implementation of HPC in business R&D.)

##### Additional questions

1. What are the national characteristics of the population?
2. Are they e.g. trend-setting, early adopters or do they have a rather conservative attitude?
3. Does the mentality of the population deviate from competitive environments?

##### Question 14

To what extent do the attitudes and culture enable the learning processes in the region?

##### Additional questions

1. Are organizations, clusters, networks, groups and individuals willing to develop, try and adopt new approaches (technology and routines) even if current results are satisfactory (e.g. always aiming at continuous improvement)?
2. What are the main characteristics of attitudes and culture?

##### Question 15

Is competition seen as a positive value in your region?

##### Additional questions

1. Is competition necessary for HPC?
2. Do you consider that reward is necessary for HPC?
3. What is the role of solidarity for the development of the region?

##### Question 16

What is the role of the European context with respect to the adoption of new technologies in your region?

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### Additional questions

1. How does the European context affect the development of HPC and the access to it?
2. Can you name the positive effects it has on HPC in the national context?
3. Can you name the negative effects it has on HPC in the national context?

## 3. Adjusted Template for HPC Benchmarks Audit Instrument

### 3.1. Desktop research report

REGION:

COMPLETION DATE:

General appraisal of usage and applicability of HPC in your country (explain which institutions deal with HPC, which is the leading institution in the area of HPC in your region (summary is expected to be in total of 300 words of length)

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Availability of HPC hard infrastructure and soft competencies in the pilot region, including experience, thematic focus, available infrastructure etc. Identify the relevant institutions (approximately 1000 words)



Main applications for which HPC is used in the business sector in your country/region (approximately 1000 words)

- good practices
- level of technological development
- other relevant aspects

Applications of HPC in the industry for R&D (approximately 1000 words)

- good practices
- level of technological development
- other relevant aspects



HPC cooperation between academia and industry in your region (approximately 1000 words)

- assessment the current situation
- good practices
- applications of HPC
- other relevant aspect

Other pilot region-specific relevant aspects of the HPC development (approximately 500 words)

References & data sources



### 3.2. Interview guidelines

REGION:

COMPLETION DATE:

Introductory questions

1. Which are the institutions/organizations responsible for high performance computing (HPC) in the pilot region?
2. What is the general situation regarding the presence and use of HPC in academia and in the business environment in the pilot region?
3. How developed is the application of HPC in different spheres?
4. Who are the main organizations/sectors that make use of HPC?
5. What are the main areas where you see the possibility of applying HPC?





## Questions on High Performance Computing and Innovation Profile

<b>Question 1</b>					
1. <i>Please assess the level of application of HPC in the business sector in your region?</i>					
What is the capacity of HPC in your region, and what is its percentage of usage? What are the main applications for which HPC is used in your region?					
<b>Examples of important aspects concerning regional profile:</b> Capacity to innovate through application of HPC					
	<b>General comments:</b>				
	<b>Strengths:</b>				
	<b>Weaknesses:</b>				
<i>On a scale from 1 to 4 what is the maturity level related to the level of application of HPC in the business sector?</i>					
<b>Score:</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	<b>Any additional comments concerning the motivation of the score?</b>				



**Question 2**

*What are the strengths and weaknesses concerning collecting, processing and disseminating High Performance Computing information (such as applicability, funding opportunities, potential partners, available know-how, technologies, etc.) in the region?*

**Examples of important aspects concerning collection, processing and dissemination of information characteristics:**

Access to information, relevant stakeholders involved in the process

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum/most desirable), what would your score be for the process concerning collecting, processing and disseminating High Performance Computing information in the region?*

**Score:**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

	<b>Any additional comments concerning the motivation of the score?</b>	
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**Question 3**

*What are the strengths and weaknesses concerning applications of HPC in different enterprises?*

**Examples of important aspects concerning RTD characteristics of enterprises situated in the region:**

Employment in different industries, R&D, R&D-characteristics (dependence on and performance in R&D, innovation and entrepreneurship, access to funding and cooperation, pro-active market approach) of individual enterprises, sectors and clusters, etc.

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the strengths and weaknesses concerning enterprises and R&D in the region?*

<b>Score:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	

	<b>Any additional comments concerning the motivation of the score?</b>	
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<b>Question 4</b>					
<i>Is the existing HPC application in the region oriented towards in-company R&amp;D?</i>					
<b>Examples of important aspects concerning orientation:</b> Orientation towards science, orientation towards non-applied research					
	<b>General comments:</b>				
	<b>Strengths:</b>				
	<b>Weaknesses:</b>				
<i>If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the orientation of existing HPC research towards business R&amp;D?</i>					
<b>Score:</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	Any additional comments concerning the motivation of the score?				



Questions on Institutions

**Question 5**

1. *What are the strengths and weaknesses concerning the role of the public authorities and/or intermediary organizations (e.g. technology transfer offices) for HPC?*

**Examples of important aspects concerning strengths and weaknesses concerning the role of the public authorities and/or intermediary organizations representing these authorities:**

Presence of strong sectors, support of R&D opportunities, formal and informal training, funding

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score public authorities and/or intermediary organizations representing these authorities?*

**Score:**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

	<b>Any additional comments concerning the motivation of the score?</b>	
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**Question 6**

*Does your region have the capacity to attract talented people, including – but not exclusively – those with HPC competencies?*

**Examples of important aspects concerning capacity to attract talented people within the region:**

Professional development, rewards and recognition, migration policy, housing, integration, quality of life, etc.

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the capacity to attract talented people within the region?*

<b>Score:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

	<b>Any additional comments concerning the motivation of the score?</b>	
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**Question 7**

2. *Does your region have the capacity to retain talented people, including those – but not exclusively – with HPC competencies?*

**Examples of important aspects concerning capacity to retain talented people within the region:**

Professional Development, Rewards and Recognition, Migration Policy, Housing, Integration, etc.

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the capacity to retain talented people within the region?*

<b>Score:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	

	<b>Any additional comments concerning the motivation of the score?</b>	
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**Question 8**

*What are the strengths and weaknesses of regional enterprise support? (Also take into account the HPC applications.)*

**Examples of important aspects concerning business environment within the region:**

Long-term objectives, Innovation vision, Technology transfer measures

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the business environment within the region?*

**Score:**

1	2	3	4

	<b>Any additional comments concerning the motivation of the score?</b>	
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## Questions on Networks

### Question 9

*How are networks organized (e.g. multi-sectoral, enterprises only or sector only, regional, cross-border etc.) and to which extent could these networks contribute effectively to the implementation of HPC in business R&D?*

**Examples of important aspects concerning network organization in the region:**

Power symmetry, openness to new actors, differences in clusters, sectors or individuals

**General comments:**

**Strengths:**

**Weaknesses:**

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-5 (four being maximum / most desirable), what would your score be for the region?*

**Score:**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

**Any additional comments concerning the motivation of the score?**

### Question 10

*What are the strengths and weaknesses concerning the cooperation between stakeholders active in the support environment?*

**Examples of important aspects concerning cooperation between stakeholders within the region:**

Key actors, cooperation, representation, operation contexts

	<b>General comments:</b>									
	<b>Strengths:</b>									
	<b>Weaknesses:</b>									
<p><i>If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (five being maximum / most desirable), what would your score be for the strengths and weaknesses concerning cooperation between stakeholders within the region?</i></p>										
<b>Score:</b>	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	1	2	3	4					
1	2	3	4							
	<b>Any additional comments concerning the motivation of the score?</b>									



**Question 11**

What are the strengths and weaknesses concerning the cooperation between regional stakeholders active in the regional business environment and actors outside the region?

**Examples of important aspects concerning cooperation between stakeholders and parties outside the region:**

Added value, differences in national and international cooperation, intermediaries

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the strengths and weaknesses concerning cooperation between stakeholders and parties outside the region?*

Score:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	Any additional comments concerning the motivation of the score?	
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### Question 12

*Do stakeholders/entrepreneurs active in innovation and technological policy trust each other?*

**Examples of important aspects concerning trust for the interaction for innovation processes within the region:**

Trust or lack thereof within and outside the region

	<b>General comments:</b>									
	<b>Strengths:</b>									
	<b>Weaknesses:</b>									
<p><i>If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the role of trust for innovation process within the region?</i></p>										
<b>Score:</b>	<table border="1"> <tr> <td><b>1</b></td> <td><b>2</b></td> <td><b>3</b></td> <td><b>4</b></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>					
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>							
	<b>Any additional comments concerning the motivation of the score?</b>									



## Questions on Cognitive Frames

### Question 13

*What are the strengths and weaknesses of the culture and attitude of the population concerning creativity, entrepreneurship and new technologies? (Take into account its conduciveness for implementation of HPC in business R&D.)*

**Examples of important aspects concerning strengths and weaknesses of the culture and attitude of the population's creativity and entrepreneurship within the region:**

Examples of creativity, propensity for new technologies etc.

	<b>General comments:</b>									
	<b>Strengths:</b>									
	<b>Weaknesses:</b>									
<p><i>If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the culture and attitude of the population's concerning creativity and entrepreneurship?</i></p>										
<b>Score:</b>	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	1	2	3	4					
1	2	3	4							
	<b>Any additional comments concerning the motivation of the score?</b>									

### Question 14

*To what extent do the attitudes and culture enable the learning processes in the region?*

**Examples of important aspects concerning attitudes / culture the learning processes:**

Willingness to adopt new approaches, e.g. application of HPC in innovation processes and business R&D

	<b>General comments:</b>									
	<b>Strengths:</b>									
	<b>Weaknesses:</b>									
<p><i>If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for role of attitudes / culture for the learning processes?</i></p>										
<b>Score:</b>	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	1	2	3	4					
1	2	3	4							
	<b>Any additional comments concerning the motivation of the score?</b>									



### Question 15

*Is competition seen as a positive value in your region?*

**Examples of important aspects concerning competition as a value for high performance computing within the region:**

Importance of solidarity

	<b>General comments:</b>	
	<b>Strengths:</b>	
	<b>Weaknesses:</b>	

*If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for competition as a positive value within the region?*

<b>Score:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	

	<b>Any additional comments concerning the motivation of the score?</b>	
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**Question 16**

*What is the role of the European context with respect to the adoption of new technologies in your region?*

**Examples of important aspects concerning globalization for innovation processes within the region:**

Access to knowledge, competition with foreign companies, access to new markets, Accessibility of information, etc.

	<b>General comments:</b>									
	<b>Strengths:</b>									
	<b>Weaknesses:</b>									
<p><i>If you should translate all these strengths and weaknesses into ONE score on a range of 1-4 (four being maximum / most desirable), what would your score be for the role of globalization for HPC development/ access?</i></p>										
<b>Score:</b>	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	1	2	3	4					
1	2	3	4							
	<b>Any additional comments concerning the motivation of the score?</b>									



## Additional information on questions

This appendix provides detailed information on each important aspect. The information can be used as a support for identifying strengths and weaknesses as well as for the scoring process.

### Question 1

Please assess the level of application of HPC in the business sector in your region?

What is the capacity of HPC in your region, and what is its percentage of usage? What are the main applications for which HPC is used in your region?

#### Additional questions

1. Are HPC processes part of the business R&D?
2. In your region, to what extent do companies have the capacity to access HPC?
3. Is there a coherent, structured information management system/process that covers collecting, processing, disseminating and monitoring needs concerning HPC relevant information such as funding opportunities, potential partners, available know-how, technologies, etc.?
4. What is the situation concerning planning for development of new areas in the field of HPC: 'soft' plans (procedures have to be started yet or are on-going) as well as 'hard' plans (procedures that are successfully finished)?

### Question 2

What are the strengths and weaknesses concerning collecting, processing and disseminating High Performance Computing information (such as applicability, funding opportunities, potential partners, available know-how, technologies, etc.) in the region?

#### Additional questions

1. What information is available on know-how, national/ EU subsidies, technology, market information, etc.?
2. Do the relevant persons, groups, organizations and networks have access to the right information?
3. Is this access part of a structured (organized) approach?
4. Are the right stakeholders involved in processing information on HPC (based on need: representatives of authorities, enterprises, universities, education, etc.)?
5. How this process can be improved?

### Question 3

What are the strengths and weaknesses concerning applications of HPC in different enterprises?

#### Additional questions

1. Are there individual enterprises with a high dependency on Research Technology Development (RTD)?
2. Are there specific (potential) RTD high-performers of sectors or clusters?
3. Are there any specific / dominant types of innovation?
4. What are the innovation trends over the last decade?

### Question 4

Is the existing HPC application in the region oriented towards in-company R&D?

#### Additional questions

1. Is the usage of HPC oriented others' needs outside of the region?
2. Is it in accordance to the main objectives of the development strategies and plans?

### Question 5

What are the strengths and weaknesses concerning the role of the public authorities and/or intermediary organizations (e.g. technology transfer offices) for HPC?

#### Additional questions

1. Have the authorities identified (potential) strong sectors, clusters and enterprises?
2. Is the offered support coherent, complete and consistent?
3. Does the support effectively address the specific needs of new entrepreneurs?
4. Which stakeholders (e.g. universities, intermediary organizations) have the authorities actively involved in these support-processes and what are their roles?
5. Do state institutions actively facilitate and stimulate the search and development of R&D opportunities based on synergy: win-win situations? E.g. to search for and develop R&D opportunities
6. Do they effectively support identifying and addressing opportunities?
7. Do they provide formal/informal trainings?

### Question 6

Does your region have the capacity to attract talented people, including – but not exclusively - those with HPC competencies?

#### Additional questions

1. Are facilities such as providing human capacity for process management or specialized expertise delivered?
2. Which are the mechanisms through which the region attracts talented people?
3. How can these mechanisms be improved?
4. Who are the actors that contribute to attracting talented people in the region?

### Question 7

Does your region have the capacity to retain talented people, including those - but not exclusively - with HPC competencies?

#### Additional questions

1. Which are the mechanisms through which the region retains talented people?
2. How can these mechanisms be improved?
3. Who are the actors that contribute to retaining talented people in the region?
4. How effective is the support for finding spaces / locations for expansion of companies or new enterprises?
5. Does the region have a good housing policy?

### Question 8

What are the strengths and weaknesses of regional enterprise support? (Also take into account the HPC applications.)

#### Additional questions

1. Is there an explicit business vision or is such a vision part of other documents?
2. Which business objectives are formulated?
3. If long-term objectives are formulated: are short and medium-term objectives formulated for project phases as well?



4. To what extent are the SMART (Specific, Measurable, Acceptable, and Realistic) objectives specified in time?
5. Are plans covering all relevant innovation issues?
6. Which (other) plans (technological, industrial, science, spatial) are relevant to RTD issues and RTD performance?
7. Are all regional, national and international weaknesses/bottlenecks, strengths and/or opportunities addressed?
8. Which organizations are involved (national, regional, municipal authorities, clusters/sectors of industry, individual companies, other stakeholders) in the planning and or the decision-making process and how?
9. How strong is the protection intellectual property?
10. How would you assess the quality of research institutions?
11. What do you think that HEIs need in order to provide HPC skills to industry or stakeholders in the region (e.g. increased investment, awareness and support)?

#### Question 9

How are networks organized (e.g. multi-sectoral, enterprises only or sector only, regional, cross-border etc.) and to which extent could these networks contribute effectively to the implementation of HPC in business R&D?

#### Additional questions

1. Are the networks considered effective concerning power symmetry, openness to new actors and ideas, creation of knowledge spill over and transfer to allow informal learning processes?
2. Are there present large differences between different clusters, sectors or individual enterprises concerning how linked / bonded they are to the region, why, and what are the consequences for the development of HPC?
3. Who has the leading role in organizing various network alliances?

#### Question 10

What are the strengths and weaknesses concerning cooperation between stakeholders active in the support environment?

#### Additional questions

1. Are PPP (Public Private Partnership) arrangements facilitated and/or used?
2. How well (based on satisfaction and output) do enterprises cooperate with knowledge institutions, authorities, higher education and, intermediary organizations?
3. Which stakeholders are leading specific modes of cooperation (science led, policy led, industry led) and how effective are these designs for innovation performance?

4. Is new cooperation developed based on the principle of added value and best solution, i.e. are partners chosen / involved because they have a clear added value for innovation development and actually represent the best option for cooperation?
5. Have key actors (individuals and organizations) been identified?
6. Are key actors representing all main innovation relevant stakeholders such as universities, authorities, enterprises or civil participants?
7. Do key actors operate within different contexts (mix of informal contacts and strong attachment, different networks) to allow quick identification of NPC needs and market opportunities?

#### Question 11

What are the strengths and weaknesses concerning cooperation between stakeholders active in the business environment and actors outside your region?

##### Additional questions

1. Is new cooperation developed based on the principle of added value and best solution, i.e. foreign partners chosen / involved because they have a clear added value for an innovation development and actually represent the best option for cooperation?
2. What significant differences are there between different clusters, sectors or individual enterprises concerning national and international cooperation and what are the consequences for innovation performance?
3. How does cooperation with others e.g. universities and intermediary organizations stimulate and facilitate access of enterprises, clusters and sectors to international collaboration?

#### Question 12

Do stakeholders/ entrepreneurs active in innovation and technological policy trust each other?

##### Additional questions

1. What is the role of trust for the interaction between the stakeholders? Does it encourage or hinder cooperation?
2. Can trust between relevant stakeholders/ entrepreneurs be perceived as an important or not so important component for the HPC?
3. How trust between relevant stakeholders/ entrepreneurs can be improved?
4. Can technology create trust between people?

#### Question 13

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What are the strengths and weaknesses of the culture and attitude of the population concerning creativity, entrepreneurship and new technologies? (Take into account its conduciveness for implementation of HPC in business R&D.)

Additional questions

1. What are the national characteristics of the population?
2. Are they e.g. trend-setting, early adopters or do they have a rather conservative attitude?
3. Does the mentality of the population deviate from competitive environments?

Question 14

To what extent do the attitudes and culture enable the learning processes in the region?

Additional questions

1. Are organizations, clusters, networks, groups and individuals willing to develop, try and adopt new approaches (technology and routines) even if current results are satisfactory (e.g. always aiming at continuous improvement)?
2. What are the main characteristics of attitudes and culture?

Question 15

Is competition seen as a positive value in your region?

Additional questions

1. Is competition necessary for HPC?
2. Do you consider that reward is necessary for HPC?
3. What is the role of solidarity for the development of the region?

Question 16

What is the role of the European context with respect to adoption of new technologies in your region?

Additional questions

1. How the European context affects the HPC development/ access?
2. Can you name the positive effects that it has on HPC in the national context?
3. Can you name the negative effects that it has on HPC in the national context?

## 4. Annex

The **Desktop Research** (see Appendix I) has the aim to extract data from publicly available sources, primarily through online search. Desktop research work will focus on two topics:

- first, to identify the current state of implementation of digital technology in general and HPC in particular, as well as the possibility of HPC applications in pilot regions with the particular focus on the business environment.
- second, to develop an overview of HPC providers and competence centres, i.e. their infrastructure, thematic orientation, competencies, linkages with the business environment

The **Interview Guidelines** has the aim to conduct semi-structured interviews with the members of the business community, business consultants, etc. This will allow us to get insight to innovation processes and to understand the obstacles and opportunities of HPC applications in innovative processes.

Semi-structured interviewing involves asking questions and getting answers from participants. Semi-structured interviewing is different from survey; it allows more freedom to interviewers and interviewees to formulate question and replies to adjust to specific situation, allowing us to explore unexpected relevant subtopics.

We have to do at least one interview in each pilot region. In order to get the best possible information, we will conduct group interview which will include at least following participants:

1. Representatives from enterprises (small, medium, large, indigenous and foreign owned)

It is possible to include other relevant participants but note that is very difficult to conduct interview with more than 7 or 8 interviewees. After you have identified relevant interviewees, you contact them. One possible approach is email with a contact letter.

IMPORTANT (!!!) Experience shows that it is very important to identify and contact relevant respondents as soon as possible. Relevant interviewees are often very busy, reluctant to talk, and it is generally not so easy to coordinate the timing, so it is very important to start with the organization well in advance.

### Interviewing procedure

1. The group interview will be conducted in a setting where interviewees will feel comfortable and relaxed. This is usually neutral terrain (e.g. university building), in a room with round table and chairs. You may offer them drinks and snacks to relax.
2. The interview is conducted in English (preferable) or in national language, if participants cannot or refuse to be interviewed in English.
3. The interview is recorded. You should get their consent in advance, to avoid any issues before the interview is conducted. If necessary, you may again provide assurance of complete anonymity. To avoid technical issues, use two recording devices simultaneously. After the interview transcribe the entire interview.
4. We will use the interview guide (Appendix II) for our group interview. Interview guide is a set of questions through which we must go during the group interview. This will ensure comparison of information in different countries. If possible, try to encourage and moderate meaningful discussion between interview participants. This can help us get additional information about situation in specific countries.
5. The interview guide also includes score for each of the main questions, between 1 and 4. The participants have to reach a consensus on a specific score. Please note that this score is not the main goal of these questions, so we ask the participants to decide on a score only after we have discussed each question in detail.





6. The results of group interviews which will be emailed to WP3 leader FIS will be:
  - Recording and complete transcript of the interview.
  
  - Filled in interview guide in English. This includes - for each main question - sections on strengths, weaknesses, additional comments and scoring.