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Conceptual Outline of HEINNOVATE for RIS3

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Self-reflection Tools for Smart Universities Acting Regionally

Content

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1. Introduction

1.1.   Aim of the document

This document, the Conceptual outline for HEINNOVATE for RIS3 (Conceptual Outline), as Deliverable 1.3.1. is based on the results of the research activities performed under Work Package 1 (WP1), summarised in the Research Report (RR) and on the Guidelines for HEInnovate for RIS3 (Guidelines). Its main objective is to support the development of a new self-assessment tool, designed to guide and facilitate organisational changes within Higher Education Institutions (HEIs) and their collaborative actions linked to the design and implementation of RIS3s. This outline will provide the backbone for the future online tool "HEINNOVATE for RIS3", as it will include the definitive set of dimensions, statements and support resources that will be included in the tool itself.

All the five partner universities - Porto Business School (PBS as project coordinator – Portugal), Corvinus University of Budapest (CUB, Hungary), Technical University of Košice (TUKE, Slovak Republic), Babes-Bolyai University of Cluj Napoca (BBU, Romania), and University of Macerata (UNIMC, Italy) - contributed to the project research phase, as well as SERN (Startup Europe Regions Network) partner, which supported the others on methodological and organisational issues. The Guidelines, elaborated by CUB on the basis of a framework shared by all partners, moving from the research results, provided concrete guidance to elaborate the Conceptual Outline relying on which the consortium will develop the "HEInnovate for RIS3" tool.

Indeed, the Conceptual Outline, elaborated by UNIMC, BBU and CUB, based on the suggestions from all partners, summarises the process through which, the consortium achieved the main contents of the "HEInnovate for RIS3" new tool: dimensions, statements, descriptions and support resources. This process started with the outcome of the research activities and continued with the consolidation of the statements and the interpretation of the results of validation workshops with key stakeholders.

The following image (Figure 1) presents the structure of the conceptual outline of "HEInnovate for RIS3": process towards "HEInnovate for RIS3" and related outputs.

FIGURE 1 - STRUCTURE OF THE CONCEPTUAL OUTLINE OF "HEINNOVATE FOR RIS3"
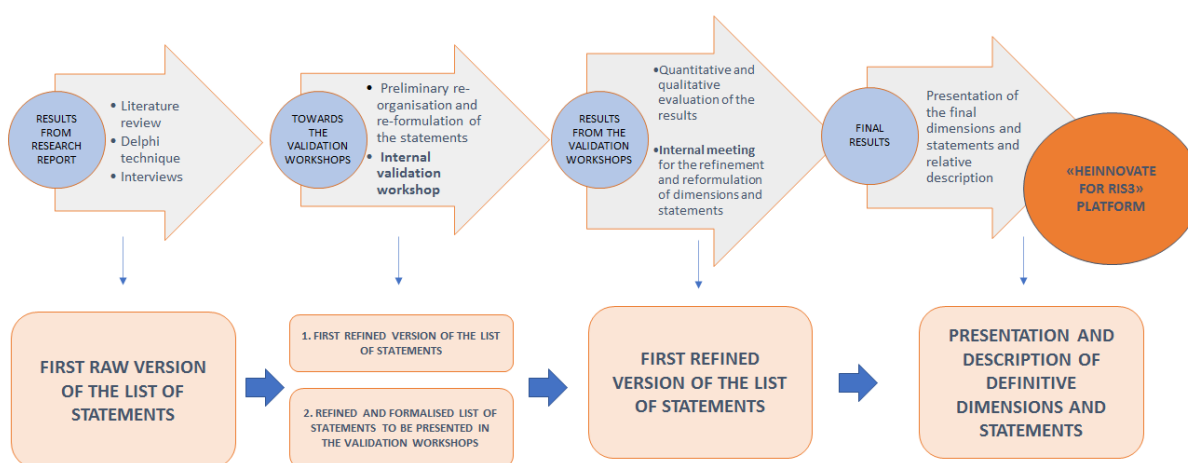
The document contains the results of the research activities retrieved from the RR, divided into research phases (Section 2); the process towards the validation of the statements, which also includes the internal validation workshop organised by the consortium to share and define the list of statements to be validated during the Validation Workshops (VWs) (Sections 3 and 4); the results of the VWs, including the process towards the definitive version of dimensions and statements (Section 5); the presentation of the refined definitive version of dimensions and statements to be included in the new self-assessment tool "HEInnovate

for RIS3", with related descriptions and supporting materials (Section 6). The latter part will be considered as "open content" as it will be updated with new materials and information gathered in WP2, WP3 and WP4, with emphasis on the feedback that will be received from the first piloting of the new tool within WP2. The document resumes with a list of background materials presented as Annexes (Section 7).

As mentioned, the final list of statements, as included in the present document, will be included in the platform hosting the new self-assessment tool "HEInnovate for RIS3", to be designed by PBS. Some statements have been rephrased and revised on the basis of the comments and feedback received from regional stakeholders during VWs' and presented in the reports elaborated by each University project partner. The description of each dimension and statement was done, with the support of the BBU team, by taking into account the original descriptions from the HEInnovate self-assessment tool, adapted to the specific contents of the RE-ACT's statements.

2. Results of the Research Report

The Research Report (RR) summarises the results of the three different research methods applied across WP1: literature review, delphi technique, interviews. First, the project team gathered information from the scientific literature (in English and other languages) on the broader topic of RIS3 and HEIs related-contribution, organising information according to the 8 dimensions of the HEInnovate tool. Secondly, national and regional RIS3 and HEInnovate experts, as well as HEI representatives, were asked to participate in a three-round Delphi survey to examine the potential role of HEIs in the development and implementation of RIS3. Thirdly, the university partners, for each country, interviewed a group of organisations responsible for RIS3 about further approaches, ideas and previous experiences on RIS3-related topics, with particular focus on the role of universities in such processes.

2.1 Results from the Literature Review

Since the project team considered that the existing HEInnovate dimensions were clear, well-built and could work as an orientative framework for the Literature Review and, then, for the new self-reflection tool, its structure had been organised under each one of the 8 dimensions: I. Leadership and governance, II. Organisational capacity, people, incentives, III. Entrepreneurial teaching and learning, IV. Preparing and supporting entrepreneurs, V. Digital transformation and capability, VI. Knowledge exchange and collaboration, VII. Internationalised institution, VIII. Measuring impact. Additionally, this approach was in line with the aim to build a tool that is strongly connected and complementary to the original one, HEIs using both tools being able to interpret results from the original and the new tool in an overarching manner.

Results showed that, in the scientific literature, the perception of the HEIs' role in contributing to regional innovation and place-based, innovation driven development expresses itself especially through knowledge generation and dissemination internally (within the institution) and outside (locally, in dialogue with the other regional stakeholders, generally quadruple helix actors). In coherence with their third mission, HEIs engage themselves regionally, to address economic and social needs in cooperation with other actors at regional, national and international level.

Distribution of information under the existing dimensions was based on the original definitions of these dimensions, however interpreted broadly, relying not only strictly on their content, but also on the spirit of these explanations. When some findings or statements did not fit the existing dimensions, those were either marked or placed on a list of "outliers" for further research and consideration. The results from the literature review showed that, among the Quadruple Helix stakeholders (HEIs, public authorities, industry and civil society), in the scientific literature, the perception of HEIs about the contribution of HEIs in RIS3 is much more investigated than the one from the other stakeholders. Consequently, as the project team derived the majority of the statements[1] (to be validated in the VWs and then included in the new "HEInnovate for RIS3" tool) from this phase of the research, this imbalanced internal perspective remained strong.

2.2 Results from the Delphi Technique

From the Delphi rounds the participants agreed and reached the consensus about the fact that HEIs should actively participate in the formulation and implementation of RIS3 and proactively engage with other stakeholders (mainly the business sector) to contribute to RIS3. They should also play a facilitator role in RIS3 processes. Regarding HEInnovate, it is perceived as a useful and helpful tool for HEIs to self-assess themselves along the above-mentioned dimensions.

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[1] The "statements" are at the basis of HEInnovate (https://heinnovate.eu/). These are sentences presented under each one of the tool's 8 dimensions, upon which HEIs can reflect and self-assess their level of regional contribution in terms of entrepreneurship and innovation. At the basis of the "HEInnovate for RIS3" tool designed by RE-ACT partners, there is the same statement system.

Nevertheless, the results of the Delphi survey added only a few new points to the list of statements, but, at the same time, they reinforced some of those identified in the processed literature.

2.3 Results from the interviews

The interviews unfolded many tasks and activities for HEIs that would enhance their performance in RIS3 design and implementation. This was expected, since the majority of the interviewees were representatives of regional and/or national ministries, authorities, agencies or other types of organizations that are responsible for regional development and particularly with research and innovation policies. Therefore, all experts interviewed were informed about RIS3 processes and able to express the related needs from the perspective of a policy maker, by responding to the open questions of the interviews and offering qualitative information. Most of the new statements that have been drawn from the interviews concern the following HEInnovate dimensions: I. Leadership and governance, II. Organisational capacity, people, incentives, VI. Knowledge exchange and collaboration, VIII. Measuring impact.

The preliminary list of statements built on the results of this three-step research process are the most important secondary results of this activity under WP1.

2.4. Overall results

Based on the results from the different research activities, the consortium could draw the following conclusions:

- the RIS3-related challenges are complex. For instance, the RIS3 priorities seldom address social issues, however, even in the areas of technology, the social malfunctions might have substantial economic consequences;
- from the interviews with RIS3 experts, a variety of experiences regarding the participation in the previous RIS3 process (2014-2020) emerged and it seems that many HEIs are still coping with uncertainty in facing external challenges both related to economic competitiveness and to community engagement;
- the public authorities or corporate entities that have modest prior experience in involving HEIs as organizations into local/regional innovation (eco-)system actions mentioned only hypothetical/theoretical support, without clear proposals for the desired progress;
- as the related scientific literature is quite recent in this field, the analytical questions are often at the stage of conceptualisation and finding real-life data or case studies-based research results was exceptional.

The review structure following the 8 dimensions of HEInnovate ensured a broad coverage of issues that are relevant for RIS3. However, an uncertain balance between conceptual issues and the practical aspects made the consolidation of the conclusions difficult.

The most diverse and imbalanced contributions came from the RIS3 expert interviews. The relevance of the received responses largely depended on the geographical context, institutional traditions, prior experience, quality of innovation system and involvement history. There was a tangible gap between the responses provided by the representatives of the organizations responsible for the RIS3 coordination, which were concrete, and those from who had only marginal access to the information and expertise on RIS3, cases in which answers were more conceptual.

The diverse output of the different research methods provided the consortium with a rich, even though imbalanced, pool of findings and conclusions that can be considered as the first building blocks for the new "HEInnovate for RIS3" tool.

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3. The process towards the Validation Workshops

The preliminary list of statements, in their first form, were not concise and "user-friendly" enough to provide an immediate basis for the VWs or for the new "HEInnovate for RIS3" tool. Besides the need to reduce the number of such statements, the overlaps, interdependence and inconsistent wordings made improvements mandatory. This was done in a series of phases by the project team. This section describes the process of refinement and preparation of the statements to be presented in the validation phase (VWs).

3.1. Preliminary results from the research activities

From the results of the above described research, a first 'raw' version of the list of statements, has been extracted, containing 117 records. There were some duplications, as well as partial overlaps. This could be observed not only for statements grouped under one dimension, but also linked to statements initially inserted under different dimensions. There were no contradicting statements, therefore, the research team decided to only re-structure, cluster, reformulate and refine the statements in order to let them be validated during the Validation Workshops (VWs) by stakeholders from the Quadruple Helix from each university partner country. Considering that the new "HEInnovate for RIS3" tool should contain a reduced list of core and overarching statements similar to the original one, the refinement was necessary for two additional reasons: (1) the number of statements had to be reduced to facilitate the validation and, after that, the development of the Conceptual Outline for the new self-reflection tool; (2) the consortium had to put special attention on the information contained in the statements, which had to be reduced by keeping the main meanings and by avoiding the risk to lose (or drop) important points or ideas.

3.2. Preliminary organization of the first raw version of the list of statements

The first raw list of statements was created by compiling the results of the different research activities from each partner country, summarised in the RR as a whole and translated to English. PBS organised this material under the existing dimensions of HEInnovate, relying on the dimension definitions (Annex 7.1). The other partners provided additional information or clarification on the statements.

3.3 Reorganisation and reformulation of the statements: the internal validation workshop

For the reasons mentioned above, the consortium agreed upon refining the statements before presenting them in the VWs. To do so, partners organised an internal workshop facilitated by BBU with the support of UNIMC. This process meant going through the following steps:

1) <u>Reorganisation of the statements</u>: the consortium chose to organise the findings of the literature review (see Section 2) according to the 8 HEInnovate dimensions. The same logic was applied in the refinement process.
2) <u>Reformulation of the statements</u>**:** partners undertook a one-by-one analysis of the statements from the reorganised list, considering them according to the original definitions of the dimensions under the HEInnovate tool. Annex 7.2 presents a preliminary refined list of statements with the indication of the research method from which each statement emerged.

The partners ran these phases in parallel, during the internal validation workshop (internal VW).

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3.3.1 About the decision to not adding new dimensions

According to the application form of the project, "at least 2 new dimensions, 10 new statements and respective support resources available" were planned to be included in the new "HEINNOVATE for RIS3", considering the latter as an extension of the original HEInnovate, and, thus, considering the new dimensions and statements in addition to the existing ones.

Moving from these premises, the project team carefully considered two options:

1) <u>Differentiation</u>: creating 2 new dimensions in addition to the 8 HEInnovate ones, which could include new statements different from the existing ones;

2) <u>Integration + Differentiation</u>: creating new statements different from the existing ones and including them within the 8 HEInnovate dimensions, in strong correlation with their definition.

The original HEInnovate focuses on "entrepreneurial universities". The RE-ACT's research results showed a specific focus on HEI's contribution to regional innovation through local engagement, mostly related to RIS3 characteristics, as it was the focus of the three research methods applied.

According to these considerations, the consortium finally decided to proceed with Option 2. The decision made was to differentiate the new tool from the original, yet, in a complementary manner, giving it a specific inclination towards RIS3, with statements still fitting under the 8 existing dimension concepts and definitions, interpreted broadly. In this way, HEIs would be able to make a self-reflection about their level of entrepreneurship through HEInnovate, and assess their contribution to RIS3 by using the new tool, ideated by the RE-ACT partners, which follows the same structure of the original one. In this way, HEIs could interpret the outcomes together and be able to capitalise better on the results obtained with the new tool. In addition, the project team learned during the process that several original statements are also important from a RIS3 perspective, thus, the new tool could be developed only in strong complementarity with the existing one.

Since the statements retrieved from the RR were in line and strongly related to the wording and the spirit of existing definitions and the new statements the need for new dimensions was not justified. Instead, the current dimensions have been extended with broader definitions and meanings related to RIS3. Consequently, no new dimensions have been proposed. Rather, a transversal dimension, the one on RIS3, across the current 8 ones has been implemented, with new statements grouped accordingly and complementary to the ones from HEInnovate.

3.3.2 The internal validation workshop

This rationalisation of the statements happened by multilateral online discussions. The progress with this method, however, proved to be too slow to make substantial advancement within the dedicated project timeframe.

Thus, the consortium decided to organise an internal workshop that took place online on the 8th of February 2021 and aimed at finalising and reducing the number of statements to a maximum of about 30 and putting them under the appropriate dimensions in order to make them ready to be presented to the stakeholders at the VWs.

While several stakeholders involved in the research activities, from different countries, mentioned similar experiences and ideas regarding the HEIs' role in the design and implementation of RIS3, the interpretation of some statements suggested by them requested more work on behalf of the project partners, because of the ambiguity of their wording.

During the internal VW, one of the steps included the critical analysis and rationalisation of the statements. Partners agreed on some criteria to undertake this step:

- KEEP: some of the statements were easier to understand. If the content was clear and fitted the logic of HEInnovate, then the statement has been kept in its original form.
- MERGE: certain overlaps have been identified among the statements derived from different sources (literature review, Delphi survey, interviews). The overlapping statements have been merged and

redefined by trying to keep most of the original information. In some cases, some overlapping statements have been kept to be used as materials for the description of the specific statements. These descriptions will be included in the tool.

- IMPROVE: some very complex statements needed improvement either in terms of simplification or of reformulation. Sometimes, partners split them into separate statements. In some cases, the project team realised that some parts of the statements belonged to a different dimension than the one in which they were originally included. Thus, these were moved to the dimension from which they actually belonged.
- DELETE: when a statement, or a part of it, did not bring any new information to the topic or even overlapped with other ones, it has been deleted.

On the basis of some criteria proposed by TUKE, UNIMC designed a framework to proceed with the selection of the statements, with the following criteria.

The statement must:

- COMPLY (with the description of the HEInnovate dimension in which it is included);
- have RELEVANCE (research-based);
- avoid INTERNAL OVERLAPPING (select the most relevant, merge when possible, delete less meaningful);
- DIFFER FROM HEINNOVATE (novelty);
- have RELEVANCE FOR RIS3 (delete those referred to more general HEIs' potential contribution - covered by HEInnovate);
- present TRANSVERSAL OVERLAPPING (between all the dimensions);
- follow the initial FORM (statements and their explanation follow the same scheme and structure as in HEInnovate).

BBU improved the previous idea by proposing to integrate it with further actions, to be run in parallel with the others, during the internal VW:

- grouping together or clustering the existing statements related among them;
- formulating a simplified more general statement;
- using the information from existing single statements (or part of them), not included in the main general one, for the statement description in order to support future self-assessment. These sub-statements, which stressed specific aspects of the main one, have been then used to detail/describe it in order to help HEIs to position themselves on a scale from N/A to 5 with reference to that statement.

Following this process, at first, the BBU team selected those statements that, from a RIS3 design and implementation perspective, appeared to be the leading/essential ones. Besides, the team made some suggestions of improvement of the statement (e.g.: additional information to complete its meaning; proposals for further differentiation from the original HEInnovate statements, etc.); highlighted the overlaps between statements and proposed some rephrasing; clustered those statements, or part of them, that could represent details of a leading one, thus becoming sub-statements.

Through this preliminary work and by following the quantitative and qualitative criteria for selection, during the internal workshop, a considerable reduction in the number of statements was achieved while keeping most of the information.

During the internal VW some issues emerged.

The overrepresentation of two dimensions (Leadership and Strategy, Knowledge Exchange and Collaboration) and the underrepresentation of other two dimensions (Internationalization, Measurement) needed special treatment. Partners carefully discussed whether the substantial number of statements under the overrepresented dimensions should be merged, or whether it would be more rational to split each dimension into two. On the other hand, the small number of statements belonging to the underrepresented dimensions could be split into new statements, or let the research-driven statements remain in their original form, and mirror the original imbalance provided by the research sources.

Finally the decision taken was to considerably reduce the number of statements under the two dimensions - Leadership and Strategy, Knowledge Exchange and Collaboration. As a result the number of statements under each of the eight dimensions became more balanced and similar to the number of statements in the original HEInnovate tool.

Some of the statements with sophisticated details reflected the understanding and perspective of the respective interviewees or of other research sources. However, they did not automatically meet the requirements of consistency and the diverse prior knowledge of the potential readers. Statements were formulated with different wordings and lengths. Consolidating the text and improving the coherence of the language of the statements had to be managed without the distortion of the original content of the research results.

These analytical approaches were important because with the results achieved, partners have also oriented our new tool towards a similar structure than the original one. This phase of consolidation of the statements led to a more refined and formalised list of statements (see Annex 7.3) that was presented to the stakeholders at the VWs (see the next section), based on the research results.

4. Validation Workshops

In April 2021, the RE-ACT project partners concluded the Validation Workshops (VWs) in order to collect opinions from the regional stakeholders belonging to the quadruple helix about the research activities performed in WP1. During the workshops, participants were asked to fill in a questionnaire to validate the statements and evaluate, separately for each, the Level of Relevance and Clarity. These have been presented under the 8 original HEInnovate dimensions. These statements resulted from the three phases (Literature Review, Delphi, Interviews) of the Consortium's research activities (WP1) and have been further refined before the VWs, during the process described in section 3.

To organise the VWs, first, the partners agreed on the technical and methodological details to conduct them:

- who should be invited (experts, stakeholders from different sectors);
- what background information should be sent in advance;
- what and how detailed information about the research should be presented by the organisers;
- what method and platform should be used to validate the statements (adapted to online environment);
- how the results should be gathered and synthesised by the partners.

The working language of the RE-ACT Consortium is English, however, the statements and the questionnaires had to be translated to national languages to help the external participants, similarly to additional materials, e.g. short presentation of the Research Report. It was a general experience for the partners that both the translation of the statements from English to the native language and the translation of the results back to English required considerable time. Still, this was the only way to bring together and analyse the various results in one document involving a diverse group of RIS3 stakeholders.

Each VW was supposed to host at least 15 participants, with a balanced presence of representatives from the triple helix. In addition, based on a decision made at the consortium level and on previous research findings, representatives of the fourth helix were also added. The following table (Table 1) lists the participants for each VW according to their profile:

TABLE 1 - SUMMARY TABLE OF THE PARTICIPANTS AT THE VALIDATION WORKSHOPS (VWS) - SOURCE: AUTHORS

			The profile of the participants

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Partner institutions	Date of the WS	Number of the participants	Higher Education Institution	Industry, Chamber of commerce, Trade association, Cluster association	Local/regional public authority, RIS3 policy maker	NGO, Civil society, Consumer/worker association, Student association
PBS – P1	9 March	11	5	0	2	4
BCE – P2	12 March	12	4	3	3	2
TUKE – P3	3 March	26	8	6	6	6
UBB – P4	5 March	17	5	4	4	4
UNIMC – P5	11 March	30	19	5	5	1

4.1 Description of the VW event

Due to the pandemic situation, all the workshops were organised in an online format using different online platforms for meetings (e.g.: MS Teams, Zoom).

In some regions interest was higher than expected, in others the initially planned number of participants could not be gathered. However, overall, the indicator set in the application has been achieved. Some participants experienced technical difficulties and the limitations of an online meeting compared to a face-to-face event were also mentioned.

The workshops were organized as follows: a general introduction on the RE-ACT project, the presentation of the activities carried out and the research results obtained, with emphasis on the list of statements.

After the VW, participants from each country were able to give their opinion on the event. Overall, according to the evaluation questionnaires, participants were satisfied with the workshop, as they mostly gave "good" or "excellent" marks in each of the categories they were questioned about. They were highly satisfied with the 'Quality of the presentations' and the 'Preparedness of the speakers', giving predominantly "excellent" grades. 'Time efficiency' was the weakest part of the Italian workshop, according to the poll, while that was not a concern in the other four countries. When looking at all the five countries, the marks given for 'The level of interaction' and 'The global impression' about the event is something that has a space for improvement. The participants would also have appreciated more 'Information to be provided before the event', however they still marked these categories mainly as "good". Regarding 'The materials and the content presented' participants were quite satisfied.

4.2 Results from the VW events

After the presentation of the RE-ACT project, participants were asked to complete a questionnaire to evaluate the research findings (Research Report) presented. In all the five university partners' countries, participants highly appreciated the results of the Research Report. Within the 7 evaluation criteria (Relevance, Quality, Evidence, Novelty, Added Value, Usability and Sustainability/Multiplication), participants mostly evaluate the

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research results as "Good" or "Excellent" when considering the different aspects of the research. The most appreciated strengths of the research were the Relevance, Quality and Added Value, while in some countries, Evidence, Novelty and Usability reached a bit lower result.

In general, participants agreed that this is a very important topic to address and should be addressed by all HEIs. In fact, it was considered very useful for HEIs to give feedback on the innovation system as a whole. But it's also important to allow for collaboration between R&D stakeholders and business.

At the end of this phase, partners showed participants the description of the dimensions of the new HEInnovate for RIS3 tool: Leadership and Governance; Organisational Capacity, People, Incentives; Entrepreneurial Learning and Teaching; Preparing and Supporting Entrepreneurs; Digital Transformation and Capability; Knowledge Exchange and Collaboration; The Internationalised Institution; Measuring Impact.

Then, partners moved on to validating separately each of the new statements proposed, through a questionnaire elaborated on Google Forms. UNIMC obtained 24 answers to the questionnaires, TUKE 23, BBU 19[2], CUB 12. PBS, with 9 participants, has divided intendees into two groups, splitting dimensions and statements to be validated between them and obtained 4 or 5 answers for each dimension depending on the group.

The questionnaire aimed at evaluating the Level of Relevance (LoR) and Clarity (Cl) of each statement, from 1 (Poor) to 4 (Excellent). The following table (Table 2), contains an overview about the arithmetic average obtained by each statement for both LoR and Cl, in each University partner's VW.

TABLE 2 - OVERVIEW ABOUT THE RESULTS FROM THE VALIDATION WORKSHOPS IN EACH RE-ACT UNIVERSITY PARTNER' VW

Leadership and Governance										
University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	LoR	Cl	LoR	Cl	LoR	Cl	LoR	Cl	LoR	Cl
The senior management of the HEI takes part in the higher level governance structure of RIS3	2,87	2,62	2,61	2,91	3,47	3,26	2,66	2,75	4	3,5
The HEI is strategically committed to implement its third mission taking into account RIS3 objectives	3,16	2,83	3,09	2,96	3,53	3,37	3,16	3	3,25	3
Senior management ensures that processes, procedures and internal communication measures facilitate the participation in RIS3	3,21	3,04	3,17	2,74	3,37	3,26	2,5	2,5	3	3,25
The top management of HEI supports open governance models	3,25	3	2,96	2,48	3,53	3,26	3,08	3,16	3,75	4
Organisational Capacity, people, incentives										
University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	LoR	Cl	LoR	Cl	LoR	Cl	LoR	Cl	LoR	Cl

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[2] The number is higher than the number of participants, since some stakeholders experiencing technical difficulties or not being able to participate due to objective reasons, completed the questionnaire after the event.

Statements/Means	UNIMC LoR	UNIMC CI	TUKE LoR	TUKE CI	BBU LoR	BBU CI	CUB LoR	CUB CI	PBS LoR	PBS CI
There is an integrated/ structured data-base/mapping of human capacities and knowledge assets of the HEI	2,37	3,04	3,3	3	3,05	2,84	3,16	2,92	3,75	3,5
The HEI has dedicated qualified personnel that supports academia and researchers in R&I activities	3,08	3,46	3,35	3,3	3,37	3,31	2,75	2,83	4	3,75
The HEI has an organisational structure dedicated to technology transfer and collaboration between academia, society and businesses, especially if connected with smart specialisation priority areas	2,79	3,46	3,3	3,22	3,21	3,05	3	2,5	3,5	3,75
The HEI promotes multidisciplinary cooperation among different departments/faculties to encourage contamination between different research topics and teaching methods, in line with business and society needs	3,08	3,5	3,09	2,3	3,21	2,89	3,08	2,83	3,5	3,75
There is a system of rewards and incentives offered to engage the members from different departments of the institution in research and innovation activities	2,29	3,29	3,35	3	3,1	3,05	2,83	3	3	3,25
The HEI harnesses funding and cooperation opportunities for R&I as triggers of change and to become more responsive to society and business needs	2,83	3,37	3,35	2,74	3,16	3,05	2,42	2,25	3,5	3,75

Entrepreneurial Learning and Teaching

University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	LoR	CI	LoR	CI	LoR	CI	LoR	CI	LoR	CI
The HEI graduate programmes provide knowledge and skills related to RIS3	2,66	3,33	3	3,35	3,1	3,16	2,5	2,42	3,25	3,25
The HEI creates and delivers education programmes for the employees of the organizations from the quadruple helix/regional innovation eco-system	2,62	2,96	3,22	3,04	3,05	3,05	2,83	2	3,25	3,5

Preparing and Supporting Entrepreneurs

University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	LoR	CI	LoR	CI	LoR	CI	LoR	CI	LoR	CI
The HEI supports the R&I based activities of and with firms/companies/industry	3,12	3,29	3,17	2,39	3,1	3,05	2,75	3,08	3,8	3,2
The HEI develops and offers business and innovation support	2,96	3,54	3,22	2,61	3,05	3,05	2,92	3	4	3,4

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services for firms/companies/industry										
The HEI offers for entrepreneurs access to information about research results of the university	2,92	3,5	3,52	3,09	3,05	3,05	3,08	2,83	3,6	2,2
The HEI supports its researchers and students in establishing spin-offs and start-ups, especially in RIS3 priority fields	3,29	3,58	3,48	3,09	3,1	3,26	3,08	3	4	3

Digital transformation and Capability

University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	LoR	CI	LoR	CI	LoR	CI	LoR	CI	LoR	CI
The HEI uses the advantage of digital technologies to support innovation driven regional development	3,16	3,29	3	2,39	3,26	3,26	2,75	2,58	3,5	3,5
The HEI participates in or creates Digital Innovation Hubs to offer services for the digitalisation of economy and society	3,12	3,58	3,48	3,04	3,31	3,26	2,58	2,5	4	3,75
The HEI contributes to the development and dissemination of digital technology driven RDI trends (e-Health, EdTech, FinTech, AI etc.)	3,16	3,58	3,13	2,96	3,31	3,21	3,25	3	4	3,75

Knowledge Exchange and Collaboration

University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	LoR	CI	LoR	CI	LoR	CI	LoR	CI	LoR	CI
The HEI collaborates with Quadruple Helix (QH) stakeholders to contribute to innovation driven regional development	3,29	3,46	3,04	2,56	3,21	3,31	3	2,83	3,6	3,6
The HEI supports the regional RIS3 responsible organization(s) in strategy development and implementation	3,08	3,54	2,83	2,91	3,21	3,31	2,92	3	3,6	3,6
The HEI supports cross-sectoral (university-industry) links and mobility	3,37	3,6	2,87	2,48	3,1	3,1	3	3,3	3,8	3,2
The HEI acts as a facilitator of QH cooperation	3,16	3,54	2,48	2,96	3	3,05	2,5	2,5	3,2	3,6
The HEI performs analysis on current and future needs of society and businesses, providing knowledge to respond challenges	3,12	3,54	3,56	3,22	3,16	2,84	3,3	3,16	3,8	2,8

The Internationalized Institution

University	UNIMC		TUKE		BBU		CUB		PBS	
Statements/Means	**LoR**	**CI**	**LoR**	**CI**	**LoR**	**CI**	**LoR**	**CI**	**LoR**	**CI**
The HEI is partner in European and international R&I projects including the cooperation with Knowledge and Innovation Communities	3,42	3,54	3,61	3,13	3,47	3,47	3,08	2,92	3,6	3,6
The HEI combines international orientation and local commitment linking the region to external sources of knowledge through projects and joint R&I activities	3,21	3,5	3,48	2,56	3,47	3,26	3,08	2,58	3,6	3,4
The HEI is part of formal and informal European and international R&I networks	3,42	3,58	3,61	3,35	3,63	3,53	3,08	3,16	3,6	3,4
Measuring Impact										
University	**UNIMC**		**TUKE**		**BBU**		**CUB**		**PBS**	
Statements/Means	**LoR**	**CI**	**LoR**	**CI**	**LoR**	**CI**	**LoR**	**CI**	**LoR**	**CI**
The HEI is actively involved in RIS3 monitoring and evaluation	3,08	3,42	3,04	3,22	3,21	3,26	2,6	2,83	3,6	3,4
The HEI measures the impact of its own activities linked to RIS3	3,25	3,46	3,17	3,04	3,05	3,16	2,92	2,6	3,8	3,4

Starting from the results summarised in Table 2, the following table (Table 3) presents the total arithmetic average scoring obtained by putting together the arithmetic averages from each University partner' VWs. This calculation has been made for each statement, in terms of both Level of Relevance and the Clarity.

In detail, with regard to the Level of Relevance, both the arithmetic average and the standard deviation were calculated. In the case of Clarity, only the arithmetic average was calculated.

TABLE 3 - CONSORTIUM TOTAL AVERAGE AND STANDARD DEVIATION FOR EACH STATEMENT

Dimensions/Averages	Consortium total calculation		
	LoR		**Clarity**
Leadership and Governance	**Arithmetic averages**	**Standard deviation**	**Arithmetic averages**
The senior management of the HEI takes part in the higher level governance structure of RIS3	3,12	0,59813878	3,01
The HEI is strategically committed to implement its third mission taking into account RIS3 objectives	3,24	0,172829396	3,03
Senior management ensures that processes, procedures and internal communication measures facilitate the participation in RIS3	3,05	0,33443983	2,96

The top management of HEI supports open governance models	3,31	0,324391738	3,18
	LoR		**Clarity**
Organisational Capacity, people, incentives	**Arithmetic averages**	**Standard deviation**	**Arithmetic averages**
There is an integrated/ structured data-base/mapping of human capacities and knowledge assets of the HEI	3,13	0,499529779	3,06
The HEI has dedicated qualified personnel that supports academia and researchers in R&I activities	3,31	0,460380278	3,33
The HEI has an organisational structure dedicated to technology transfer and collaboration between academia, society and businesses, especially if connected with smart specialisation priority areas	3,16	0,273952551	3,19
The HEI promotes multidisciplinary cooperation among different departments/faculties to encourage contamination between different research topics and teaching methods, in line with business and society needs	3,19	0,180748444	3,06
There is a system of rewards and incentives offered to engage the members from different departments of the institution in research and innovation activities	2,91	0,396396266	3,12
The HEI harnesses funding and cooperation opportunities for R&I as triggers of change and to become more responsive to society and business needs	3,05	0,432978059	3,03
	LoR		**Clarity**
Entrepreneurial Learning and Teaching	**Arithmetic averages**	**Standard deviation**	**Arithmetic averages**
The HEI graduate programmes provide knowledge and skills related to RIS3	2,9	0,312281924	3,1
The HEI creates and delivers education programmes for the employees of the organizations from the quadruple helix/regional innovation eco-system	2,99	0,267637815	2,91
	LoR		**Clarity**
Preparing and Supporting Entrepreneurs	**Arithmetic averages**	**Standard deviation**	**Arithmetic averages**
The HEI supports the R&I based activities of and with firms/companies/industry	3,19	0,380486531	3
The HEI develops and offers business and innovation support services for firms/companies/industry	3,23	0,445645599	3,12
The HEI offers for entrepreneurs access to information about research results of the university	3,23	0,304926221	2,93
The HEI supports its researchers and students in establishing spin-offs and start-ups, especially in RIS3 priority fields	3,39	0,377624152	3,19

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Digital transformation and Capability	LoR		Clarity
	Arithmetic averages	**Standard deviation**	**Arithmetic averages**
The HEI uses the advantage of digital technologies to support innovation driven regional development	3,13	0,281033806	3
The HEI participates in or creates Digital Innovation Hubs to offer services for the digitalisation of economy and society	3,3	0,517996139	3,23
The HEI contributes to the development and dissemination of digital technology driven RDI trends (e-Health, EdTech, FinTech, AI etc.)	3,37	0,359374457	3,3

Knowledge Exchange and Collaboration	LoR		Clarity
	Arithmetic averages	**Standard deviation**	**Arithmetic averages**
The HEI collaborates with Quadruple Helix (QH) stakeholders to contribute to innovation driven regional development	3,23	0,239729014	3,15
The HEI supports the regional RIS3 responsible organization(s) in strategy development and implementation	3,13	0,301612334	3,27
The HEI supports cross-sectoral (university-industry) links and mobility	3,23	0,368741102	3,16
The HEI acts as a facilitator of Quadruple Helix cooperation	2,87	0,353157189	3,13
The HEI performs analysis on current and future needs of society and businesses, providing knowledge to respond challenges	3,4	0,287610848	3,11

The Internationalized Institution	LoR		Clarity
	Arithmetic averages	**Standard deviation**	**Arithmetic averages**
The HEI is partner in European and international R&I projects including the cooperation with Knowledge and Innovation Communities	3,44	0,215244048	3,33
The HEI combines international orientation and local commitment linking the region to external sources of knowledge through projects and joint R&I activities	3,37	0,214872055	3,06
The HEI is part of formal and informal European and international R&I networks	3,47	0,232744495	3,4

Measuring Impact	LoR		Clarity
	Arithmetic averages	**Standard deviation**	**Arithmetic averages**
The HEI is actively involved in RIS3 monitoring and evaluation	3,12	0,359137857	3,23
The HEI measures the impact of its own activities linked to RIS3	3,24	0,338038459	3,14

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Considering the results obtained and the methodology used, the partners agreed that all statements should be kept, with no statement rated lower than 2.5.

Regarding the statements under the 8 dimensions, most participants considered the majority of them as "Good" or "Excellent". However, some suggested rephrasing some statements and clarifying the meaning of some terms or to try to simplify wording and make sentences more straightforward.

4.3 Towards the definitive version of Dimensions and Statements of "HEInnovate for RIS3"

Based on comments from VWs participants, the partners decided to reformulate the statements to improve them and make them clearer in terms of understanding. This was especially done by the BBU team, with the support of the other partners, during an online internal meeting in May 2021.

To proceed to this reformulation, partners considered all the validated statements extracted from the VWs. They analysed them in relation with the corresponding comments from each country's VW reports and related-annexes. The participants during the VWs made comments about Level of Relevance and Clarity of the statements. The process towards the definitive reformulation, based on these considerations is presented in Annex 7.4 and the results are then described in the following section (Section 6). Moreover, during the VWs, each dimension and statement have been presented through a short description, in coherence with the original HEInnovate description and adapted to the goals of "HEInnovate for RIS3".

During the internal meeting, in May, the partners also worked on these aspects. With reference to the new statements, new, complementary definitions have been elaborated to incorporate the specific RIS3 transversal dimension and specificities deriving from the role of HEIs in smart specialisation processes. The statements' description, consisting in a short description and sub-statements detailing aspects of the main ones, will help HEIs in positioning themselves, during the self-assessment, in a scale from N/A to 5, from a RIS3 perspective. The definitive dimensions and statements are presented in Section 5.

5. Definitive Dimensions and Statements: presentation and description

The titles of the dimensions of the new self-assessment tool "HEInnovate for RIS3" are the same as the 8 ones of the original HEInnovate, with small adjustments in some cases. Concerning their content, even though they directly derive from HEInnovate dimension definitions, their description is adapted and tailored to RIS3. As for the statements, by taking into consideration their official description in HEInnovate, for the new tool partners provided an updated description for each one, under each dimension, relying also on the series of statements derived from the literature review that were turned into "sub-statements" or "aspect" of main statements used at the VWs. The latter are then used, together with additional information, as a description for each statement. The new tool will be developed considering all the four types of actors of the so-called "Quadruple Helix of Innovation", which, by collaborating, are able to give a concrete contribution in all phases of the RIS3 process. The actors taken into consideration are: Universities, Public Institutions (National, Regional, Local level), the Industry and the Civil Society.

In the following part, a description of the 8 Dimensions is provided from a RIS3 perspective in close connection with the spirit and wording of the original HEInnovate definitions. Under each dimension, the final list of statements is presented, each statement being provided with a description that should support self-assessment, i.e. positioning in a scale from N/A to 5, similar to HEInnovate.

Leadership and Governance – The effective involvement of an HEI in the smart specialisation process implies commitment and entrepreneurial orientation by HEI senior (higher) managers and decision-makers. Managerial, regulatory and infrastructural frameworks based on which HEIs interact with their external environment determine the extent of their participation and impact on regional innovation. This dimension underlines the most important steps and actions HEI senior managers decision-making structures should take in order to facilitate the HEIs participation in different phases of RIS3 design (including revision) and implementation (including monitoring and evaluation). It covers HEI senior managers' involvement in regional RIS3 governance structures, as well as other steps that HEI decision-makers should take in order to facilitate the institutions' internal involvement in RIS3 and the HEI's external involvement in the regional innovation ecosystem as part of the quadruple helix.

1. **The HEI is represented through its senior management in the highest governing body of RIS3 on a regional level.**

RIS3 design and implementation is a bottom-up, collaborative process, involving stakeholders from the quadruple helix. These stakeholders, including academia, are brought together in entrepreneurial discovery processes and different region-specific governance structures to support the identification of new opportunities, but also to create ownership of the strategy and ensure stakeholder involvement during strategy design and implementation.

A typical RIS3 governance structure at the regional level consists of a steering group, working groups and a management team. The steering group is the highest level RIS3 governance body, gathering high level representatives of regional stakeholders, including HEIs, and is responsible for the overall success of the strategy, together with the policy making organization.

To score highly, an HEI could, for example:

- Be represented in the RIS3 steering group by a person from senior management, actively contributing to coordination with other RIS3 governance structures and to the integration of stakeholder viewpoints in the design and implementation of the strategy
- Actively encourage a culture of collaboration with other steering group members and further external and internal partners to contribute to the success of the RIS3
- Provide institutional support in the design, and implementation of the strategy
- Act as one of the leaders of the RIS3 at regional level, contributing to efficient communication about the importance of smart specialisation and to the mobilization and involvement of a wide variety of stakeholders in the entrepreneurial discovery process
- Cooperate with other members of the governance structure to support local and regional policymakers in addressing complex policy, practical and societal challenges.

2. The HEI is strategically committed to implement its third mission taking into account RIS3 objectives.

The HEI asserts its entrepreneurial role (locally/ regionally/ nationally/ internationally), as well as its vision and priorities related to its involvement in RIS3 design and implementation. Therefore, the strategy of an HEI which reflects its entrepreneurial aspirations and agenda should also incorporate the RIS3 objectives, ensuring the institution's effective contribution to the strategy success, in line with its research and innovation profile.

To score highly, an HEI could, for example:

- Incorporate into its mission statement and internal strategy the HEI's contribution to the vision and objectives of RIS3
- Emphasize in its strategy the importance of smart specialisation and the smart specialisation priority areas or domains to which the HEI aims to contribute
- Have a strategy implementation plan with measures and indicators aligned to RIS3, clearly stating how the HEI contributes to the success of the strategy
- Promote institutional participation in RIS3 through internal measures aimed at ensuring the effective participation of the HEI staff in the relevant phases of RIS3 design and implementation, including monitoring, evaluation, as well as strategy revision
- Strategically support and stimulate the participation of the HEI in European and international institutional partnerships and research and innovation focused networks to foster transnational and interregional cooperation in line with the RIS3 objectives
- Strategically encourage cooperation and collaboration with external regional stakeholders both formally and informally

3. Senior management of the HEI ensures that processes, procedures and internal communication measures facilitate the HEI's participation in key steps of RIS3 design and implementation.

An effective involvement of an HEI in RIS3 design and implementation must be based on the involvement of staff members from different institutional levels with different roles and responsibilities - researchers, faculty or research leaders, technology transfer experts, administrative personnel, etc. -, depending on the expertise needed and type of action required. In addition, it requires integration of wider social and economic aspects. Optimal communication flows and internal rules facilitating various types of participation are needed for an effective involvement.

To score high, an HEI could, for example:

- Ensure that there is a RIS3 dedicated person within the higher management of the HEI (for example, Vice Rector or Pro-rector for Entrepreneurship and Innovation or someone with a similar status)
- Create clear and concrete mechanisms to involve researchers and innovators into RIS3 related activities
- Establish functional communication flows with incorporated feed-back loops to:
  - enable concentration of all RIS3 related information and requests in one place, as well as transparent information sharing with dedicated HEI staff

- ○ prompt responsiveness to the requests of RIS3 partners and other stakeholders
- Reconfigure internal processes and procedures to:
  - ○ enable and support (administratively, organisationally and financially) the involvement of staff and that of the institution in RIS3
  - ○ support participation of staff at innovation capacity building trainings
  - ○ encourage cooperation and collaboration with other stakeholders from and outside the region through network participation
  - ○ incorporate broader regional, social and economic aspects, including problems and challenges, into its agenda and decision-making.

4. **The HEI is able to reach out to and attract key innovators from the faculties into the entrepreneurial discovery process and RIS3 implementation.**

The involvement of researchers and innovators with entrepreneurial mindset and/or good research results in RIS3 should be facilitated. This involvement should be effectively encouraged by the HEIs senior management and stimulated by the HEI's internal environment.

To score high, an HEI could, for example:

- Communicate effectively the importance of RIS3 and the benefits of participating in RIS3 related activities for individual staff members and the HEI as a whole
- Motivate and mobilise staff to take a proactive role in RIS3, especially in the entrepreneurial discovery process and in the generation and development of projects linked with RIS3 implementation.

5. **Every HEI employee involved in RIS3 has equal access to all information; the principles of transparency and participation are consistently applied.**

An open, participatory and inclusive decision-making model within the institution can contribute to an effective and efficient participation of the HEI in RIS3. For that to happen, it is of key importance that all those involved in RIS3 activities at the HEI have easy and seamless access to the relevant information and are able to contribute to the overall institutional involvement.

To score high, an HEI could, for example:

- Create centralised data repositories and communication channels to ensure equal access of staff to relevant information in a timely manner
- Introduce models of shared leadership and ownership to balance competencies between senior management and various faculties, departments, R&D institutes and technology transfer offices within the HEI
- Promote participatory and transparent decision-making models.

Organisational Capacity, people, funding and incentives – *The HEI should take an active role in contributing to RIS3 objectives and addressing regional needs, making the best use of its knowledge assets and of available external public and private funding opportunities. To this end, HEIs should build appropriate internal structures, as well as encourage flexibility and adaptability. This section covers all internal organisational aspects that should be in place at the HEI to support its participation in RIS3 processes.*

1. **The HEI maintains a structured, up-to-date registry of its internal knowledge assets.**

HEIs can contribute in several ways to the structural transformation of the regional economy through innovation, as well as by addressing social needs and challenges. To this end HEIs should assess their strengths and weaknesses in terms of human capacities and knowledge so that they are able to mobilise the best available resources, when needed, as well as to be able to build new capacities.

To score high, an HEI could, for example:

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- Internally map the competencies, skills and expertise of its human resources, as well as activities, projects, scientific results and other relevant assets that are related to RIS3
- Establish a structured internal database containing a register of knowledge assets that permits searches based on keywords and smart specialisation priority areas, i.e. the economic, scientific and technological fields to which these priorities are linked, as well as interlinked challenges
- Periodically update the database through internal mapping or update it continuously based on inputs and data uploaded by staff (academia, researchers, experts, etc.)
- Match competencies, skills and expertise with regional needs and objectives highlighted in RIS3 to support the identification of gaps and to create synergies
- Support the development of new competencies and capacities to address the identified gaps

2. **The HEI has dedicated qualified personnel to support academics and researchers in research and innovation.**

Staff involved in research, development and innovation (RDI) activities may have difficulties in finding the time needed to obtain necessary funding and resources or in dealing with administrative issues and may lack the necessary expertise. They may also have similar difficulties in orienting their research towards market and society needs. Thus, academics and researchers should be supported by dedicated personnel to be able to concentrate on their core activity.

To score high, an HEI could, for example:

- Have dedicated and skilled staff to support researchers and academics in raising public funds for research and innovation, including:
  - gathering and integrating data and information available at regional, national, European and international level on funding opportunities and calls, ensuring transparent and timely dissemination of information
  - maintaining a database of project ideas proposed by academics and researchers and providing support in finding relevant funding opportunities
  - supporting the development of project ideas into applications, including compliance with administrative and eligibility requirements, as well as assistance in finding partners
  - assisting in the contracting process the technical and financial implementation of projects, including compliance with visibility and communication requirements, as well as in project closure
- Have experts that support academics and researchers in orienting their activities towards economic and societal needs, including:
  - mapping market and societal needs and trends
  - facilitating communication and collaboration between academics, researchers, businesses and society through the organization of events or dedicated platforms
- Have dedicated personnel working with the RIS3 responsible organisation(s) and disseminating relevant information towards HEI staff involved in research and innovation in a timely and equitable manner
- Transfer relevant information from staff involved in research and innovation activities towards the RIS3 responsible organization.

3. **The HEI has organisational structures dedicated to knowledge and technology transfer that cover the smart specialisation priority areas.**

The transfer of knowledge and technology to businesses and society is an important step in turning research results into innovation that can have an impact on regional development in general and on the structural transformation of the economy in line with RIS3 objectives. This activity is also an important source of private fund attraction.

To score high, an HEI could, for example:

- Have a dedicated internal organisational structure that deals with the full range of traditional knowledge and technology transfer services1, covering all scientific areas of the HEI, including the ones relevant for RIS3
- Offer services complementary to knowledge and technology transfer ones, such as other specific business and innovation related services, e.g. elaboration of market studies, business plans
- Continuously upgrade knowledge and technology transfer services and related infrastructures to involve a variety of stakeholders (citizens, consumers) in open and co-creative knowledge and technology transfer activities
- Enable the knowledge and technology transfer structure to operate independently from an administrative and financial point of view
- Be engaged in joint research and development programmes, science and technology parks, innovation hubs, or other similar facilities.

4. The HEI promotes multidisciplinary cooperation among different departments/faculties/research units in accordance with business and society needs.

Market and societal needs are complex and in many cases can be addressed by combining different types of scientific knowledge, approaches and methods and/or by combining different scientific and/or technological fields.

To score high, an HEI could, for example:

- Bring together within a single infrastructure all researchers and equipment dedicated to research
- Encourage the exchange of research ideas between research teams
- Facilitate and encourage the internal mobility of researchers between research institutes and centres and/or stimulate establishment of multidisciplinary teams to develop solutions addressing business and society needs
- Cooperate with other regional HEIs, with complementary or different research profiles, on joint research and innovation projects.

5. A system of rewards is in place to involve staff from different departments of the HEI in research and innovation activities.

Participation of academia and researchers, as well as of staff and students dedicated to RIS3 should be rewarded in line with a motivational framework established at the institutional level and based on objective criteria. Such a reward system could also contribute to talent attraction and retention.

To score high, an HEI could, for example:

- Ensure that performance-assessment frameworks for academic careers take into account the involvement in RIS3 related activities at regional, national, European and international level as well as RIS3-related achievements - different from scientific articles, licenses and patents
- Implement hybrid work models (a flexible arrangement of onsite and offsite work) for researchers
- Offer individual and institutional incentives to promote entrepreneurial agenda and to build relationships with stakeholders beyond academic boundaries
- Offer periodically, based on transparent rules and objective criteria and in line with the results achieved:
  - non-financial rewards, such as recognition, diplomas, awards, etc.
  - financial rewards, such as prizes, a share of revenues from technology transfer contracts, incentives, etc.

6. The HEI makes the best use of available funding opportunities for research and innovation to contribute to RIS3 objectives.

A variety of funding sources may be available for research and innovation projects that could be harvested in line with RIS3 objectives. These may come from regional and national public budgets, as well as from European or international public sources, but also from private funds.

To score high, an HEI could, for example:

- Establish an internal portfolio of project ideas and prioritise those that can contribute to RIS3 objectives
- Provide the description of project ideas to the RIS3 responsible organisation in order to be taken into consideration in the regional portfolio of projects (if one exists)
- Participate in the entrepreneurial discovery process in order to present and/or support project ideas to other types of stakeholders and, when appropriate, form partnerships with them for further developing the ideas or to attract private capital for their implementation
- Continuously explore funding opportunities to identify relevant calls for RIS3 related projects,
- Prioritise RIS3-related projects when taking internal decisions regarding project applications to be developed and submitted
- Act proactively and build European and international partnerships to address regional challenges

Entrepreneurial Learning and Teaching – *The availability of skilled human resources appropriate to the regional economic structure and research and development specialisation is of key importance. The match between the supply of education at all levels and regional human resource needs is one of the important aspects covered by the early smart specialisation concept. HEIs have an important role to play in developing specialised human resources, as well as in supporting the development of more transversal skills necessary for smart specialisation. In fact, HEIs have a twofold role in order to promote the regional human capital: provide horizontal competences, and answer to specific needs through specialised programs. The latter can be co-created with local partners. This dimension concerns the educational role HEIs can play in order to provide human capital in line with market needs, as well as in supporting students in developing skills and in acquiring competencies related to smart specialisation. In addition it covers other types of educational programmes that an HEI could provide, particularly for employees of companies, in order to stimulate the development of entrepreneurial and innovative mindsets and capacities.*

1. The HEI graduate programmes provide knowledge and skills related to RIS3.

HEIs can also contribute to RIS3 in the context of their primary mission, as providers of specialised future workforce. Ideally, the higher educational offer - at all levels of education, i.e. BA, MA, PhD - should support to some extent structural transformation in smart specialisation priority areas, through the provision of skilled human resources.

To score high, an HEI could, for example:

- Periodically update its curricula in order to match market needs and specifically the needs related to smart specialisation priority areas
- Be open to incorporate into its higher educational offer programmes that provide students with knowledge and skills necessary for future economic, social and technological challenges
- Integrate the results of entrepreneurial research into its educational offer
- Cooperate with businesses to map and gather information on their human resource needs
- Enter into partnerships with enterprises to offer jointly developed programmes, e.g. internships, student placements, industrial PhDs, and thus promote the development of practical skills
- Develop horizontal or transversal programmes (even optional courses) to enable students to acquire knowledge and skills related to research and innovation
- Adapt the content and examination methods towards teaching and assessing skills rather than assessing specific knowledge, offering more individualised programs

- Provide courses with a societal orientation, such as citizenship, policy debate, environmental awareness, cultural enlightenment, sustainable development and general well-being of the population
- Adopt new student-centric and problem based teaching methodologies

2. The HEI delivers training programmes to support the upskilling and reskilling of staff in the smart specialisation priority areas.

Besides graduate programmes, HEIs can develop and deliver training programmes that support the continuous learning of employees of businesses, with an emphasis on employees from the priority areas of smart specialisation. It can also offer training courses that contribute to general capacity building of employees from the regional innovation system in innovation-related matters.

To score high, an HEI could, for example:

- Create and deliver training or educational programmes for employees of companies for their further development as part of an adult learning or continuous education offer
- Develop and offer on-demand training programmes tailored to the needs of companies in order to teach employees how to efficiently use and exploit new technologies
- Offer training programmes that develop research and innovation related knowledge and skills of employees, developing the capacity of actors from the quadruple helix and contributing to the interconnection of the regional innovation system.

Preparing and Supporting Entrepreneurs – *As an important actor in the regional innovation system an HEI can support research and innovation in smart specialisation priority areas in several ways. Extensive levels of market-oriented regional engagement and involvement in regional R&I networks are two crucial factors for an HEI to have regional impact. Alongside, physical capital, such as TTOs and business incubators, can boost spin-off companies. Such companies can create a regional impact not only through innovation, but also by job creation. This dimension relates to the role an HEI should play in launching new or improved products and processes to the market through targeted support to existing companies, as well as by facilitating the commercialisation of in-house research results through the creation of new innovative companies.*

1. The HEI actively supports companies in the smart specialisation priority areas in their research and innovation activities.

HEIs should develop specific research and innovation services tailored to the needs of established large and medium-sized companies. In addition, they should support the research and innovation activities initiated by small and micro companies. To this end, HEIs may enter into collaborative research activities or offer enterprises access to their research and innovation infrastructure.

To score high, an HEI could, for example:

- Have in its internal organisational structure or in a separate organisation an entity offering tailored R&I services for companies operating in economic areas covered by smart specialisation priority domains in research stages such as experimental development, industrial research
- Offer companies access to R&I facilities and equipment, as well as services for testing, validating and prototyping new products
- Have dedicated facilities and/or platforms that enable co-creation processes involving companies, researchers, students and/or consumers, e.g. Living Labs, Fab Labs, etc.

2. The HEI develops and provides services to support entrepreneurship and innovation in companies.

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Successfully commercialising or bringing research results to market is complex and entails risks, including financial ones, as the well-known valley of death. In addition to the specific problems that can occur in the latter stages of research and innovation activities, innovation can also be blocked due to lack of knowledge of companies about certain aspects linked to innovation, or their lack of capacity to address them, as well as by problems characteristic of the demand-side. To foster innovation on a regional level, HEIs can develop and offer complementary services that specifically tackle these problems, in addition to specific R&I services.

To score high, an HEI could, for example:

- Develop and offer innovation support services, such as the development of business plans, market studies, go-to-market strategies, marketing and branding strategies
- Develop (access to funding) services to support entrepreneurs in accessing public funds and private capital (such services may range from providing information about funding opportunities to a partial or full support for the development of the funding application)
- Develop and offer services that support growth of enterprises and expansion into internal and international markets, like acceleration programmes and services, scale-up services
- Support commercialisation of innovative goods and services through demand-side intervention, i.e. by building the market/request on behalf of consumers for innovative products

3. **The HEI provides RIS3 partners with access to information on prospective research results that can be commercialised.**

The lack of information about ongoing research and development activities, as well as about expected and achieved results can hinder the uptake of research results of HEIs by companies. Thus, HEIs should ensure that entrepreneurs have access to information on current and prospective research results.

To score high, an HEI could, for example:

- Offer information on commercialisable research results, in a targeted manner, towards companies, upon request
- Regularly organise match-making or brokerage events for researchers and entrepreneurs to offer information about ongoing research and prospective R&D results
- Have a dedicated website or a section on the HEI's website that offers such information in an equal and transparent manner to all interested parties

4. **The HEI supports its researchers and students in establishing innovative start-ups and spin-offs, especially in smart specialisation priority areas.**

Bringing research results to the market in the form of new goods and/or services cannot only happen through technology transfer towards already existing companies, but also through the creation of new businesses. To this end HEIs can support students and researchers in establishing their own innovative start-ups or create spin-offs.

To score high, an HEI could, for example:

- Organise events and competitions for innovative business ideas proposed by students or researchers individually or in teams, such as business plan competitions, Boot-camps, Hackathons, Jumpstarter events, Innovation camps, Techdays, etc.
- Mobilise private capital through the involvement of business angels, venture capitalists, etc. to provide seed funding for the development of most promising innovative business plans
- Access public funding, if available, to provide funding for start-up or spin-off creation
- Support the establishment of spin-offs through a transparent internal selection process, based on objective criteria
- Offer support for the establishment and further development of start-ups and spin-offs in its specialised facilities ranging from legal assistance to more complex services such as support for access to funding or incubation and acceleration.

Digital transformation and Capability – *Building digital skills and the use of digital technologies in the economy and society is fundamental for digital transition, but also a source for new or improved products (goods and services). This dimension refers to actions HEIs can take not only to exploit the opportunities offered by novel digital technologies, but also to support other stakeholders from the region in the uptake and use of such technologies.*

1. **The HEI uses the advantage of digital technologies to foster innovation on a regional level.**

Digital technologies can be used in all scientific and economic activities, as well as different areas of life, including research and innovation. HEIs can capitalise on the advantages of such technologies in order to contribute to regional development through innovation.

To score high, an HEI could, for example:

- Develop digital platforms to support technology transfer and cooperation between researchers and entrepreneurs
- Develop and run digital platforms to support knowledge and data diffusion and involvement of quadruple helix stakeholders in regional innovation
- Offer companies a 'test before invest' experimentation service, supporting them to respond to digital challenges

2. **The HEI supports digital transition at regional level.**

Uptake and use of digital technologies was an important aspect in the concept of smart specialisation and plays an important role in research and innovation. Relying on their infrastructure and knowledge, HEIs can bring an important contribution to digital transition both in the economy and society.

To score high, an HEI could, for example:

- Offer technology transfer services in the domain of digital technologies
- Cooperate with or be involved as a partner in a regional digital innovation hub
- Establish and run its own digital innovation hub
- Specialise and become an European Digital Innovation Hub, offering services for all EU regions, connecting in a network with other hubs

3. **The HEI contributes to the uptake and the dissemination of the latest digital technological advancements.**

Some of the latest digital technologies - e.g. cyber security, Internet of Things, quantum computing, high performance computing, cyber-physical systems, etc. - are considered a key to innovation and digital future. Part of them are also considered key enabling or generic technologies - like artificial intelligence - with an important role in retaining competitiveness of industry and scaling up on new markets. HEIs can have a role both in the development and dissemination of such technologies. They can pursue the latest technological advances in the digital field and seek to leverage the new opportunities for smart specialisation in non-traditional and new areas of economic activity.

To score highly, an HEI could, for example:

- Contribute to the dissemination of novel digital technologies and their uptake in research and in the economy
- Orient research towards the development of such technologies and their use in new domains
- Develop infrastructures and provide adequate training to support the use of these digital technologies
- Foster participation in European and international projects and/or networks, like the Digital Europe Programme or one of the Knowledge and Innovation Communities under EIT Digital

Knowledge exchange and collaboration – *Innovation relies very much on sharing and reinterpretation/recombination of existing knowledge through a continuous collaborative process*

among the different actors from the Quadruple Helix. Smart specialisation priority areas are often located at the intersection between science areas, technology fields and economic activities, implying the application of multidisciplinary approaches and 'boundary spanning' between research or academia and industry, at the same time being responsive to specific societal challenges. Collaboration between HEIs and other regional public and private institutions, as well as society can also support alignment of supply and demand for knowledge and skills, especially in a RIS3 context. This section refers to the ability of HEIs to build and sustain relationships with key regional, national and international partners in order to be able to respond to regional needs, as well as to contribute to the creation or enforcement of linkages within the regional innovation system.

1. **The HEI supports innovation in smart specialisation priority areas through collaboration with other regional quadruple helix (QH) stakeholders.**

Entrepreneurial discovery as a continuous process underpins smart specialisation as part of a broad stakeholder involvement and bottom-up planning process. The entrepreneurial spirit of this discovery must involve representatives of the quadruple helix, including HEIs. Besides active participation in entrepreneurial discovery, HEIs should foster pro-active dialogue and connections with and between regional key actors, acting as a key regional player in ine with their third mission. Moreover, HEIs are able to bring together the entrepreneurial and innovation communities to leverage the strengths of a region, supporting the regional government in policy design and implementation.

To score high, an HEI could, for example:

- Participate in entrepreneurial discovery focus groups organised by the RIS3 responsible organisation, cooperating and interacting with other Quadruple Helix stakeholders and supporting the development of partnerships
- Have informal ties and communication channels with other relevant RIS3 stakeholders through which knowledge and information is shared and recombined
- Have formal ties - e.g. partnership agreements, cooperation agreements, institutional arrangement, such as a council or committee - with relevant RIS3 stakeholders and regular discussions oriented towards solving social and economic needs
- Participate in various events with other regional stakeholders, for example at networking or match-making events organised by other actors
- Foster long-term and sustainable relationships with RIS3 stakeholders for the benefit of the region instead of project-based cooperation
- Collaborate with other higher education institutions in the region as well as with R&D organisations and technology transfer centres to enhance exchange of scientific and technological knowledge, to capitalise on complementary research assets and to jointly develop related services

2. **The HEI supports the regional RIS3 responsible organisation(s) in the strategy development and implementation.**

Besides participation in RIS3 governance structures and in the entrepreneurial discovery process, or in the generation, development and implementation of RIS3 related projects or contribution to strategy monitoring and evaluation, the HEI can be actively involved in other steps of RIS3 design and implementation, as well. This involvement can be related for example to performing the socio-economic analysis or the RDI analysis, update of the project portfolio, active participation in project development labs, elaboration of studies linked to the revision of smart specialisation priority areas or development of financing instruments and calls for proposals, etc.

To score high, an HEI could, for example:

- Contribute to the analysis of regional research and innovation assets by providing relevant data linked to planned and ongoing R&D activities, tangible and intangible R&D assets, etc.
- Support the identification of societal challenges that need to be addressed at regional level
- Perform specific analysis and/or elaborate studies to support strategy design and/or implementation
- Support the evidence-based identification of competitive advantages and unique resources,

- Alert policy-makers to information regarding global trends through its European and international networks
- Work closely with the organisation responsible for RIS3 linked to the smart specialisation policy process.

3. The HEI supports university-industry links and mobility.

Cross-sectoral links and mobility are an important way of transferring, exchanging and combining knowledge between different fields and sectors, i.e. between HEIs as knowledge providers and industry as knowledge explorers, and can result in creating new value and innovation. Bringing researchers from HEIs and industry together, additionally promotes new business opportunities, can result in the establishment of new businesses and create new areas of economic development.

To score high, an HEI could, for example:

- Have cooperative PhD programmes with the industry (industrial PhDs)
- Have staff mobility programmes with industry
- Have student internship programmes
- Have a joint R&D agenda with industrial partners
- Share equipment and facilities with companies

4. The HEI facilitates cooperation between Quadruple Helix actors.

Effective and efficient quadruple helix cooperation and a connected regional innovation system are of key importance for smart specialisation. Besides playing a key role as a regional actor, HEIs can also contribute to creating new or enforcing existing connections and ties within the regional innovation system. HEIs can also act as a catalyst for the harmonisation of different interests and perspectives, as well as contribute to the improvement of RIS3 governance structures.

To score high, an HEI could, for example:

- Exploit new Quadruple Helix cooperation opportunities among regional stakeholders, through the organisation of dedicated events
- Contribute to and support experimentation with new stakeholder involvement and RIS3 governance models
- Actively promote engagement towards societal challenges and sustainability, enabling quadruple helix actors to enact values and proactive attitudes towards issues of regional importance
- Run collaborative processes with other actors of the quadruple helix to address emerging economic and societal challenges
- Liaise between and bring together the entrepreneurial and innovation communities, as well as citizens to exploit strengths and challenges of the region, acting in parallel as an intermediary with the organisation in charge of regional policy.

5. The HEI analyses the current and future needs of society and business, providing the knowledge to respond to the challenges.

Smart specialisation strategies take into account to a large extent the challenges society and enterprises are facing. RIS3s should primarily aim for economic transformation but should also contribute to the transformation of society and of socio-technical systems. Besides the needs and challenges incorporated during strategy design, new ones may emerge within the policy cycle or in the span to the next one, and might need to be tackled. Some of these challenges can be anticipated, while others need quick responses and reactions as soon as they appear. HEIs can play an active role not only in addressing challenges already identified, but also in anticipating future needs and in tackling unexpected disruptions, contributing to social and economic resilience.

To score high, an HEI could, for example:

- Conduct foresight and forecasting activities linked to future societal needs and, based on findings, develop capacities, initiate internal changes, projects and actions to meet identified needs

- Respond to current challenges and needs the community and society are facing, and become a catalyst of regional development, socio-technical system transformation and resilience
- Be oriented towards the needs of the economy and of companies from smart specialisation priority areas both in education and research-innovation.

The Internationalized Institution – *HEIs play a key role in connecting a region to international knowledge flows relevant for RIS3 and are a gateway for accessing extra-regional knowledge sources. Integration into larger knowledge flows through wider networks can be of particular importance for the regional innovation system, since it can result in the transfer of knowledge and technologies that are necessary for the industry, but are not available within the region. This section looks at the HEI participation in knowledge exchange international projects and networks, both formally (when there is a formal agreement for HEI involvement) and informally (where it arises from interpersonal relationships that researchers or research teams build individually). It also emphasizes the nodal role HEIs have in transposing regional ambitions to the international arena and in supporting the regions' integration into global value chains, as well as reaching out from the region to solve region-specific needs.*

1. **The HEI participates as a partner in European and international R&I projects.**

Alongside their tailor-made character to regional assets and specific bottlenecks, smart specialisation strategies should also have an outward looking character and put emphasis on the integration in European and international value chains and knowledge flows. HEIs can develop strategic interregional partnerships and support these aims, additionally contributing to synergies between regional and European or international funding instruments. Participation in such projects can not only capitalise on regional assets, but can also respond to regional needs and challenges.

To score high, an HEI could, for example:

- Be part of interregional partnerships supported under one or more of the three smart specialisation platforms, i.e. Agri-food, Energy and Industrial Modernisation
- Participate in Vanguard Initiative or other similar interregional, supraregional or transnational initiatives
- Become a member of or affiliate with an EIT Knowledge and Innovation Community, i.e. EIT Digital, EIT Urban Mobility, EIT Raw Materials, EIT Energy, EIT Climate, EIT Health KICs,etc.
- Initiate and coordinate European and international partnerships and projects developed to tackle region specific needs and challenges in line with RIS3 objectives
- Foster complementary participation of relevant regional actors in such European and international projects
- Capitalize on joint results after the projects' lifetime to improve educational and R&I offer, as well as the institutions' regional embeddedness

2. **The HEI links the region to external knowledge sources.**

Regional actors involved in RIS3 processes and regions should rely on external knowledge acquisition that can help them to improve their regional knowledge base and support specialisation. By combining international focus and local commitment, HEIs should connect the region to external sources of knowledge through their formal or informal networks, acting as a link between global and regional/local levels, absorbing relevant knowledge available and sharing it with other regional stakeholders. These linkages should also be used to address specific social challenges faced by the region.

To score high, an HEI could, for example:

- Become a gateway for importing and disseminating in the region latest technological advancements
- Actively search for information and knowledge sources that could support the region in addressing region-specific challenges

- Play a relevant part in facilitating the connection between regional actors and European or international counterparts
- Contribute to bringing the industry sectors closer to the internationalised R&I,
- Facilitate or intermediate (through their TTOs) technology transfer from the outside to companies from their region
- Link the region with international/European centres of excellence

3. The HEI is engaged in European and international R&I networks.

Participation in European and international educational or research and innovation networks fosters integration into knowledge flows and can contribute to knowledge exchange (sharing and accessing relevant knowledge) and partnerships in line with regional needs and smart specialisation objectives. Being part of both formal and informal European and international networks, HEIs can bring a valuable contribution to regional development. To score high, an HEI could, for example:

- Connect with researchers and academics, as well as with experts from other types of organisations at European or international level through informal links
- Support membership of researchers and academics in European and international scientific organisations
- Support researchers to participate at European or international conferences, as well as in brokerage and match-making events with other actors from the quadruple helix
- Actively participate in European educational and R&I networks, such as European Research Area (ERA) or the European Higher Education Area (EHEA)
- Participate in other relevant initiatives, such as the European University Association or European Association of Institutions in Higher Education, University-Industry Innovation Network.

Measuring Impact – *Monitoring and evaluation of intended outputs and outcomes is at the core of RIS3 and ideally policy responsible organisations should involve regional key actors in these processes, including HEIs. From another point of view, an HEI committed to contribute to smart specialisation objectives should also monitor the implementation and impact of its own RIS3 related actions in order to be able to make necessary adjustments. This section concerns not only internal monitoring and evaluation measures that should be in place within the HEI, but also refers to the support an HEI can offer to the RIS3 responsible organisation in the overall monitoring and evaluation of the strategy, through provision of data and the development of new methods and tools for monitoring and evaluation.*

1. The HEI is actively involved in participatory RIS3 monitoring, evaluation and learning activities.

Due to the transformative character of the policy and its specific vertical intervention logic, as well as experimental character, monitoring and evaluation of RIS3s cannot solely rely on statistical or programme indicators that are usually available. Additional quantitative information should be collected and interpreted and there is a need for new indicators and data collection methods. These can cover for example the development of interdisciplinary approaches to data collection for new indicators; new methods to improve measurement of innovative activity in complex or emerging business areas, organizations and networks, or of skills required in innovative workplaces, or of the use of emerging and enabling technologies, as well as of social innovation and impact of innovative activity on society, etc. HEIs can support both data collection and the definition of new indicator systems, as well as develop methodologies for monitoring and evaluation. Not least, HEIs committed to their third mission and contributing to RIS3 should also periodically assess its own achievements linked to RIS3. Monitoring and evaluation of internal actions can not only support adjustments and improvements of the HEI's activity, but could serve as a valuable information source for the RIS3 responsible organisation.

To score high, an HEI could, for example:

- Support RIS3 monitoring, evaluation and learning by providing information and data connected to its own R&I activity, including participation in European and international projects and networks
- Participate, together with other actors, in the regular review of the theory of change, according to RIS3 interventions, results and impact
- Assist the RIS3 responsible organisation in monitoring by analysing data and making recommendations based on results
- Review or propose new indicators and data collection techniques to support the development of the RIS3 monitoring and evaluation system
- Provide and develop novel tools and methods to assess the impact of RIS3 on regional development both from an economic and social point of view
- Perform alone or in a consortia with other organizations the impact evaluation of the RIS3,
- Engage in monitoring experts working groups to support the regional administration in monitoring through a multidisciplinary approach

2. The HEI measures its own contribution to reaching RIS3 objectives.

An HEI strategically committed to developing its third mission and entrepreneurial profile, and to contributing to regional development through smart specialisation, should put emphasis on measuring to what extent its internal actions contribute to RIS3 objectives. Similarly, an HEI should understand the impact of its own RIS3-related activities. Measurement of its own contribution to RIS3 implementation cannot be only used for improvement at the level of the organisation, but also pertain to the way an HEI can support RIS3 monitoring and evaluation performed or initiated by the policy responsible organisation.

To score high, an HEI could, for example:

- Periodically monitor outcomes of its own activities linked to RIS3 according to previously set milestones
- Revise internal actions based on the results of the monitoring
- Perform evaluation of its own RIS3 related actions to measure its impact on RIS3 result and context indicators
- Engage in a continuous learning process with other actors to identify inhibiting and accelerating factors for the achievement of RIS3 objectives

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6. Annexes

6.1 First raw version of the list of statements

This list presents a raw version of the statements deriving from the integration of the results from the WP1 research activities: Literature review, Delphi and interviews, included under the HEInnovate dimensions' framework.

Legenda:
- **Literature review results**
- **Delphi results**
- **Interview results**

I. ***LEADERSHIP AND GOVERNANCE***
   - *The HEI has an important role in RIS3 higher level governance structures*
   - *The HEI takes part in the governance structure in a quadruple helix approach*
   - *The HEI participates to bottom-up approaches to shape a strategic shared vision, objectives and smart specialisation priorities for the design of an action plan*
   - *The HEI collaborates with regional authorities by engaging in and experimenting high-level strategy governance models*
   - *The HEI counts on power balance between the central level and the different departments (academic community and administration) for the effectiveness and efficiency of the institution*
   - *The leadership and governance level is involved in building international institutional partnerships*
   - *The HEI fosters the development of relationships to participate in European and International RDI projects*
   - The HEI participates in all RIS3 phases (design, implementation, monitoring and evaluation).
   - The HEI participates in the entrepreneurial discovery process (EDP).
   - The HEI identifies specialisation priorities.
   - The HEI has a competence centre.
   - The HEI has one stop shop access to its offers.
   - The HEI has a team that coordinates RIS3 processes (clear internal structure and responsibilities for those who are going to be active in RIS3 related tasks).
   - The HEI has a responsible unit/ person to communicate with external partners about its third mission and RIS3 activities.
   - The HEI is cutting red tape (clear and fast decision-making, eased administration).
   - The HEI has a reward system for internal and external recognition of researchers.
   - The HEI has a recognition system to keep all stakeholders aligned, engaged and motivated.
   - The HEI's staff/unit responsibility for fundamental research and business co-operations is differentiated.
   - The HEI encourages meetings among all stakeholders.
   - The HEI has a monitoring and evaluating system of RIS3 activities that provides feedback to the policymakers.
   - The HEI supports open governance models.

II. ***ORGANISATIONAL CAPACITY: FUNDING, PEOPLE AND INCENTIVES***
   - *The HEI counts on a support structure (governance system; human capital, financial and physical dimensions) to contribute to RIS3 design and implementation*
   - *The HEI carries on activities mainly funded and regulated by national provisions*
   - *There is a system of collaboration among different departments/faculties from the same HEI to promote contamination between different research topics and teaching methods and to facilitate interdisciplinarity and sense of belonging*
   - *There is a rewarding system and incentives to engage the members from different departments of the institution in entrepreneurship and innovation activities*
   - *The HEI provides highly skilled human capital, ideas and solutions to future economic, social and technological challenges*

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- *The HEI puts efforts in improving its RIS3 related learning process.*
- *The HEI puts effort in its capacities to better consider RIS3 aspects and take part in RIS3 design and implementation.*
- *The HEI performs foresight activities, forecasting what will be the skills of the future, in order to provide a proactive, rather than a reactive, response (in terms of teaching, researching and other activities).*
- *The HEI presents multi-disciplinary cooperation between departments.*
- *The HEI promotes RDI with the same intensity as education*
- *The HEI is harnessing funding opportunities as triggers of change and to become more responsive.*

III. ENTREPRENEURIAL TEACHING AND LEARNING
- *The HEI plays as a channel of intellectual capital through knowledge creation and dissemination*
- *The HEI trains human capital for RIS3 priority areas*
- *The HEI trains human capital for the modern economy and attract talents*
- *The HEI contributes to upskill the existing workforce*
- *The HEI contributes in the EDP through education providing graduates with innovation skills, in line with the RIS3 priorities*
- *Students and teachers are involved in entrepreneurship experiential classes and projects and collaborate to provide concrete solutions to external stakeholders from the industry (internal relationships)*
- *The HEI prepares students for solving economic, social and technological challenges in the future mainly by enforcing interdisciplinary approaches.*
- *The HEI is becoming more entrepreneurial.*
- *The HEI is committed to develop entrepreneurial skills across disciplines (for students, teachers, and staff).*
- *The HEI integrates practical and theoretical knowledge and skills.*
- *The HEI creates capacity building programs targeted to social economy actors.*
- *The HEI creates capacity building programs targeted to the regional ecosystem.*

IV. PREPARING AND SUPPORTING ENTREPRENEURS
- *The HEI collaborates with local businesses and communities to enhance their capacity to be innovative and competitive*
- *Different faculties and departments co-participate in living labs*
- *Students and teachers are involved in training combining theory with practice and collaborate with real cases of local businesses (external relationships)*
- *The HEI plays a key role in entrepreneurial discovery processes and interaction/cooperation with business environment*
- *The HEI develops services linked to RDI and business support, like TT and innovation services, start-up support, acceleration, etc.*
- *The HEI contributes to the regional RDI needs through the establishment of startups with scientific and technological bases.*

V. DIGITAL TRANSFORMATION AND CAPABILITY
- *The HEI cooperates with research and technology centres to enhance the exchange of knowledge and its set of technology services*
- *The HEI participates in Digital Innovation Hubs by offering services supporting the digitalisation of economy and society*
- *The HEI combines technology and business knowledge.*
- *The HEI creates innovation platforms with Quadruple Helix partners.*
- *The HEI offers innovation and technology transfer related training.*
- *The HEI performs research on cutting edge technology solutions.*
- *The HEI exploits social media opportunities.*

VI. KNOWLEDGE EXCHANGE AND COLLABORATION
- *The HEI contributes to regional innovation policies to transfer regional economic, technological and institutional capacity to a broader society*

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- *The HEI plays and anticipatory, active and strategic role through its research activity*
- *The HEI participates in smart specialisation platforms*
- *The HEI contributes in the EDP by supporting the development of the quadruple helix partnerships*
- *The HEI contributes to the EDP at local level, to identify competitive advantages and set regional strategies and resources*
- *The HEI collaborates with business to run research for technology and innovation transfer and seeking to maximise financial returns in the region*
- *The HEI takes care of community challenges and activities by becoming catalysts of local development, knowledge transfers and spill-over and re-engages citizens in a process of local democracy*
- *The HEI takes part in innovation ecosystems to contribute to local and regional development, addressing labour market needs, fostering social links and maximizing the use of available resources*
- *The HEI contributes to the definition of a shared vision for the RIS3 strategy and to a more precise identification and definition of smart specialisation priority areas, being able to interpret context and challenges*
- *The HEI stimulates internal staff to open-up to the business world, by being a partner in the entrepreneurial ecosystem*
- *The HEI acts as a facilitator among regional partners through networking and collaboration, by promoting sustainability and social engagement*
- *The HEI take part in living labs with all local sectoral actors and supports the creation, prototyping, validating, and testing of new technologies, services, products, and systems in real-life contexts*
- *The HEI understands research, innovation and education needs of local companies and learns more about social challenges*
- *The HEI orients research towards the needs of businesses and society and presents the services of the university to regional actors.*
- *The HEI promotes cross-sector RDI cooperation and provision of innovation infrastructures*
- *The HEI has a pro-active dialogue and collaboration with economic actors and other key stakeholders to contribute to regional development.*
- *The HEI plays a liaison/facilitator role for inclusive growth*
- *The HEI contributes with methodological support to RIS3 design, by providing information and data*
- *The HEI contributes to RIS3 implementation by bringing knowledge regarding new technologies and RDI trends*
- *The HEI is involved in the definition of priorities and actions of RIS3, as well as in project development*
- *The HEI actively participates in formulating and implementing the RIS3 strategy*
- The HEI establishes collaborations with companies.
- The HEI-business cooperation has a long lifetime rather than being one-shot.
- The HEI establishes collaborations with other actors for the Quadruple Helix (academia, business, public authorities, and civil society).
- The HEI has formal and informal ties with RIS3 stakeholders.
- The HEI is focused on knowledge transfer activities (from R&D activities to the world).
- The HEI is focused on market entry and IP services.
- The HEI has prompt responsiveness to the questions of stakeholders.
- The HEI has an updated inventory of its expertise and services, which is being communicated to partners, making the HEI more attractive.
  The HEI shares its research infrastructure with stakeholders.
- The HEI rapidly adapts its supply of fields of study (curriculum and the RDI activities) to the demand of businesses and societal needs.
- The HEI analyses the human capital needs of the region in smart specialisation areas, adapting its educational offer.
- The HEI belongs to a regional network.
- The HEI cooperates with the regional government.
- The HEI has a role on regional innovation through other services rather than teaching and researching, for example, consultancy services, market analysis (screening of the needs of the RIS3 stakeholders), definition of priorities, among others.
- The HEI has industrial/cooperative PhDs (building bridges between industry and the academia)
- The HEI disseminates the results of its studies and translates them in a language accessible to all.

- The HEI has joint projects.
- The HEI endeavours to overcome the limitations of joint projects (funding, expectations, etc.)
- The HEI facilitates new cooperation opportunities (for example organising networking events).

VII.   THE INTERNATIONALISED INSTITUTION
- The HEI is partner in European and International RDI projects
- The HEI connects the region to external sources of knowledge through its international networks
- The HEI combines international orientation and local commitment, especially in terms of education
- Students and academic staff from the same institution are engaged in international projects or exchanges
- The HEI builds international relationships through Knowledge and Innovation Communities (KiCs)
- The HEI belongs to international networks.
- The HEI contributes to the internationalisation of economic activities in the RIS3 priority areas.
- The HEI is engaged in international research collaboration for the exchange of best practice through the access to different funding sources.
- The HEI has access to global trends, which allow it to assume a proactive role in modernizing its educational offer, taking place at the forefront of innovation.
- The HEI has an excellent level of internationalization linking the region to international sources of knowledge through European projects.
- The HEI is able to gain and maintain partners to build co-creation projects that are not based on personal contacts.
- The HEI is maintaining the collaborations after the projects' lifetime.

VIII.   MEASURING IMPACT
- The HEI contributes to the monitoring and evaluation of RIS3 through data analysis and by training human capital to work as data analysts
- The HEI refers to international/national models for measuring and identifying impact indicators, outcomes, results and context indicators
- The HEI participates to bottom-up approaches to shape a strategic shared vision, objectives and smart specialisation priorities for the identification of indicators for a monitoring and evaluation system
- The HEI analyses and shares the results of their collaboration with internal stakeholders
- The HEI analyses and shares the results of its collaboration with local and regional stakeholders
- The HEI has a system to evaluate its community impact.
- The HEI measures its impact on RIS3.
- The HEI measures the impact of RIS3 on regional development.
- The HEI analyses the matching between competencies and RIS3 priorities.

6.2 The first refinement of the statements in the Research Report

The table below summarises the first version of the statements derived from the Research Report. The different columns show which of the research methods was the source for the given statement.

Dimension/Statements			
I. Leadership and governance	**Literature review**	**Delphi survey**	**Interviews**
1. The leaders from the HEI take part in the higher level governance structure of RIS3.	X		
2. The HEI counts on power balance between the central level and the different departments (academic community and administration) for the effectiveness and efficiency of the institution.	X		
3. The HEI is strategically committed to implement its third mission, i.e., to contribute in solving the needs of businesses and society.			X
4. The leadership of the HEI fosters European and international institutional partnerships and participation in R&I oriented networks.	X		
5. The HEI leaders are committed to ensure the HEI's participation in all RIS3 phases (design, implementation, monitoring and evaluation).			X
6. The HEI leaders are committed to support participation of relevant HEI staff at entrepreneurial discovery processes (EDP), identifying specialisation priorities.		X	X
7. The HEI has a clear and fast decision-making process, eased by administration, in order to take part in RIS3 related activities.			X
8. The HEI leadership encourages cooperation and collaboration with all stakeholders.			X
9. The HEI supports open governance models.			X
II. Organisational capacity, people, incentives	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI counts on a support structure (management and administration system; human capital, financial and physical resources) to contribute to RIS3 design and implementation.	X		
2. The HEI has dedicated and qualified personnel that supports academia and researchers in attracting funds for R&I and for commercialising their research results.	X		
3. The HEI has an organisational structure facilitating technology transfer and collaboration between academia and society and businesses, especially if connected with smart specialisation priority areas.	X		
4. The HEI promotes multidisciplinary cooperation among different departments/faculties to encourage contamination between different research topics and teaching methods, in line with business and society needs.	X		
5. There is a rewarding system and incentives offered to engage the members from different departments of the institution in research and innovation activities			X

	Literature review	Delphi survey	Interviews
6. The HEI is oriented and open to provide highly skilled human capital, ideas and solutions to future economic, social and technological challenges in line with RIS3 vision and objectives.		X	
7. The HEI performs analysis and foresight activities, forecasting what will be the needs of the future, in order to provide a proactive, rather than a reactive, response (in terms of teaching, researching and other activities).			X
8. The HEI harnesses funding and cooperation opportunities as triggers of change and to become more responsive to society and business needs.			X
9. The HEI has dedicated personnel that cooperates with RIS3 responsible organisation(s) and disseminates relevant information towards HEI staff involved in R&I and gathers, centralises data and information available at the level of HEI feeding into the RIS3 process.			X
10. The HEI has dedicated personnel that cooperates with RIS3 responsible organisation(s) and disseminates relevant information towards HEI staff involved in R&I.			X
11. The HEI has dedicated personnel that cooperates with RIS3 responsible organisation(s) to gather, centralise data and information available at the level of HEI feeding into the RIS3 process.			X
12. The HEI has dedicated infrastructure and equipment for collaborative R&I and technology transfer, assuring access to relevant Quadruple Helix stakeholders, including students, e.g. Living Labs.			X
13. The HEI contributes to and supports experimentation with new RIS3 governance (stakeholder involvement) models.			X
14. The HEI performs analysis and elaborates studies to support strategy design.			X
III. Entrepreneurial Teaching and Learning	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI contributes to the development of human capital necessary for businesses from RIS3 priority areas, adapting its curricula according to market needs.		X	
2. The HEI provides students with R&I skills.	X		
3. The HEI creates and delivers education programmes for further development of employees of businesses from RIS3 priority areas.	X		
4. The HEI offers targeted training for employees of businesses in order to learn how to efficiently use and exploit equipment using latest technologies.	X		
5. The HEI creates and delivers education programmes that are building the capacity of actors participating in the regional innovation ecosystem to foster links and cooperation between the knowledge production and knowledge exploitation sub-systems.			X
IV. Preparing and Supporting Entrepreneurs	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI collaborates with local businesses and communities to enhance their innovative capacity.	X		
2. The HEI offers access to entrepreneurs and their staff to R&I facilities and support on behalf of researchers to test, validate and prototype new products (experimental development, industrial research).	X		
3. The HEI offers access for entrepreneurs to own research results.	X		

	Literature review	Delphi survey	Interviews
4. The HEI encourages collaborative research by involving students and academia to perform R&I according to the needs of businesses.	X		
5. The HEI supports own researchers, including students, in developing spin-offs for the commercialisation of own research results.	X		
6. The HEI develops services to support R&I, including TT, as well as connected business and innovation support services (market study, business plans, business scale-up, access to funding, acceleration, etc.).		X	
7. The HEI contributes to the regional R&I needs through the establishment of spin-offs with scientific and technological base.			X
V. Digital Transformation and Capability	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI cooperates with research and technology centres to enhance the exchange of knowledge and its set of technology services.	X		
2. The HEI participates in or creates Digital Innovation Hubs by offering services supporting the digitalisation of economy and society.	X		
3. The HEI develops free MOOCs in line with business and society needs and in order to foster the development of the regional innovation ecosystem.	X		
4. The HEI contributes to RIS3 implementation by bringing knowledge regarding new technologies and RDI trends.			X
VI. Knowledge Exchange and Collaboration	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI participates on smart specialisation platforms.	X	X	
2. The HEI participates in Vanguard Initiative or other similar interregional/supraregional initiatives.			X
3. The HEI cooperates and interacts during the EDP with other stakeholders, supporting the development of Quadruple Helix partnerships.	X		
4. The HEI collaborates with business in joint R&I projects.	X		
5. The HEI takes care of community challenges and activities by becoming catalysts of local development and knowledge transfer.	X		
6. The HEI acts as a facilitator among regional partners through networking and collaboration, by promoting sustainability and social engagement.	X	X	
7. The HEI is oriented towards company needs in terms of research, innovation and education, and presents its services to regional actors.	X	X	
8. The HEI has a pro-active dialogue and collaboration with economic actors and other key stakeholders to contribute to regional development.	X		
9. The HEI has long-term relationships with all actors of the Quadruple Helix.			X
10. The HEI has formal ties with relevant RIS3 stakeholders.			X
11. The HEI has informal ties with RIS3 stakeholders.			X
12. The HEI has prompt responsiveness to the requests of stakeholders.			X
13. The HEI rapidly adapts its educational and R&I offer to the needs specific for the regional smart specialisation areas.		X	
14. The HEI cooperates with regional government.			X

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	Literature review	Delphi survey	Interviews
15. The HEI has industrial/cooperative PhDs (building bridges between industry and the academia).			X
16. The HEI facilitates new cooperation opportunities (for example organising networking events).			X
VII. **The Internationalised Institution**	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI is partner in European and international R&I projects.	X		
2. The HEI initiates European and international partnerships/projects to solve regional needs.	X		
3. The HEI combines international orientation and local commitment linking the region to external sources of knowledge through projects and joint R&I activities.	X		
4. The HEI contributes to the internationalisation (scaling-up) of the economic activities in the RIS3 priority areas.			X
5. The HEI has access to global trends, which allow it to assume a proactive role in modernising its educational and R&I offer.			X
6. The HEI maintains its international collaborations after the projects' lifetime.			X
VIII. **Measuring Impact**	**Literature review**	**Delphi survey**	**Interviews**
1. The HEI contributes to the monitoring and evaluation of RIS3 through data analysis.	X		
2. The HEI contributes to the development of RIS3 monitoring systems through proposing new indicators and data collection techniques.	X		
3. The HEI contributes to the identification of suitable indicators for the RIS3 monitoring and evaluation system.	X		
4. The HEI has a system to evaluate the impact of its own activities on businesses and community.	X		
5. The HEI supports RIS3 monitoring through the provision of information and data.			X
6. The HEI measures the impact of its own activities on RIS3.			X
7. The HEI provides tools and methods to assess the impact of RIS3 on regional development.			X
8. The HEI analyses the matching between its competencies and RIS3 priorities.			X

6.3 List of statements used at the Validation Workshops

This is the list developed as an outcome of the internal workshop held on the refinement, reorganisation of statements. Only the "main" or "leading" statements were used at the validation workshop. The rest of the initial statements that were turned into "sub-statements" or "aspects" linked to the "main" or "leading" statement have been further developed, in some cases further detailed, in other cases fully elaborated at a further stage to support the development of the new tool.

1. LEADERSHIP AND GOVERNANCE	*HEInnovate original explanation*: Strong leadership and good governance are crucial to developing an entrepreneurial and innovative culture within an HEI. Many HEIs include the words 'enterprise' and 'entrepreneurship' in their mission statements, but in an entrepreneurial institution this is more than a reference. This section highlights some of the important factors an HEI may consider in order to strengthen its entrepreneurial agenda.
	HEInnovate for RIS3 explanation: Internal factors related to the management and administration of the HEI that influence the RIS3 participation.
	1. 1. The senior management of the HEI takes part in the higher level governance structure of RIS3.
	1. 2. The HEI is strategically committed to implement its third mission taking into account RIS3 objectives *Aspects:* *1.2.1. The HEI leaders are committed to ensure the HEI's participation in most phases of RIS3 (design, implementation, monitoring and evaluation).* *1.2.2. The management of the HEI fosters European and international institutional participation in R&I oriented networks.* *1.2.3. The HEI top management is committed to support participation of relevant HEI staff in the entrepreneurial discovery process (EDP) identifying specialisation priorities.*
	1.3. Senior management ensures processes, procedures and internal communication measures facilitating participation in RIS3 *1.3.1. The HEI counts on shared leadership as power balance between the central level and the different departments (academic community and administration)* *1.3.2. The HEI leadership encourages cooperation and collaboration with all stakeholders.* *1.3.3. The HEI has prompt responsiveness to the requests of stakeholders.* *1.3.4. The senior management is able to communicate a RIS3 vision and set up the right communication flows in both directions across the university.*
	1.4. The top management of HEI supports open governance models.
2. ORGANISATIONAL CAPACITY, PEOPLE, INCENTIVES	*HEInnovate original explanation*: The organisational capacity of an HEI drives its ability to deliver on its strategy. If an HEI is committed to carrying out entrepreneurial activities to support its strategic objectives, then key resources such as funding and investments, people, expertise and knowledge, and incentive systems need to be in place to sustain and grow its capacity for entrepreneurship.
	HEInnovate for RIS3 explanation: The HEI counts on a support structure (management and administration system; human capital, financial and physical resources) to contribute to RIS3 design and implementation / objectives.
	2.1. There is an integrated, structured data-base/mapping of human capacities and knowledge assets of the HEI *2.1.1. The HEI maps competencies, skills and expertise ~~in~~ as well as knowledge assets and activities related to RIS3 (and the broader economic and social needs of the region)* *2.1.2 The HEI analyses the matching between its competencies and the economic and social needs, including RIS3 priorities of the region.*
	2.2. The HEI has dedicated qualified personnel that supports academia and researchers in R&I activities Aspects: *attracting funds for R&I, for commercialising their research results and cooperation with QH/RIS3 related organizations.* *2.2.1. The HEI gathers and integrates data and information available at local , ~~and~~ regional, national, European and international level, including calls, and funding opportunities for HEIs.* *2.2.2. The HEI has dedicated personnel that cooperates with RIS3 responsible organisation(s) and disseminates relevant information towards HEI staff involved in R&I*
	2.3. The HEI has an organisational structure dedicated to technology transfer and collaboration between academia, society and businesses, especially if connected with smart specialisation priority areas.
	2.4. The HEI promotes multidisciplinary cooperation among different departments/faculties to encourage contamination between different research topics and teaching methods, in line with business and society needs.
	2.5. There is a system of rewards and incentives offered to engage the members from different departments of the institution in research and innovation activities.
	2.6. The HEI harnesses funding and cooperation opportunities for R&I **as triggers of change and to become more responsive to society and business needs.**
3. ENTREPRENEURIAL LEARNING AND TEACHING	*HEInnovate original explanation*: Entrepreneurial teaching and learning involves exploring innovative teaching methods and finding ways to stimulate entrepreneurial mindsets. It is not just learning about entrepreneurship, it is also about being exposed to entrepreneurial experiences and acquiring the skills and competences for developing entrepreneurial mindsets.
	HEInnovate for RIS3 explanation: Promotion of entrepreneurial development and provision of the right tools to deliver education and training opportunities both internally and externally, with a focus on RIS3.

	3.1. The HEI graduate programmes provide human capital with knowledge and skills related to RIS3 *Aspects:* *3.1.1. The HEI contributes to the development of human capital necessary for businesses from RIS3 priority areas, adapting its curricula according to market needs.* *3.1.2. The HEI is oriented and open to provide highly skilled human capital, ideas and solutions to future economic, social and technological challenges in line with RIS3 vision and objectives.* *3.1.3 The HEI provides students with R&I skills.*
	3.2. The HEI creates and delivers education programmes for the employees of the organizations from the quadruple helix/regional innovation eco-system *Aspects:* *3.2.1. The HEI creates and delivers education programmes for further development of employees of businesses from RIS3 priority areas.* *3.2.2. The HEI offers targeted training for employees of businesses in order to learn how to efficiently use and exploit latest technologies.* *3.2.3. The HEI creates and delivers education programmes that are building the capacity of actors participating in the regional innovation ecosystem to foster links and cooperation between the knowledge production and knowledge exploitation sub-systems.*
4. PREPARING AND SUPPORTING ENTREPRENEURS	*HEInnovate original explanation: HEIs are already deploying digital technologies, however the uptake and integration varies among and within institutions. HEIs should make the most out of the opportunities presented by digital transformation and consider digital technologies as a key enabler. This section of the self-assessment provides a number of statements to reflect on HEI's digital capability, defined as the ability to integrate, optimise and transform digital technologies to support innovation and entrepreneurship.HEIs can help students, graduates and staff consider starting a business as a career option. At the outset it is important to help individuals reflect on the commercial, social, environmental or lifestyle objectives related to their entrepreneurial aspirations and intentions. For those who decide to proceed to start a business, or other type of venture, targeted assistance can then be offered in generating, evaluating and acting upon the idea, building the skills necessary for successful entrepreneurship, and importantly finding relevant team members and getting access to appropriate finance and effective networks. In offering such support, an HEI should ideally act as part of a wider business support ecosystem rather than operating in isolation.*
	HEInnovate for RIS3 explanation: Supporting entrepreneurship among staff and students with research results that can be commercialised, as well as supporting innovation in enterprises.
	4.1 The HEI supports the R&I based activities of and with firms/companies/industry *Aspects:test, validate and prototype new products (experimental development, industrial research). Support for researchers and students, collaborative research, co-creation* *4.1.1. The HEI offers access to R&I facilities and research services for entrepreneurs* *4.1.2. The HEI has dedicated infrastructure and equipment for collaborative R&I and technology transfer, assuring access to relevant Quadruple Helix stakeholders, including students, for example Living Labs, Fab Labs etc.* *4.1.3. The HEI encourages collaborative research by involving students and academia to perform R&I according to the needs of businesses.*
	4.2. The HEI develops and offers business and innovation support services for firms/companies/industry *4.2.1. The HEI develops and offers services to support business and innovation support services (market study, business plans, business scale-up, access to funding, acceleration, etc.).* *4.2.2. The HEI collaborates with local businesses and communities to enhance their innovative capacity.*
	4.3. The HEI offers for entrepreneurs access to information about research results of the university
	4.4. The HEI supports its researchers and students in establishing spin-offs and start-ups, especially in RIS3 priority fields *4.4.1. The HEI organises awareness raising events on R&I based innovations and business ideas of the HEI, including Hackatons, Boot-camps and Jumpstarters* *4.4.2. The HEI contributes to the regional economy, including R&I needs, through the support of the establishment of spin-offs with scientific and technological base.* *4.4.3. The HEI supports spin offs and start-ups with business and innovation services*
5. DIGITAL TRANSFORMATION AND CAPABILITY	*HEInnovate original explanation: HEIs are already deploying digital technologies, however the uptake and integration varies among and within institutions. HEIs should make the most out of the opportunities presented by digital transformation and consider digital technologies as a key enabler. This section of the self-assessment provides a number of statements to reflect on HEI's digital capability, defined as the ability to integrate, optimise and transform digital technologies to support innovation and entrepreneurship.*
	HEInnovate for RIS3 explanation: The internal ability to exploit the opportunities offered by digital technologies, supporting digitalisation of economy and society.
	5.1. The HEI uses the advantage of digital technologies to support innovation driven regional development.
	5.2. The HEI participates in or creates Digital Innovation Hubs to offer services for the digitalisation of economy and society.
	5.3. The HEI contributes to the development and dissemination of digital technology driven RDI trends (e-Health, EdTech, FinTech, AI etc.) .

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	5.4. KET, DIG ????
6 KNOWLEDGE EXCHANGE AND COLLABORATION	*HEInnovate original explanation: Knowledge exchange is an important catalyst for organisational innovation, the advancement of teaching and research, and local development. It is a continuous process which includes the 'third mission' of an HEI, defined as the stimulation and direct application and exploitation of knowledge for the benefit of the social, cultural and economic development of society. The motivation for increased collaboration and knowledge exchange is to create value for the HEI and society.*
	HEInnovate for RIS3 explanation: The ability to build and sustain relationships with key regional partners.
	6.1. The HEI collaborates with QH stakeholders to contribute to innovation driven regional development **Aspects: pro-active dialogue** *6.1.1. The HEI cooperates and interacts during the EDP with other stakeholders, supporting the development of Quadruple Helix partnerships.* *6.1.2. The HEI has informal ties with RIS3 stakeholders.* *6.1.3. The HEI facilitates new cooperation opportunities (for example organising networking events).* *6.1.4. The HEI has long-term relationships with all actors of the Quadruple Helix.* *6.1.5. The HEI has formal ties with relevant RIS3 stakeholders.* *6.1.6. The HEI cooperates with research and technology centres to enhance the exchange of knowledge and its set of technology services.*
	6.2. The HEI support the regional RIS3 responsible organization(s) in strategy development and implementation *6.2.1. The HEI performs analysis and elaborates studies to support strategy design and implementation* *6.2.2. The HEI cooperates with organization(s) responsible for regional policy*
	6.3. The HEI supports cross-sectoral (university-industry) links and mobility *6.3.1. The HEI has industrial/cooperative PhDs (building bridges between industry and academia).*
	6.4. The HEI acts as a facilitator of QH cooperation *6.4.1. The HEI promotes competitiveness , social engagement and sustainability through QH networking and collaboration .* *6.4.2. The HEI contributes to and supports experimentation with new RIS3 governance (stakeholder involvement) models.*
	6.5. The HEI performs analysis on current and future needs of society and businesses, providing knowledge to respond challenges *6.5.1. The HEI conducts foresight activities, forecasting what will be the needs of the future, in order to provide a proactive, rather than a reactive responsiveness, and drives internal change and capacity development accordingly* *6.5.2. The HEI takes care of community challenges and activities by becoming catalysts of local development and knowledge transfer.* *6.5.3. The HEI is oriented towards company needs in terms of research, innovation and education, and presents its services to regional actors.*
7. THE INTERNATIONALIZED INSTITUTION	*HEInnovate original explanation: Internationalisation is the process of integrating an international or global dimension into the design and delivery of education, research, and knowledge exchange. Internationalisation is not an end in itself, but a vehicle for change and improvement. It introduces alternative ways of thinking, questions traditional teaching methods, and opens up governance and management to external stakeholders. Therefore, it is linked very strongly to being entrepreneurial. It is not possible for an HEI to be entrepreneurial without being international, but the HEI can be international without being entrepreneurial or innovative.*
	HEInnovate for RIS3 explanation: The connection of the region to international environment and knowledge flows relevant for RIS3.
	7.1. The HEI is partner in European and international R&I projects including the cooperation with KICs. *Aspects: The HEI participates on smart specialisation platforms.* *7.1.1. The HEI participates in Vanguard Initiative or other similar interregional/supraregional initiatives.* *7.1.2. The HEI initiates European and international partnerships/projects (to solve regional needs).* *7.1.3. The HEI capitalizes partnerships after the projects' lifetime.*
	7.2. The HEI combines international orientation and local commitment linking the region to external sources of knowledge through projects and joint R&I activities.
	7.3. The HEI is part of formal and informal European and international R&I networks *Aspects: ERA, European Higher Education Area, ….* *7.3.1. The HEI has access to global trends and new technologies based on its research networks, which allows a proactive role in modernizing its educational and R&I offer.* *7.3.2. The HEI offers access to its network connections and across it to international knowledge and information sources*

8. MEASURING IMPACT	*HEInnovate original explanation: Entrepreneurial / innovative HEIs need to understand the impact of the changes they bring about in their institution. The concept of an entrepreneurial / innovative HEI combines institutional self-perception, external reflection and an evidence-based approach. However, impact measurement in HEIs remains underdeveloped. The current measurements typically focus on the quantity of spin-offs, the volume and quality of intellectual property generation and research income generation, rather than graduate entrepreneurship, teaching and learning outcomes, retaining talent, the contribution to local economic development or the impact of the broader entrepreneurial agenda. This section identifies the areas where an institution might measure impact.*
	HEInnovate for RIS3 explanation: Understand the impact of own RIS3 related actions and contributing to RIS3 monitoring.
	8.1. The HEI is actively involved in RIS3 monitoring and evaluation **Aspects:** *8.1.1. The HEI supports RIS3 monitoring through the provision of information and data.* *8.1.2. The HEI supports RIS3 monitoring through data analysis* *8.1.3. The HEI propose new indicators and data collection techniques suitable for the RIS3 monitoring and evaluation system.* *8.1.4 The HEI provides tools and methods to assess the impact of RIS3 and regional development.*
	8.2 The HEI measures the impact of its own activities linked to RIS3. *8.2.1. The HEI monitors its own activities linked to RIS3.* *8.2.2. Based on results of monitoring the HEI revises internal actions.* *8.2.3. The HEI performs evaluation of own RIS3 related actions to measure its impact on innovation driven regional development.*

6.4 Reformulation of the statements based on the results of the Validation Workshops

The following table contains the statements elaborated by the consortium that have been used during the Validation Workshops. During the workshops the participants validated the statements providing useful suggestions (second column) for the partners in order to improve them and make them more understandable. In the third column are then present the statements reformulated in the light of the comments made.

Statements	Suggestions from VWs	Definitive reformulation
Leadership and Governance		
The senior management of the HEI takes part in the higher level governance structure of RIS3	- Suggestion: The senior management of the HEI takes part in the highest governance body of RIS3 (Romania)	The HEI is represented through its leaders in the highest level governance body of RIS3 on regional level.
The HEI is strategically committed to implement its third mission taking into account RIS3 objectives	- The usage of the term "third mission" might not be clear for everyone (Portugal) - Clarify the concept of third mission (Hungary)	The HEI is strategically committed to implement its third mission taking into account RIS3 objectives.
Senior management ensures that processes, procedures and internal communication measures facilitate the participation in RIS3	- Suggestion: Senior management ensures that processes, procedures and internal communication measures facilitate the uptake, participation and monitoring of RIS3 (Romania)	The HEI's leaders ensure that processes, procedures and internal communication measures facilitate the HEIs participation in the most important steps of RIS3 design and implementation.
The top management of HEI supports open governance models	- The concept of open governance is not clear. HEI should be open to what, whom? (Slovakia) - Clarify the concept of open governance models (Hungary)	The HEI's leaders integrate wider (regional) social and economic aspects in its decision-making.
Organisational Capacity, people, incentives		
There is an integrated/structured data-base/mapping of human capacities and knowledge assets of the HEI	- Avoid putting too many options in statement no. 1 because it takes away from the relevance of the statement (Romania)	The HEI has a structured, up-to-date registry of its internal knowledge assets

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The HEI has dedicated qualified personnel that supports academia and researchers in R&I activities		<u>Accepted as it is</u>
The HEI has an organisational structure dedicated to technology transfer and collaboration between academia, society and businesses, especially if connected with smart specialisation priority areas	- Too long statements - hard to follow. Suggest making shorter sentences, even split into two (Romania) - It should be more precise, e.g. "related to the priorities of the smart specialisation strategy" (Hungary)	The HEI has organisational structures dedicated to knowledge and technology transfer covering smart specialisation priority areas.
The HEI promotes multidisciplinary cooperation among different departments/faculties to encourage contamination between different research topics and teaching methods, in line with business and society needs	- The word contamination was not clear. Proposal to replace it with blending (Slovakia) - What does contamination mean? Proposal to replace it with collaboration (Romania) - Too long statements - hard to follow. Suggest making shorter sentences, even split into two (Romania)	The HEI promotes multidisciplinary cooperation among different departments/faculties/research units in line with business and society needs.
The HEI harnesses funding and cooperation opportunities for R&I as triggers of change and to become more responsive to society and business needs	- It is too abstract and complicated (Hungary)	The HEI makes the best use of available R&I funding opportunities to contribute to RIS3 objectives.
Entrepreneurial Learning and Teaching		
The HEI graduate programmes provide knowledge and skills related to RIS3	- Change "higher education graduate programmes" in "higher education training programmes" (Hungary) - Suggestion: HEI training programmes develop competences that support the implementation of RIS3 and participation in it (Hungary) (CUB)	<u>Accepted as it is.</u>
The HEI creates and delivers education programmes for the employees of the organizations from the quadruple helix/regional innovation eco-system	- It is not clear for which organisations' employees does higher education deliver/prepare training programmes (Hungary)	The HEI delivers training programmes to support upskilling and reskilling of employees from smart specialisation priority domains.
Preparing and Supporting Entrepreneurs		
The HEI supports the R&I-based activities of and with firms/companies/industry	- Better explain the difference and definition of firms/companies/industry (Slovakia) - What about civil society? (Hungary)	The HEI supports companies from smart specialisation priority domains in their R&I activities.
The HEI develops and offers business and innovation support services for firms/companies/industry	- Better explain the difference and definition of firms/companies/industry (Slovakia) - What about civil society? (Hungary)	The HEI develops and offers business and innovation support services for companies.
The HEI offers for entrepreneurs access to information about research results of the university	- It should be clarified the extent of the offer (offer when required?) (Portugal) - Suggestion: The HEI offers entrepreneurs access to information about research	The HEI provides RIS3 partners access to information about prospective research results that can be commercialised.

	- results of the university (Romania) - Suggestion: The HEI offers access to information about actionable research results of the university (Romania)	
The HEI supports its researchers and students in establishing spin-offs and start-ups, especially in RIS3 priority fields	- It should be clarified the scope of the verb "support". There may be support but lack of resources for this purpose or lack of recognition for the purposes of assessing performance and career development (Portugal)	The HEI supports its researchers and students in establishing innovative start-ups and spin-offs, especially in smart specialisation priority areas.
Digital transformation and Capability		
The HEI uses the advantage of digital technologies to support innovation-driven regional development	- "Innovation driven RD" is not well formulated (Slovakia)	The HEI uses the advantage of digital technologies to support regional innovation.
The HEI participates in or creates Digital Innovation Hubs to offer services for the digitalisation of economy and society	- It is a big difference to create or just participate. Explain better or differentiate it (Slovakia) - Suggestion: The HEI actively participates in or creates Digital Innovation Hubs to offer services for the digitalisation of economy and society (Romania)	The HEI supports digital transition at regional level.
The HEI contributes to the development and dissemination of digital technology driven RDI trends (e-Health, EdTech, FinTech, AI etc.)	- "Digital technology driven RDI trends" is not well formulated (Slovakia)	The HEI contributes to the uptake and the dissemination of digital technology trends (e-Health, EdTech, FinTech, AI etc.).
Knowledge Exchange and Collaboration		
The HEI collaborates with Quadruple Helix (QH) stakeholders to contribute to innovation driven regional development	- "Innovation driven RD" is not well formulated (Slovakia)	The HEI supports innovation in smart specialisation priority areas through collaboration with other regional quadruple helix (QH) stakeholders.
The HEI supports the regional RIS3 responsible organization(s) in strategy development and implementation		<u>Accepted as it is</u>
The HEI supports cross-sectoral (university-industry) links and mobility	- The verb "supports" should be replaced by "promotes" as it implies action (Portugal) - It's not clear the concept of cross-sectoral (Slovakia)	The HEI supports university-industry links and mobility.
The HEI performs analysis on current and future needs of society and businesses, providing knowledge to respond challenges		The HEI performs analysis on current and future needs of society and businesses, providing knowledge to respond to challenges
The Internationalized Institution		
The HEI is partner in European and international R&I projects including the cooperation with Knowledge and Innovation Communities	- Why just Knowledge and Innovation Communities? (Slovakia) - Reformulate the statement to make it clearer and easy to follow (Romania)	The HEI participates, as partner, in European and international R&I projects.

The HEI combines international orientation and local commitment linking the region to external sources of knowledge through projects and joint R&I activities	- Reformulate the statement to make it clearer and easy to follow (Romania)	The HEI connects the region to external knowledge sources.
The HEI is part of formal and informal European and international R&I networks	- Reformulate the statement to make it clearer and easy to follow (Romania)	The HEI is engaged in European and international R&I networks.
Measuring Impact		
The HEI is actively involved in RIS3 monitoring and evaluation	- It is all right to monitor but what about revisions? (Romania)	Accepted as it is
The HEI measures the impact of its own activities linked to RIS3	- An evaluation of the people/talents who work in the RIS3 mission is lacking, not only to recognize their commitment and performance but to reinforce their relevance in the dynamics of the HEI (Portugal)	The HEI measures its own contribution to reaching RIS3 objective

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