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Higher Education for Smart Specialisation Towards strategic partnerships for innovation

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Executive Summary

This Policy Brief reports on the first phase of the project on Higher Education for Smart Specialisation (HESS), which is managed by the Joint Research Centre (JRC) in partnership with DG Education and Culture. The project was established in March 2016 as a result of work by the JRC's S3 Platform which detected the need to understand more about Higher Education Institutions (HEIs) to ensure that their full contribution to S3 implementation was achieved. In particular, HESS explores how HEIs can contribute to smart specialisation more broadly than through knowledge production, appealing to their capabilities of human capital creation (in its different facets), knowledge dissemination and transfer, as well as support to entrepreneurship.

Activities of HESS

In order to respond to these aspects, the HESS project carries out two main activities. On the one hand it analyses the European policy and funding landscape to establish how HEIs can be supported in a broad sense to implement Smart Specialisation Strategies (S3). On the other it provides targeted support to selected regions in Europe by undertaking 'action research' in partnership with regional authorities, the local HEIs and other stakeholders. The first phase of the project has analysed the programming of the European Structural and Investment Funds (ESIF) and piloted action research in the regions of Navarre (Spain) and North East Romania.

Building on existing knowledge

The policy brief starts by presenting the state of play in regard to universities and smart specialisation. This work has mainly been conceptual in nature, such as a previous JRC policy brief from 2013. The HESS project follows a much larger amount of research and experience into how universities can contribute to innovation and regional development, and the policy brief analyses some of the main contributions, including concepts such as the 'entrepreneurial' and 'civic' university, which have made their way into policy making, most recently the Communication on a Renewed EU Agenda for Higher Education (European Commission 2017a). The policy brief tries to operationalise some of this conceptual background with a framework that is used to analyse the results of the pilot case studies. It sets the scene for building an evidence base for HESS.

Baseline of evidence

A baseline has been established for HESS in two ways. Firstly, a survey of the S3 Platform from 2015 has been analysed to establish how regional authorities perceive HEIs and their role in smart specialisation. It shows a clear demand for wider partnerships that cover all their activities, rather than just their mission of knowledge production. A second part of the baseline analyses the European funding framework, and in particular the European Social Fund (ESF), to establish the extent to which it is supporting the development of human capital for innovation. The results show that the overall budget is much lower than for research under the European Regional Development Fund (ERDF), and moreover is very unevenly distributed across the European Union. This data will be complemented in the future with information on actual spending and projects supported, but indicates where to look for evidence of how European funds can help mobilise HEIs in a broad sense, which is the main objective of the project.

Piloting action research

In order to understand the regional context for building partnerships with HEIs, in-depth case-study research is the most appropriate method. However, the HESS case studies are not just about collecting information; building on the JRC's experience with the S3 Platform peer reviews and its targeted support to lagging regions, principles and methods of action research have been adopted. At its core, this means that the research will have an impact on the object being studied (in this case the partnership between regions and HEIs), and is therefore also akin to capacity building. HESS aims to co-produce knowledge with regions in Europe and build a community of practice among them. The pilot case studies were selected deliberately because of their different regional contexts in terms of levels of innovation and policy competences. In the case of North East Romania it was the first time that the Regional Development Agency and the universities came together to discuss a regional strategy. In the case of Navarre, which has followed a regional innovation strategy for the last two decades, the action research had a different purpose, namely to explore more specific problems in cooperation, such as the link with vocational education and training and between the two main universities. The results are analysed in one section of the policy brief, but are fully reported in separate JRC technical reports (Campillo et al. 2017, Marinelli et al. 2017).

Policy recommendations

The HESS project cannot yet make very specific policy recommendations at EU level while the evidence base is still being built – although the two case study reports do this for those regions. The intention is that following another round of action research in the next project phase, a handbook for regional authorities will be produced that will provide much more practical guidance on how to build a partnership with local universities in the context of smart specialisation. However, based on the analysis of surveys and cases studies in this first phase, it emerges that the European funding landscape and regulatory environment provide limited scope for HEI engagement in S3 beyond research activities. Smart specialisation is confined to one part of the ERDF that focuses much more on research compared to the capabilities of HEIs to develop and retain talent, foster entrepreneurship and engage with business on their human capital needs. Therefore the main policy recommendation is to explore measures to better support human capabilities for innovation and application of new technologies, especially in Europe's less developed regions.

1 Introduction

Smart specialisation is the EU's flagship approach for knowledge based regional development.¹ It underpins the Cohesion Policy, since EU Member States are required to have Smart Specialisation Strategies (S3) to spend Thematic Objective one (TO1) of the European Structural and Investment Funds (ESIF) on Research, Innovation and Technological Development.² Elements of the Horizon 2020 programme are linked to smart specialisation and guidance has been produced on creating synergies with the ESIF.³ However, while there is still a lack of evidence on the results, it is becoming clearer that the success of S3 depends on a much closer integration of several other policy areas, not least Higher Education (HE). This is the main motivation behind the JRC project on Higher Education for Smart Specialisation (HESS), initiated in partnership with DG Education and Culture. This policy brief presents results from the first phase of the HESS project.

Although smart specialisation is closely linked to spending TO1 of the ESIF, guidance from the European Commission has always highlighted that S3 is best served by a comprehensive policy mix (European Commission 2012, 2014b). However, this has been difficult to implement for a number of reasons. Firstly, priority setting was a challenging and long process, and policy mixes have consequently tended to receive less attention. Secondly, priorities are often technologically defined and knowledge production orientated without consideration of economic demand, an essential factor but one which requires a more integrated policy mix. Thirdly, S3 governance structures that integrate ministries and stakeholders at different geographical levels have not operated well or have not even been activated. Finally, and perhaps most importantly, from the EU level down there have been few concrete incentives to integrate a broader range of policies. The natural outcome is that – notwithstanding notable examples – smart specialisation is not widely considered outside the confines of ESIF managing authorities responsible for TO1.

In the HESS project Higher Education Institutions (HEIs)⁴ are considered broadly, across the spectrum of all their activities, from research to

¹ For information and analysis on the smart specialisation concept and its implementation see: <http://s3platform.jrc.ec.europa.eu/knowledge-repository>

² The ESIF have 11 Thematic Objectives, laid out in Article 9 of EU Regulation No 1303/2013

³ The potential for combining the EU's Research and Innovation framework programmes and the ESIF is described in European Commission (2016)

⁴ The terms universities and higher education institutions (HEIs) are used interchangeably and refer to public or private institutions that teach from undergraduate level and/or are involved in research activity

education and external engagement. The policy brief starts with a review of the conceptual frameworks that help outline how HE can contribute to smart specialisation. The second part provides an overview of how HEIs are involved in the design and implementation of S3 across Europe based on two sources: firstly, it draws on a survey of the S3 Platform, a network of national and regional authorities responsible for smart specialisation, coordinated by the JRC. Secondly, it gives an overview of the EU funding framework, focusing in particular on the ESIF and the extent to which the European Social Fund is being deployed to implement S3. The third part of the policy brief analyses two case studies that were selected by the HESS project as pilots for action research. These case studies had three aims: firstly to find out if and how HE is considered as part of the S3 process (the research); secondly to promote closer partnerships between regional authorities and the local HEIs to strengthen their role in smart specialisation (the action); and, last but not least, the case studies helped to advance the conceptualisation of HEIs in S3 implementation. The final part attempts to draw some policy lessons, reflects on the first twelve month phase of the HESS project and suggests new research questions and methods.

2 Conceptual background

Universities and other HEIs have a great deal to contribute to and gain from involvement with S3 (Goddard et al. 2013). Their potential goes far beyond their function as producers of new research, particularly in lagging or peripheral regions where supplying and creating demand for human capital and skills is likely to be a more critical contribution to building regional capacity than research (European Commission 2015, Kempton 2016, Vallance et al. 2017). The HESS project looks at all the activities and missions of HEIs, but pays particular attention to their role in nurturing human capabilities, both in terms of hard skills (especially STEM disciplines) but also other skills in support of entrepreneurship and knowledge management, which together with the application of new technologies can have a big impact on a region's development. It also recognises that there is no 'one size fits all' model for how HEIs are involved in S3 and that the place specific context will largely affect their role and contribution (See Box 1).

2.1 Models of university engagement

Since the mid-1990s academics and policy makers alike have attempted to characterise and codify relationships between universities and their contribution to local development, innovation and economic growth (Clark, 1998, Etzkowitz and Leydesdorff, 1995). However criticisms of these models point to an overly narrow focus on research in physical sciences and technology transfer which neglects teaching and knowledge transfer through students, the role of humanities and social sciences, and engagement with place-based communities and civil society more generally. This has generated a new literature around more holistic, non-linear models of university interactions with the outside world (Gunasekara 2006), partly driven by the aftermath of the economic crisis of 2008/9 and the need to respond to the growth of 'grand challenges' which have local as well as global implications (e.g. ageing population, climate change, migration etc.). These models attempt to capture the development of universities over time from the 'Ivory Tower' stereotype and are compared in Table 1. However, caution should be taken with labels – both for the reason of diversity highlighted above and because different policy makers and academics have used the same term to describe different characteristics of HEIs. For example, the HEInnovate self-assessment tool adopts the term 'Entrepreneurial HEI' to describe the

attributes, objectives and activities⁵ of HEIs in a way that is closer to the concept of the civic university (Goddard, 2009) than that of the entrepreneurial university (Etzkowitz, 2013). This is illustrated by a concept note from HEInnovate, where Gibb et al. (2014) write that:

"Entrepreneurial higher education institutions are designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursuit and use of knowledge across boundaries. They contribute effectively to the enhancement of learning in a societal environment characterised by high levels of uncertainty and complexity and they are dedicated to creating public value via a process of open engagement, mutual learning, discovery and exchange with all stakeholders in society - local, national and international."

Table 1: Models of university engagement

Model	Ivory Tower	Entrepreneurial University	Civic University
Characteristics	Traditional teaching methods for the elite, curiosity research, disciplinary silos.	Strong focus on research, technological innovation, commercialisation and business development which involves mobilising the resources of the university for the benefit of the economic development of the city or region.	Engagement embedded across the whole institution, providing opportunities for students, businesses and public institutions; managed to facilitate institution-wide engagement with the city and region of which it is part; operates on a global scale but uses its location to form its identity.
Concepts		Triple helix, science parks, technology transfer, incubators	Engaged research and teaching, science with and for society, quadruple helix, smart specialisation
Authors/References		Etzkowitz (2013)	Goddard (2009), Goddard et al (2016), European Commission (2017)
International networks/tools	Campus Engage; Talloires Network; U-Multirank; Global University Network for Innovation (GUNI); HEInnovate; University Industry Innovation Network (UIIN)		

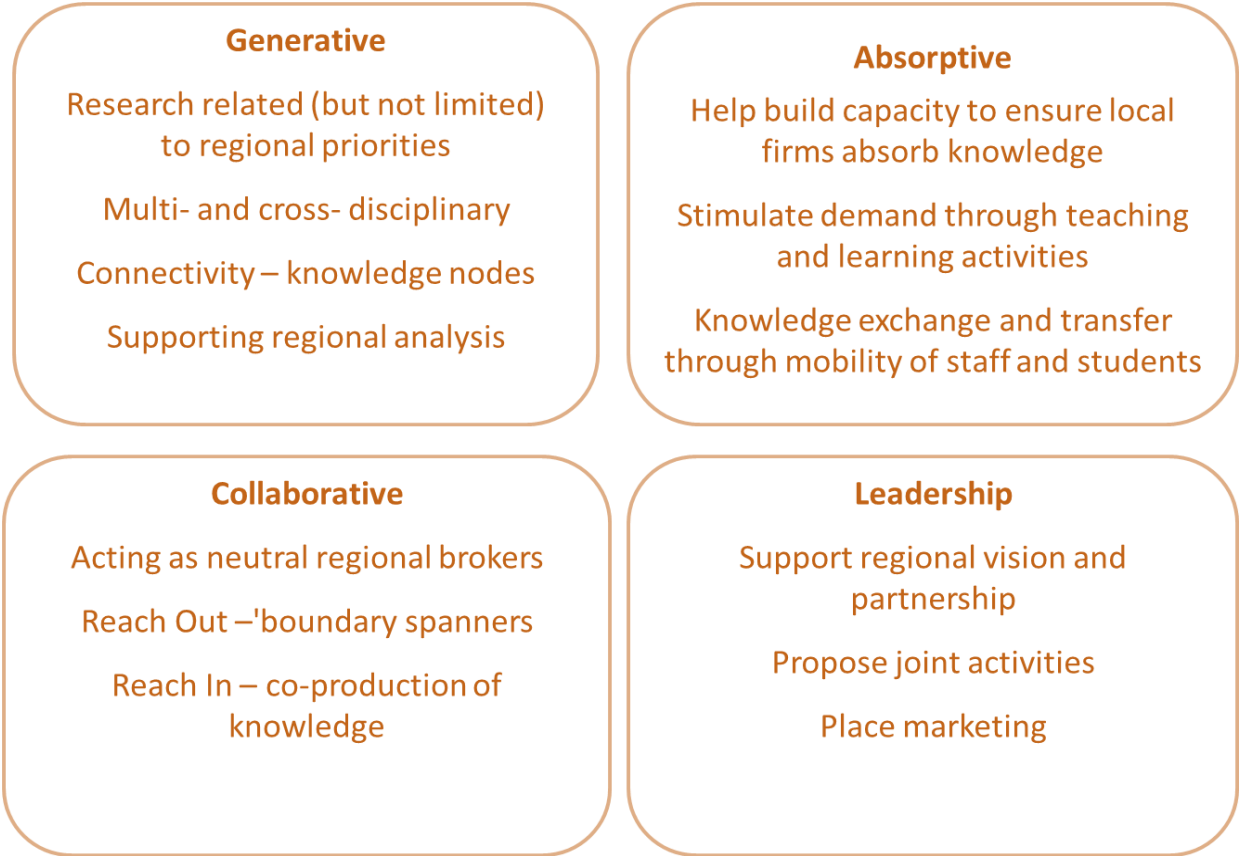
⁵ For more information about this framework see: <https://heinnovate.eu/en>

In section 2.3 where we introduce the analytical framework used by HESS so far, we refer to the different models in Table 1. However, whereas our framework is more connected to that of the civic university, on a policy level it is very similar to the objectives of HEInnovate, but with a stronger place based dimension.

2.2 Universities and Smart Specialisation

The perceived importance of universities in the smart specialisation process led to a first S3 Platform policy brief (European Commission 2013). It identified four types of capacities in universities which could allow them to play a significant role in the definition and implementation of S3, as shown in Figure 1. It also analysed the obstacles and barriers which prevented them from assuming this role, most notably the lack of mutual understanding between them and those responsible for the S3. Finally, it highlighted that the focus of policy makers has historically been on the contribution of universities to the supply side (i.e. generating research, sources of new businesses and human capital etc.) while in lagging or peripheral regions weaknesses on the demand side (e.g. low levels of absorptive capacity among the local private sector) have constrained the level of university/region cooperation for innovation.

Figure 1: Capacities of universities in the context of smart specialisation



2.3 Analytical framework for the comparison of HESS case-studies

Since the 2013 policy brief there have been a number of initiatives that have explored the role of universities in S3, including the Erasmus+ Thinking Smart project,⁶ the European University Association's S3 working group⁷, examples from the S3 Platform (European Commission 2014), and the JRC project on Targeted Support to Lagging Regions.⁸ This empirical work has allowed the identification of key dimensions of S3 development and implementation and the mechanisms through which HEIs can support them. These are set out in Table 2 and are used to compare the two pilot HESS case studies in section 4 of this policy brief:

Table 2: Framework to analyse the contribution of HEIs to S3

Element of Smart Specialisation	HEIs' related activities
Entrepreneurial Process of Discovery (EDP)	Contribute through applied and interdisciplinary research Horizontal skills among graduates
Support to a limited selection of priorities	Evolution of curricula and research portfolios to emerging priorities
Innovation for all regions – Place based approach	Embedded in regional governance Importance of the social sciences
Broader understanding of innovation and research	Respond to regional challenges Beyond third mission.

Entrepreneurial Discovery Process (EDP): The term originally referred to the identification of areas for investment in research and innovation (i.e. priority-areas), through an inclusive and evidence-based process grounded in stakeholders' engagement. As indicated by Marinelli and Periañez (2017) the EDP is better seen as a continuous activity, which continues throughout S3 implementation. In this context, universities need to develop capabilities to engage and interact with the private and public sectors, with the aim of jointly identifying, reviewing and revising priorities. This requires an understanding of entrepreneurial and market dynamics as well as policy processes. In this sense, universities that are able to engage in applied and inter-disciplinary research are best suited to engage in the EDP. In this context, universities can play a highly valuable role in absorbing knowledge from outside the region and applying it to the local context (European Commission 2014).

⁶ <http://thinkingsmart.utad.pt/>

⁷ [http://www.eua.be/policy-representation/research-innovation-policy/research-and-innovation-strategies-for-smart-specialisation-\(ris3\)](http://www.eua.be/policy-representation/research-innovation-policy/research-and-innovation-strategies-for-smart-specialisation-(ris3))

⁸ <http://s3platform.jrc.ec.europa.eu/ris3-in-lagging-regions>

Support to a limited selection of priorities: The most significant aspect of smart specialisation is the selection of priorities to channel funding and other strategic policy decisions. Universities are critical actors in supplying ideas and human capital that underpin priorities. Many are likely to have specialisms related to the regional priorities (and indeed contributed to their definition as discussed above). As priorities evolve and are better understood, training and research needs are likely to evolve or emerge (i.e. targeting more specific population; covering new niches, etc.). Universities are critical in addressing these aspects, in organising activities to upskill the existing workforce, in collaboration with other forms of education (further education, vocational and technical training).

Place based approach to innovation: Smart specialisation was adopted by the Cohesion Policy, thus giving it a strong place based dimension (McCann and Ortega-Argilés 2013). A place-based policy aims to realise the potential of local assets through tailored interventions (as opposed to 'one size fits all') and a strong 'bottom-up' engagement supported by an adequate institutional and governance set-up (Barca 2009). HEIs can support a place-based approach to innovation policy by contributing to the identification of regional priorities, in line with their own strategies and capabilities. At the same time, their ability to benefit from a place-based strategy depends on the strengths of their systemic links to the regional innovation system. In such cases HEIs have spaces to interact with regional authorities and the entrepreneurial community, either through looser arrangements (e.g. ad hoc meetings/fora) or more formalised ones (e.g. sharing committees, participating in governing boards).

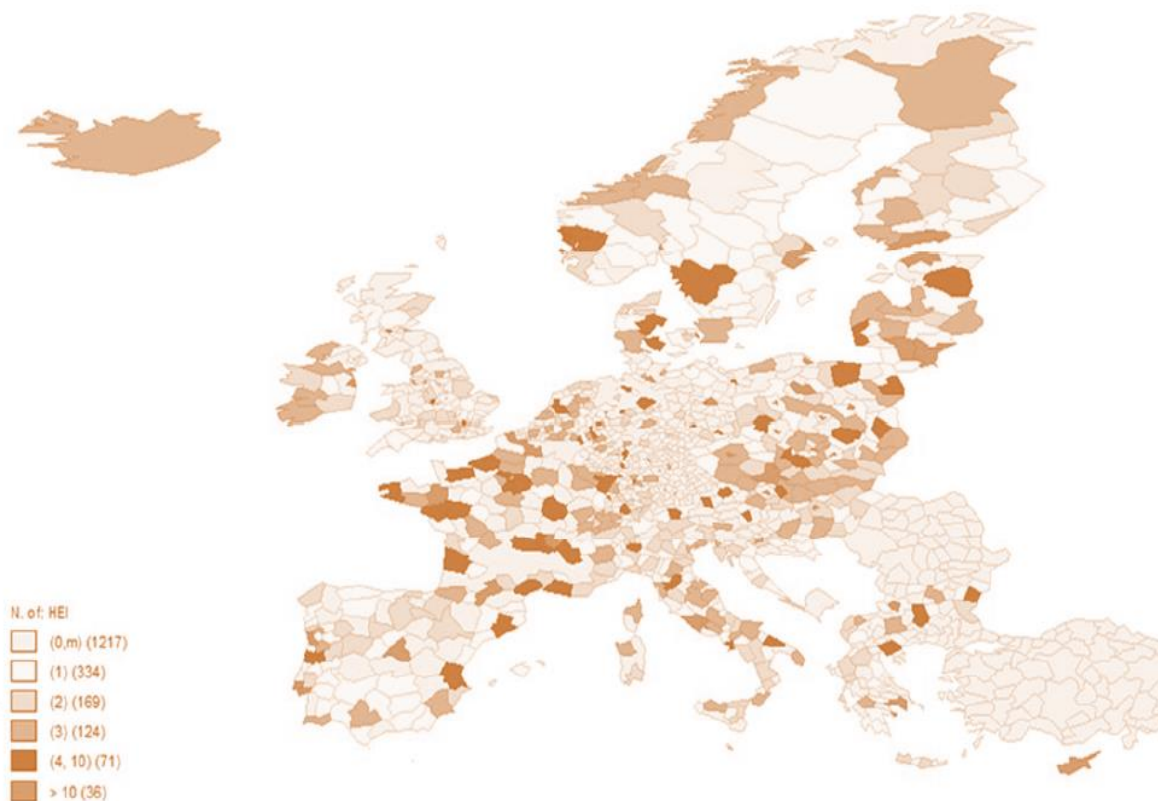
An HEI that embeds its activities and governance follows most closely the 'Engaged' and 'Civic' models of universities in Table 1. At the same time, the place-based approach in smart specialisation would promote multiple models and tools for HEI engagement, depending on their profiles and potential, which can be contingent on both regional context and external factors such as the national regulation of higher education. These factors are summarised in Box 1.

The strength of HEI engagement within S3 should not be understood exclusively in terms of STEM disciplines. Rather, social sciences and humanities also have their role to play. At a more general level, social scientists can detect and articulate societal challenges and interpret stakeholder positions in light of broader contextual factors that can ultimately support a more precise identification of S3 priorities. At the same time, humanities and social sciences may, in their own right,

provide opportunities for interdisciplinary research and innovation that would otherwise go undetected. Through smart specialisation they offer opportunities for collaboration between university departments, such as in the field of cultural heritage, which is strongly linked to important economic sectors such as tourism. Similarly, fields like telemedicine, which build on engineering and medical skills, can be enhanced by a good understanding of socio-demographic trends.

A broader understanding of research and innovation – Smart specialisation promotes a broader understanding of research and innovation, in both process (compared to linear models) and objectives (for example social or eco innovation). Hence, the emphasis so far placed on 'technology transfer' and the concept of the 'entrepreneurial university' in the sense of commercialisation of knowledge, should be broadened to include elements identified by the civic university literature. In the engaged or civic university model shown in Table 1, research and teaching also address societal challenges and HEIs systematically engage with a large number of stakeholders (including customers and civic society at large) not just firms.

Figure 2: Distribution of HEIs in Europe



Source: European Tertiary Education Register (2017)

Box 1: Factors that influence HEIs engagement in regional development

Regional context: Regions vary in terms of size, population and other demographic characteristic, with different patterns of economic development and innovation, depending on historic conditions, path dependencies and firm composition. These factors impact on the potential of universities to contribute to regional development. For example, in a region with very low levels of skills and aspiration among the population, the presence of a university alone is not enough to raise levels of human capital, and additional interventions will be needed to create the stepping stones to higher education (e.g. improvements in secondary education, outreach programmes, sandwich courses etc.)

Nature and structure of higher education: The HE landscape varies widely across EU regions. More than one third of NUTS 3 regions have no university, a quarter have just one while others (notably in metropolitan areas) have multiple universities, as depicted in Figure 2. There may be a mix of public and private, research intensive and vocational, large and small. Issues related to student recruitment, origin and retention as well as pedagogical methods and new trends in HE (such as distance or structured learning) and links to professional and vocational education all have a bearing on the extent to which local universities engage with the regional strategy.

Policy and governance of higher education: In some places there are high levels of autonomy for both the institutions *and* academics. This means that policy makers have limited capacity to intervene in shaping HE activities and university leaders might not be able to make academics contribute to regional development. Funding also has an influence as it drives behaviour within universities. If the emphasis is on 'research excellence' (as defined by international league tables) then universities and their staff may not see much incentive in working locally. There are also questions to consider around the extent to which higher education policy is either spatially blind or place sensitive – have HEIs been deliberately placed in HE and research 'cold spots'? What does this mean for their links to other regional actors?

Policy and Governance of Territorial Development - There are a range of governance models across Europe, including federal systems (e.g. Germany), autonomous regions (e.g. Spain) and centralised systems (e.g. Romania). Understanding the policy and governance of territorial development is important in assessing the potential of universities (and other actors) to become involved in S3. Devolved regions will often have greater powers and control over funding mechanisms that can be deployed to incentivise contributions to regional development compared to countries where policy and decision making takes place centrally.

3. EU wide overview of regions and funding

3.1 Survey of the S3 Platform

In 2011 the S3 Platform was established at the JRC to provide advice to national and regional authorities on the design and implementation of their S3. A total of 179 regions and 20 countries have joined the Platform.⁹ In 2015 a survey of its members was carried out to understand the role of different institutions in smart specialisation. The survey included several questions about how regional and national authorities perceive HEIs¹⁰ and therefore provides a good baseline for HESS, even though it was undertaken a year before the project was launched.

The survey was sent to 354 policy makers from the S3 Platform database. Altogether, 138 responses were received from 87 authorities, representing 25 different EU Member States and two candidate countries. 24 of the responses were from the national level and 114 from regional representatives. Among the regional responses 35 are classified as less developed regions for the purposes of ESIF eligibility, 16 as transition regions and 63 as more developed regions. A cross tabulation of results according to eligibility statuses allows an analysis of how regions perceive the role of HEIs in different regional settings, which results in four principal observations.

Firstly, as illustrated in Figure 3, the survey shows a strong disconnection between research and innovation in less developed regions. While over a third of respondents from these regions thought the levels of research were strong, only 13.9% believed this to be the case for innovation. This compares with transition regions where the gap is smaller, and more developed regions where innovation is considered to be stronger than research (although research is still considerably stronger than the other two categories of region). The graph suggests that in less developed regions research capabilities are perceived as disconnected from innovation, questions how the former can enhance the latter, and what other elements of the innovation system should be supported.

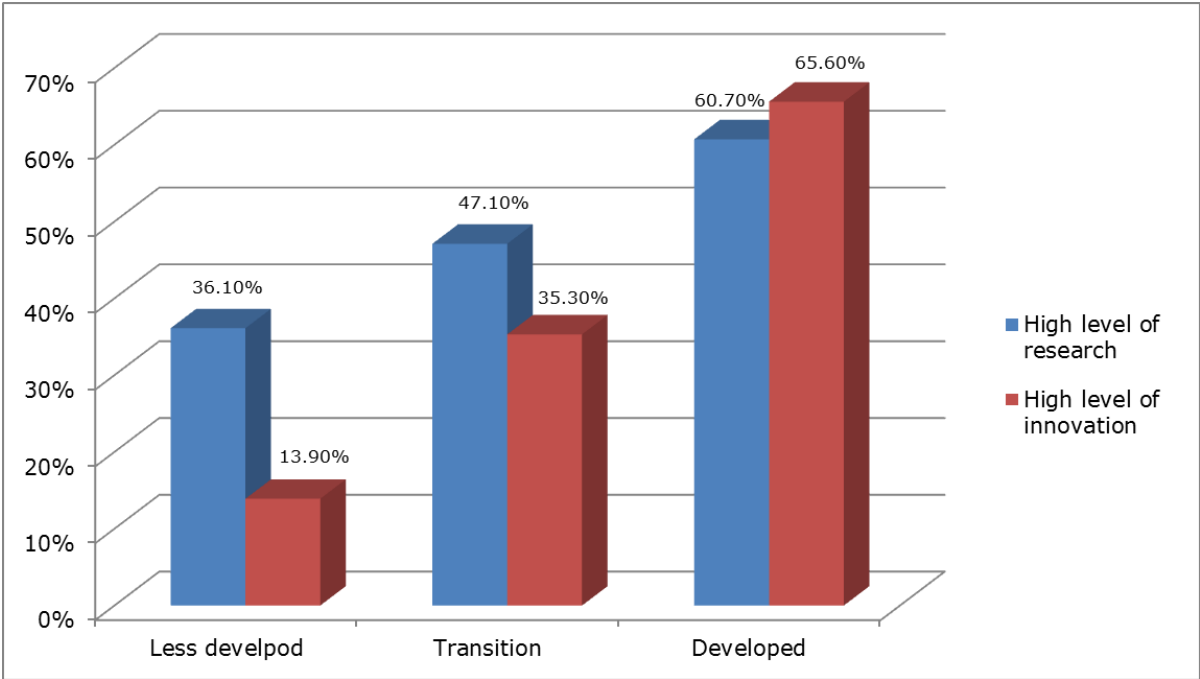
Secondly, although a high proportion of regions in all categories reported that universities have been highly involved in S3 development, their engagement with the region is seen to be more related to self-interest and short term financial gain rather than a mutual beneficial partnership. This is shown in the free text comments made by regions as well as in the

⁹ This includes nine regions and two countries from outside the European Union.

¹⁰ A survey of HEIs on how they perceive their role in smart specialisation may be launched in the future, using data from the European Tertiary Education Register (ETER).

answers to a question on whether universities were "protective of their own interests": in less developed regions 33.4% strongly agreed (score of six or seven from seven) compared to 21.3% in more developed regions.¹¹ Many regions reported a widening role for universities as a result of smart specialisation. Whereas respondents from more developed regions mostly highlighted links with business, especially in engineering subjects, those from less developed regions were more likely to underline the role of local universities in the process of strategy formation, including 'entrepreneurial discovery' and governance structures.

Figure 3: Perception of levels of research and innovation in S3 Platform regions (% of respondents giving a score of five or above from seven)



Source: S3 Platform Survey on Institutions and Smart Specialisation

Thirdly, the survey shows that in less developed regions universities appear to have less capacity to apply and engage in publicly funded innovation projects compared to their counterparts in more developed regions. The survey highlights the need for many universities, especially in Central and Eastern Europe, to build the skills and capabilities to apply for European projects and successfully deliver them.

Finally, and most significantly for the HESS project, the survey reveals that higher education is much more important for less developed regions in their efforts to build innovation capabilities. One of the survey questions

¹¹ Similar results were reported in a Fraunhofer survey of S3 actors who perceive universities firstly as representatives of their own interests (Kroll 2016).

asked respondents to rate the importance of six different policy areas, and in the case of higher education, 25% from less developed regions gave the highest score compared with 11.5% from more developed regions. This is illustrated in Table 3 along with a similar difference in importance attached to vocational training between categories of region. In their comments, respondents from less developed regions were much more likely to refer to vocational training and lifelong learning, as well skills gaps, when asked about the role of universities, showing that the role of higher education needs to be widened substantially in these places to meet demand. For example, a respondent from a region that is much less developed compared to its country as whole, commented that "in our region we have a complete deficit of [vocational skills and lifelong learning], where the competencies of the workforce does not fully correspond to the competences and skills that the firms need to be competitive in a globalised economy".

Table 3: Importance of different policy areas for the implementation of S3 (% of respondents who gave a score of seven out of seven)

Policy area	All	Less developed regions	More developed regions	North West Europe	Southern Europe	Central & Eastern Europe
Higher Education	16.20	25.00	11.50	8.00	20.00	24.20
Vocational training	12.50	17.10	8.20	6.00	12.20	23.50
Research and science	42.80	47.20	37.70	41.20	36.00	55.90
Innovation in firms	66.70	69.40	65.60	64.70	66.00	70.60
Infrastructure investments	13.80	19.40	13.10	7.80	14.00	20.60
Social innovation	15.30	25.70	14.30	7.80	28.00	9.10

Source: S3 Platform Survey on Institutions and Smart Specialisation

Overall, the S3 Platform survey reveals the challenges for building partnerships between regions and universities in less developed regions. In these places universities are being asked to take a wider role than before, putting pressure on their ability to deliver. The ESIF may be able to help, and therefore an overview of the European funding landscape can help to set the scene for the HESS project.

3.2 European Structural and Investment Funds: some insights on their ability to support HEIs

The European Commission encourages national and regional authorities to deploy a range of funding instruments to help implement their S3 – in addition to broader structural and legislative reforms to develop regional innovation systems (European Commission 2012). Nevertheless, the

immediate concern is that European funding programmes are designed and managed in a way that contributes to smart specialisation. There are two types; on the one hand the European Commission's centrally managed programmes for research and innovation (Horizon 2020), enterprise (COSME) and education (ERAMUS+); on the other hand a large amount of financial resources are available through the ESIF. Synergies between the two types are being promoted and analysed,¹² but smart specialisation is most relevant to the ESIF because S3 is an 'ex-ante conditionality' of spending these funds on research and innovation (TO1).

As expected, initial analysis shows that a very high proportion of funding calls of ESIF Operational Programmes (OPs) under TO1 on research and innovation (R&I) have S3 related selection criteria (Giannelle et al. 2017). While data on actual spending and project beneficiaries will soon become available, HEIs are undoubtedly significant beneficiaries under this thematic objective. Although this will hopefully align research portfolios more closely to S3 priorities and promote technology transfer, it does not cover a critical element for regional development, namely human capital, for which the most relevant fund is the European Social Fund (ESF). In particular, the most specific thematic objective for higher education is TO10 on Investing in education, training and vocational training for skills and lifelong learning. The other relevant TOs are 8 (Promoting sustainable and quality employment and supporting labour mobility) and to a lesser extent 9 (Promoting social inclusion, combating poverty and discrimination).

The move back to multi-fund OPs¹³ comprising both ERDF and ESF has provided an opportunity to harness the ESF to implement S3 in an integrated way. However, as will be shown, its use for innovation is limited and highly heterogeneous across Member States. There is an obvious reason for this: the ESF and ERDF have been designed and are being managed independently at the EC level and often are implemented by different managing authorities at national and region levels.

At the beginning of the HESS project it is useful to establish exactly how the ESF can be used for innovation and S3 implementation, and where in the EU these funds have been programmed. As spending and beneficiary data becomes available it will be possible to assess how the ESF is actually spent and make recommendations for the future programmes. In this section data from the European Commission's Infoview database is used

¹² See the JRC project 'Stairway to Excellence': <http://s3platform.jrc.ec.europa.eu/stairway-to-excellence>

¹³ In the 2007-2013 programming period only single fund OPs were permitted.

to analyse the programming of ESF. A keyword search is also applied to a group of countries to give an initial idea of what type of projects could be funded.

In addition to the eleven TOs and their Investment Priorities established by each fund, the ESIF are programmed and monitored across more specific 'dimensions', including:

- 123 Intervention Fields;
- 7 Forms of investment (grants, prizes or financial instruments);
- Types of territory (scale from largest urban or most rural);
- 7 Territorial Delivery Mechanisms; and
- 8 ESF Secondary Objectives

For the purpose of the HESS project, the most interesting dimensions are the intervention fields and ESF secondary objectives, although others may be useful for future research questions. Box 2 lists the ESIF dimensions most likely to cover funding for research, education and innovation activities of HEIs. It must be stressed that categorising programmed funds is approximate; it is likely that projects benefitting HEIs may be categorised in different intervention fields than those listed in the table. Accurate figures on beneficiaries will only be possible by analysing project data.¹⁴ However, these dimensions are useful for establishing the overall picture of spending related to the missions of HEIs.

Box 2: Dimensions of the ESIF most relevant to HEIs

Intervention fields related to Higher Education

049 - Education infrastructure for tertiary education

116 - Improving the quality and efficiency of, and access to, tertiary and equivalent education with a view to increasing participation and attainment levels, especially for disadvantaged groups

Intervention fields related to Research

058 - Research and innovation infrastructure (public)

059 - Research and innovation infrastructure (private, including science parks)

060 - Research and innovation activities in public research centres and centres of competence including networking

061 - Research and innovation activities in private research centres including networking

062 - Technology transfer and university-enterprise cooperation primarily benefiting SMEs

ESF Secondary Objectives

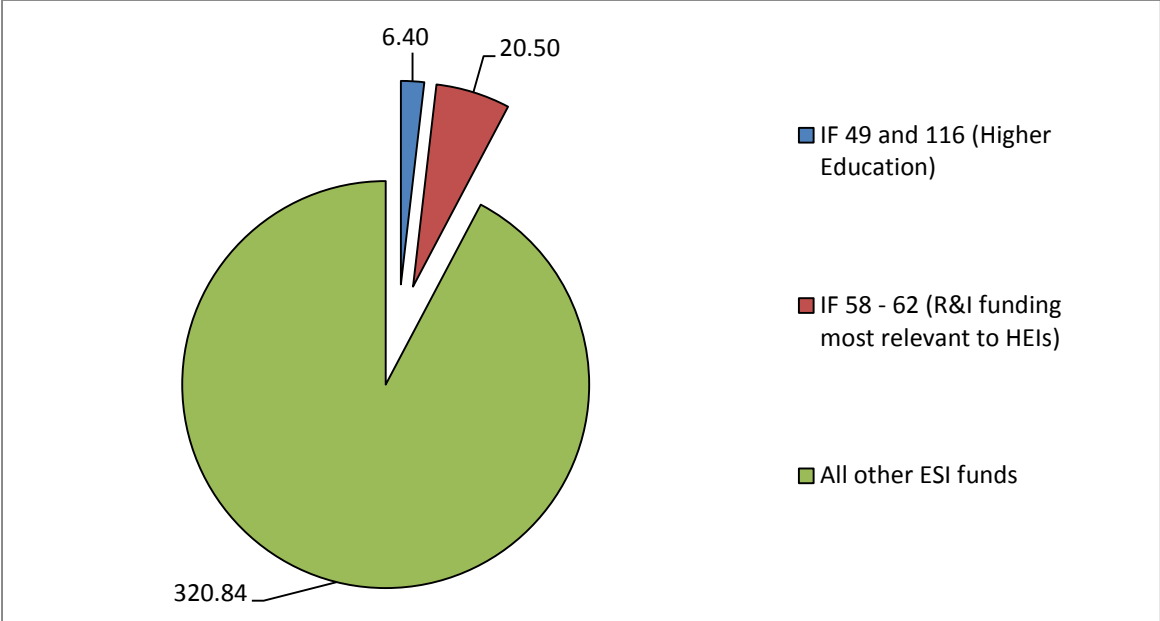
04 - Strengthening research, technological development and innovation

¹⁴ Data on project beneficiaries are not communicated to the Commission but Managing Authorities are obliged to publish it online (Article 116 Regulation 1303/2013)

The most comprehensive dimension of the ESIF for analysing the content of programmes is the intervention field. However, for the purposes of the HESS project, the **ESF Secondary Objective on Strengthening research, technological development and innovation** is likely to give the clearest indication as to the volume and distribution of funds that may be spent on human capital and more specifically higher education in order to implement S3.

There are two striking observations from analysing this programming data. The first is the very small proportion of the ESIF available for higher education compared to other elements of human capital, and certainly compared to research. Figure 4 shows that just €6.4 billion is categorised for spending on higher education, including infrastructure. This compares to more than €20 billion in the categories of intervention related to research for which HEIs are likely to largely benefit. Furthermore, there is just over €1.6 billion categorised under the ESF Secondary Objective for R&I, which represents just 0.46% of the entire budget of the ESIF.

Figure 4: Planned investments from the ESIF by Investment Fields most likely to benefit HEIs (in billion €)



The second main observation from analysing the ESIF is that support for non-research activities of HEIs is very uneven across the European Union. Figure 5 shows that almost half of the total amount of funds programmed for improving the quality and efficiency of tertiary education (Intervention field 116) can be found in just two Member States (Poland and Portugal). As for the ESF Secondary Objective on Research and Innovation, the

situation is even more heterogeneous. Figure 6 shows that 80% of this €1.6 billion is programmed in just four Member States (Germany, Spain, Portugal and the Czech Republic). It is also possible to see how much of this ESF Secondary Objective is included in the main ESF Thematic Objectives (8-10), giving a clear picture where higher education may contribute to smart specialisation through the support of ESIF. It shows that the total amount of €893 million contributing to TO10 is distributed more evenly than for the other TOs, although there is a large concentration in three Member States (Spain, Germany and the Czech Republic). In Portugal a larger amount contributes to labour market interventions (TO8) but in many other countries, notably the Czech Republic, this ESF secondary objective relates exclusively to education.

When analysed at the level of Operational Programmes, it allows us to identify the programmes where the most funds have been programmed according to these criteria. While these planned investments may not be implemented, it indicates which regions could be analysed further. Figure 7 shows the ten programmes with the most planned investment under TO10 that also contributes to the ESF secondary objective for R&I. The most significant programme by a large margin is the Czech national ESF/ERDF programme for Research Development and Education.

Figure 5: Planned investments from the ESIF under Intervention Field 116 by EU Member State (in million €)

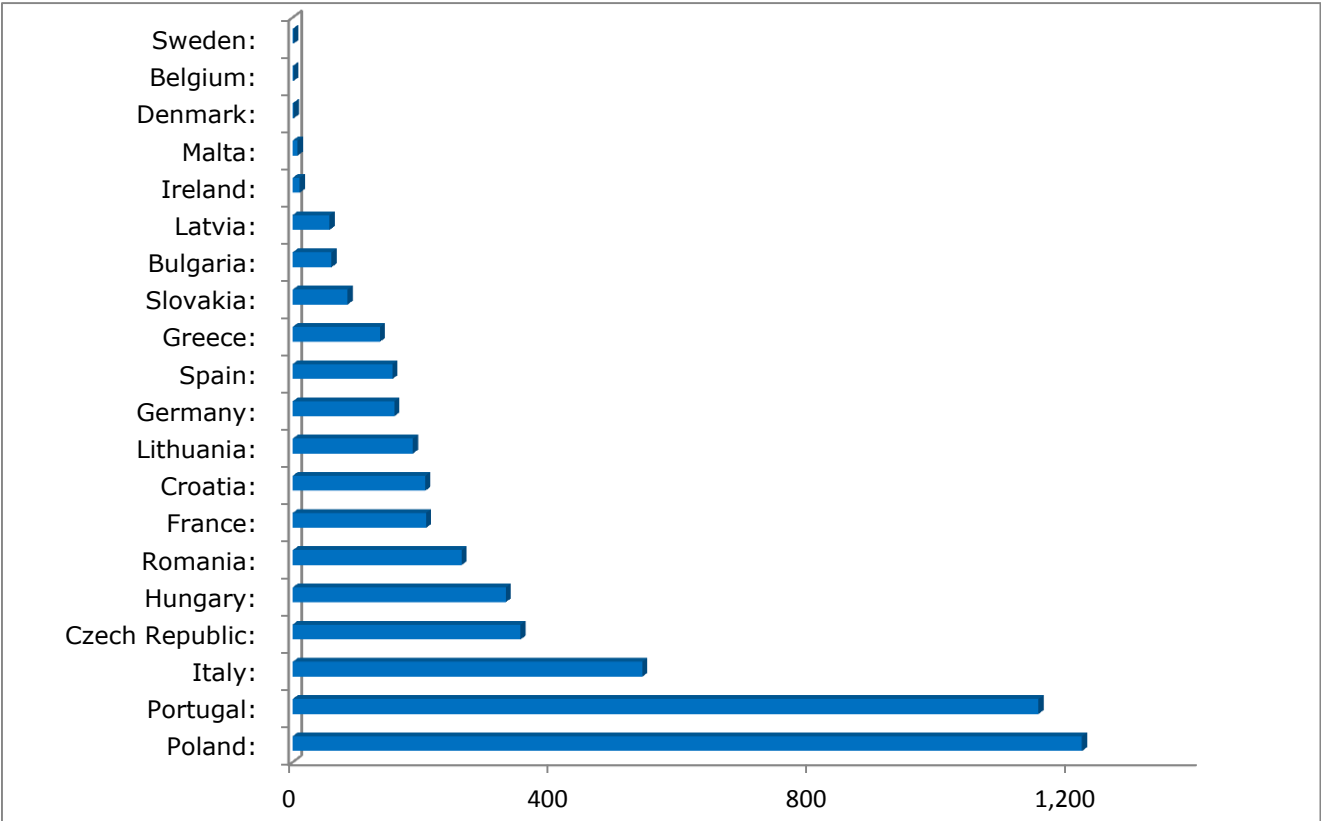


Figure 6: Planned investments from the ESIF by ESF Secondary Objective on Research and Innovation linked to Thematic Objectives (in million €)

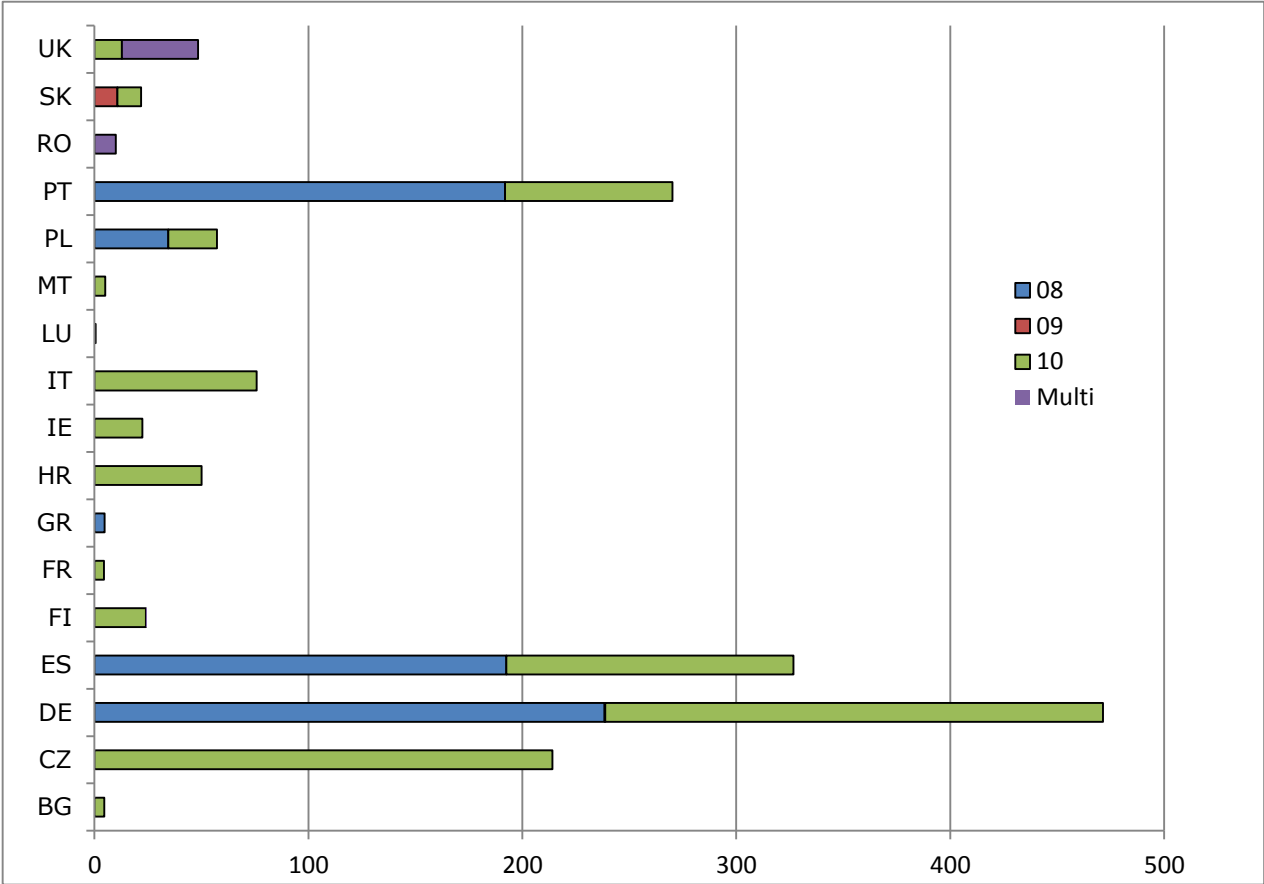
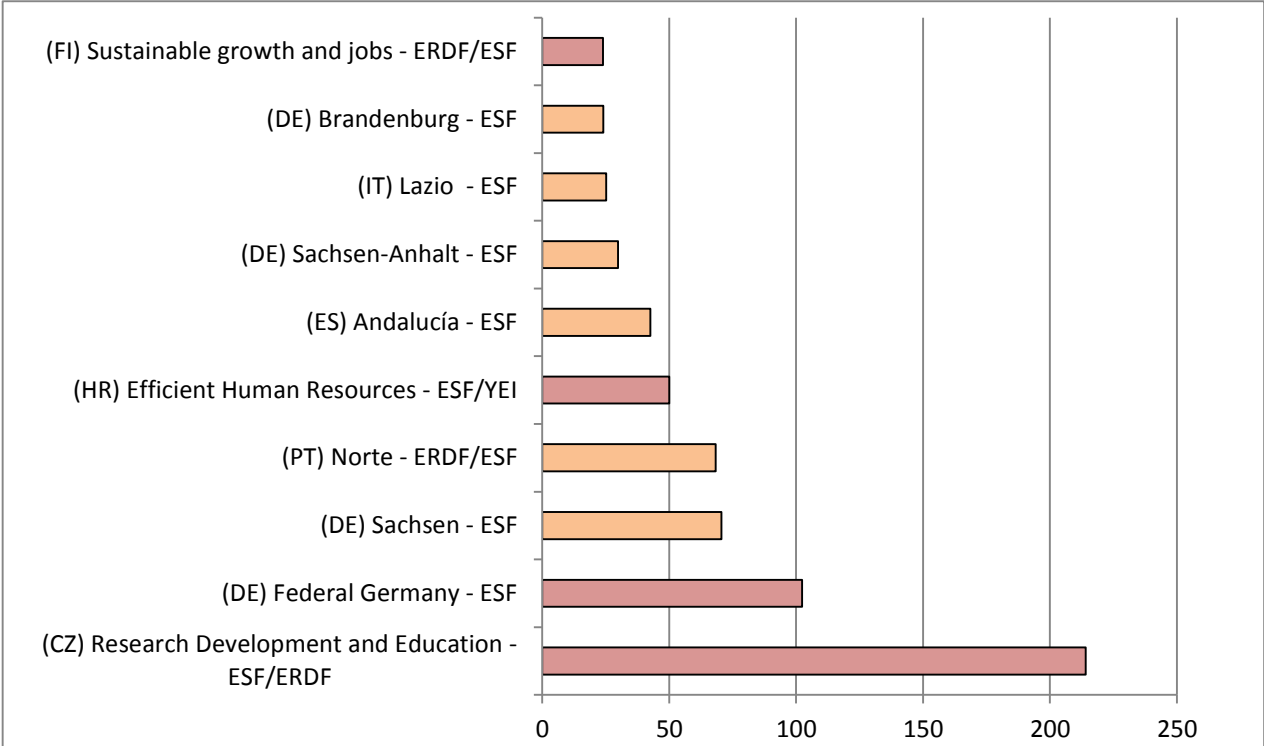


Figure 7: ESIF Operational Programmes most relevant for HE spending on innovation (classified as both TO 10 and ESF secondary objective on R&I)



This analysis of the programming data provides an overview of how the budget of the ESIF is distributed across themes and regions. However, to understand better the content of the programmes, we have performed a pilot key word search for six of the main EU languages: English, French, German, Spanish, Italian and Polish. Programmes written in these languages were searched for both a list of single keywords and for coincidence in the same statements of a more limited number of core keywords (e.g. smart specialisation, universities, higher education). The results, displayed in Table 4, show that as expected the more generic keywords such as higher education, degrees and universities are recorded many times. More specific keywords such as the entrepreneurial university, PhD studies or university management are recorded much less. Combined terms are also rare but the results of this pilot do allow us to identify the Operational Programmes in which they feature, and thus the possibility for further analysis.

Table 4: Results of ESIF Keyword search related to Higher Education and Smart Specialisation

Single terms			
Academia	45	Lifelong learning	62
Business support	28	Lifelong training	11
COFUND	3	Master's course	6
College, colleges	28	Master's degree	12
Continuous education	48	Mobility of researchers, Research mobility	36
Curricula, curriculum	32	PhD candidates	16
Degree course, degree courses	104	PhD studies	3
Degree, degrees	117	Polytechnic, polytechnics	4
Doctoral programme	3	Postdoctoral	6
Doctorate	4	Postgraduate	13
economic impact	15	Rector	1
Education	128	RIS3	1
Entrepreneurial university	1	Science park, Science parks	15

Facilities	130	Skills accreditation	19
Further Education	8	Smart specialisation	69
Governance	1	social impact	6
HEI, HEIs	48	Spin-offs	46
Higher Education	100	Student, students	88
Higher Education Institution, Higher Education Institutions	24	Study, studies	150
Innovation support	17	Tertiary Education	29
Knowledge institution, knowledge institutions	34	Thesis	7
Laboratory, laboratories	26	University management	1
Labs	25	University, universities	278
Leadership	1	Vocational training	160
Selected combined terms			
Education AND smart specialisation	7	Leadership AND university	1
Higher education AND smart specialisation	3	Governance AND university	1
Spin offs AND smart specialisation	6	Governance AND higher education	1
Studies AND smart specialisation	4	Higher education AND courses	6
Universities AND smart specialisation	5	Postgraduate AND smart specialisation	1
Vocational training AND smart specialisation	1	Postdoctoral AND smart specialisation	1
Curricula AND smart specialisation	2		

4 Case Studies

4.1 Overview of the process

The two regions selected as pilot case studies were Navarre in Spain and North East Romania. Together with JRC researchers and external experts both regions undertook a process of investigation and reflection into how their local HEIs were contributing to smart specialisation. An integral part of the work was to build stronger partnerships between policy makers, the HEIs and the wider innovation community. A further objective of the pilot case studies was to test the methodology in order to inform future development of the HESS project itself.

The methods were broadly the same in both places, though with some adjustments to reflect differences in the two regional contexts. The three stages undertaken in each region is described in Box 3. The full written results of the pilot case studies are in the form of JRC technical reports (Campillo et al. 2017, Marinelli et al. 2017).

Box 3: The three stage process of the HESS pilot case studies

Stage 1 Exploratory Workshops: These took place in May (Navarre) and June (NE Romania) 2016 with representatives from HEIs and other regional bodies. They aimed to understand how the HE system is integrated into the S3 policy mix and how HEIs are contributing to implementation. The workshops also aimed to narrow down the analytical objectives of the case-study and initiate a process of self-reflection to address the implications of S3 for regional governance.

Stage 2 Semi-structured in-depth interviews: These took place during November and December 2016 and consisted of 12 (Navarre) and 21 (NE Romania) interviews with key university representatives and in the case of Navarre, regional government and industry representatives. The interviews lasted approximately two hours each and discussed in more depth the issues that were identified in the respective exploratory workshops.

Stage 3 Validation Workshops: These were held in December 2016 with 14 (Navarre) and 25 (North East Romania) participants including university representatives, regional government and agencies, experts and JRC researchers. The main objectives were to present and validate the results from the previous steps, discuss policy and strategy implications, and to identify potential actions that could be taken onwards by the stakeholders.

In NE Romania where the process of involving universities in regional innovation strategies is less developed this workshop was targeted primarily at university leaders. In Navarre where universities are already quite well embedded in regional innovation this included a wider stakeholder group.

4.2 Comparison of findings

The findings of the case studies are analysed here following the framework introduced in Section 2, with each of the four elements of smart specialisation and their impact on HEIs, namely: prioritisation, entrepreneurial discovery, the place based approach and open innovation.

Table 5 Key characteristics of the case studies

North East Romania	Navarre
<ul style="list-style-type: none"> • North East Romania has the lowest GDP per capita among all Romanian regions, with €4900 per inhabitant compared to €8100 in Romania as a whole and €28900 in the EU28. • Main cities: Iasi, Suceava, Bacau, Piatra Neamt, Botosani and Vaslui. • Economic activity is concentrated in low-skilled, low-tech sectors. Manufacturing represents 20.2% of GVA, and professional, scientific and technical activities account for only 4.2% of GVA. While agriculture, forestry and fishing account for 8.5% of value added they account for 50.2% of employment. • The regional innovation system is in its early stages of development, with weak systemic links among knowledge actors, an emergent regional governance structure and limited tradition of knowledge and technology transfer. • North East Romania is home to seven public and four private HEIs. Three of the regional universities rank among the top 10 in the country. • Universities are mainly focussed on education, followed by research, with "third mission" activities (technology transfer and societal engagement) still at an incipient stage. 	<ul style="list-style-type: none"> • GDP per capita is above the EU average, and the third highest among Spanish regions. • Navarre is a moderate innovator in EU28, according to the 2016 Regional Innovation Monitor. Out of the 17 Spanish regions, only Navarre and the Basque Country display an R&D intensity above the EU average • 17% of the total active population is employed as research personnel (FTE). • The region is a high performer in tertiary education attainment with 69% of the population aged 30-34 having completed tertiary education, above the Spanish average (60%). • Since 2000, R&D and innovation support policies have been shaped by successive regional technological plans, with high levels of stability and continuity in the staff designing these plans. • Navarre is home to two universities: The UPNA, a public university, strong in technology transfer and engineering fields. The UNAV is a private university positioned first in Spain in teaching and excelling in the bio-medical field.

4.2.1 Contribution to the entrepreneurial discovery process

Following the conceptual framework introduced in section 2, the role of HEIs in the EDP refers to their engagement in the activities that allow the regions to identify S3 priorities and to keep reflecting and refining them.

As indicated by Healy (2017), the North East RDA has a strong legacy of progressive actions in the field of regional innovation. Indeed, it was one of the first RDAs in Romania to begin the process of developing a regional S3, helped by the knowledge acquired with previous involvement in EU projects and regional innovation networks, as well as its experience with consultative and bottom-up approaches (ibid). While the region started working on its strategy back in 2013, since 2016 it has been developed further through a partnership with the JRC.¹⁵

HEIs in the region have been among the actors involved in the identification and refinement of priorities, throughout the so called Entrepreneurial Discovery Process. Indeed, the selected priorities reflect the area of expertise of the universities, as indicated in Table 6.

Table 6: Public Universities' links to S3 priorities in North East Romania

HE Institutions	S3 Priority Areas
"Alexandru Ioan Cuza" University	ICT, Tourism, across all priorities through interdisciplinary & entrepreneurship courses
"Gheorghe Asachi" Technical University	Textile, ICT,
"Grigore T. Popa" University of Medicine and Pharmacy	Biotechnology (Pharmaceutical); ICT (Public Health); Tourism(Medical recovery)
"Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine	Agro-Food, Biotechnology, Tourism (Slow food/Healthy food)
"George Enescu" National University of Arts	Tourism (New media/Creative and Cultural Industries)
"Stefan cel Mare" University	ICT, Tourism, Agrofood, Biotechnology(Pharmaceutical)
"Vasile Alecsandri" University	Environment, Tourism (kineto therapy and medical recovery)

The EDP in North East Romania was based first on technical meetings which identified the priority areas and then, with the support of the JRC, on a set of structured participatory workshops which allowed stakeholders to start operationalising the afore-mentioned priority areas. Universities were always present in these gatherings, and were active in different capacities (i.e. as simple contributors in the brainstorming, or presenters, chairs of discussions). As well contributing with ideas, the presence of

¹⁵ North East Romania is part of the JRC project on RIS3 Targeted Support in Lagging Regions: <http://s3platform.jrc.ec.europa.eu/ris3-in-lagging-regions>

universities ensured that the scientific and technological capacity of the region was taken into account when exploring entrepreneurial ideas.

Given that the regional innovation ecosystem in Navarre is much more advanced, it has been easier for universities to be closely involved with the EDP. In recent years the system has been boosted by the launch in 2013 of the AdiTech Corporation which brings together the six different technology centres, institutes and industry associations of Navarre (including the research institutes and centres of the both universities) under one organisation. This provides an important instrument to position and enhance the involvement of the universities in Navarre S3 deployment. In order to ensure the interdisciplinary approach and strategic vision of the institutes to contribute to the region, the institutes share a common building and have a single Head of Business Development to support the scientific directors in the management of knowledge transfer, regional engagement and international projection.

Both universities in Navarre have actively participated in the entrepreneurial discovery process design for the definition of the Navarre S3, including playing an active part in working groups and decision-making bodies. University involvement has been at the highest level, with rectors and vice-rectors leading the process, which has resulted in a very strong role for the universities in shaping the regional innovation strategy. The broader academic community engagement and awareness of the S3 process has not been considered a key aspect in the first stages of the strategy's definition, which has mostly involved senior managers.

The recent creation of research institutes by both universities could be a vehicle for the involvement of the academic community in S3, as their research fields match very well with the S3 selected priority areas and its personnel has been closer to the S3 process. The institutes want to boost interdisciplinary, world-class and more integrated research capacities to better respond to the S3. Furthermore, very interestingly, some of the institutes' have integrated capacities outside the university, with agreements between both universities, the regional administration and healthcare services, which reinforces the structuring role that the new instrument might have and the central role of universities.

As an example, the INARBE research institute of the UPNA has been recognised to have an important role in S3, particularly in the generation of knowledge, monitoring and evaluation of the strategy and processes. Nevertheless certain limiting factors need to be addressed, including the restrictive regulations applied to university professors, the time devoted to

teaching and research and high levels of bureaucracy. The creation of the Business and Social Forum by the UPNA has generated a space to discuss and enable the identification of emerging needs of the business environment, improve the employability of upcoming PhDs, and the introduction of entrepreneurial skills in curricula. The Forum has worked with more than 20 regional business stakeholders to define and launch Industrial PhDs.

In terms of human capital retention, the fact that two universities are based in a small region attracts an important number of higher education students relative to the total population. The UPNA has strong connections to the business fabric of the region and plays a central role in the retention of talent, whereas the UNAV is a well-recognised organisation that attracts an important number of international students and researchers. Nevertheless, both universities think Navarre would greatly benefit from the design and implementation of a programme to attract international researchers. Experiences such as Ikerbasque¹⁶ in the Basque Country or ICREA¹⁷ in Catalonia could increase the knowledge base of Navarre, fostering international connections and helping to create a climate of excellence that permeates into the innovation system, having a strong impact on S3 implementation.

4.2.2 Support to a limited selection of priorities

In North East Romania and Navarre, the teaching and research strengths of the HEIs are well aligned to the S3 priorities. In North East Romania an analysis of universities' profile was a key part of strategy formation, whereas in Navarre this was not the case, save for the priority of health. To a certain extent this reflects very different levels of development of the regional innovation systems.¹⁸ Compared to North East Romania there is much more innovation in Navarre from a wide variety of economic actors, and therefore the analytical basis (including the type of indicators) and the selection process was considerably wider. North East Romania is the country's least economically developed region but is home to some of its most high performing universities and a very dynamic RDA. Therefore the

¹⁶ Ikerbasque was created by the Basque government in 2007 with the mission to develop and consolidate scientific research in the Basque Country, attracting international talent to the Basque Country and helping researchers to work in research and innovation organisations of the Basque Country. . <http://www.ikerbasque.net/en/>

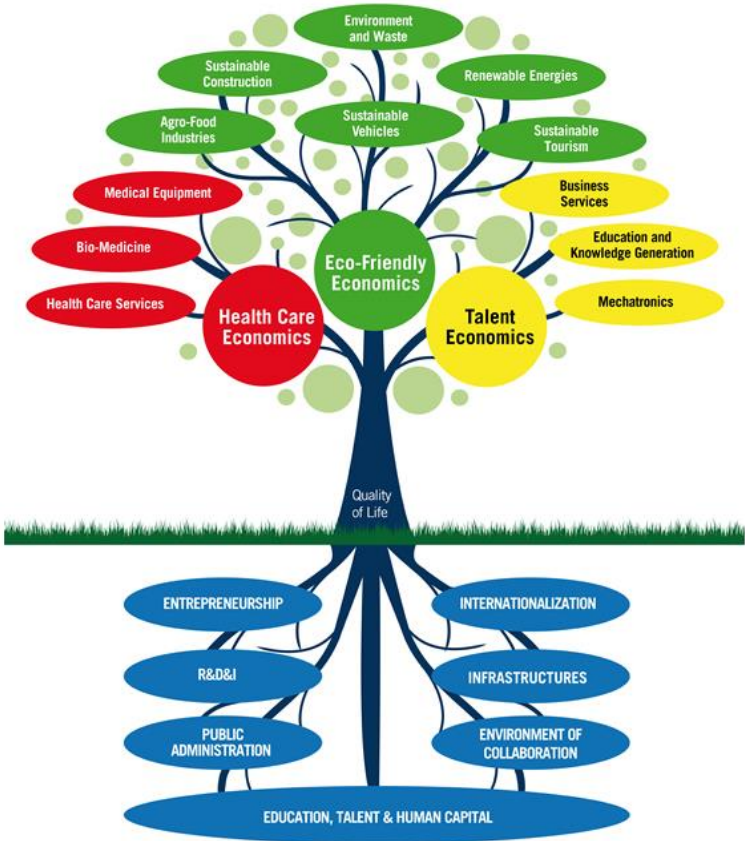
¹⁷ ICREA works with Catalan universities and research centres to integrate ICREA research professors in the Catalan research system. It attracts researchers from all over the world to Catalonia offering permanent positions. <https://www.icrea.cat/en/>

¹⁸ The regional innovation monitor classes North East Romania as an 'Modest Innovator' (less than 50% of the EU average), whereas Navarre is classed as an 'Innovation Follower' (higher than the EU average). It is one of only two regions in Spain (the other being the Basque Country) to be ranked in this category.

universities have a potentially much larger role to play in knowledge driven development. This said, there was a perception in Navarre that the S3 would have benefitted significantly from a more comprehensive audit of the regional higher education system and which (sub-)disciplines have most potential to drive innovation.

There are also differences between the two regions when it comes to supply and demand for human capital in the labour market. As a less developed region the mismatches are much greater in North East Romania. In some cases (mostly in social sciences, humanities, business, law etc.) there is an oversupply of graduates while other areas (engineering, medical, IT, textiles) there are not enough graduates to meet demand. In some cases (e.g. textiles) it is difficult to recruit students to these programmes, in other cases (e.g. IT) the problem is the 'brain drain' of graduates moving out of the region. Interestingly, in Navarre, while employers consider the level of technical competence of graduates to be high and aligned to the region's industrial profile, they see a need for stronger horizontal skills such as entrepreneurship and problem solving.

Figure 8: Navarre's "Innovation Tree"



Source: Government of Navarre (2016)

Unlike most S3, education and training has in fact been included as one of the horizontal priorities in Navarre's S3, as illustrated in Figure 8. The objective is to support innovative education oriented towards values and professional skills for the future. In its policy mix the strategy states that it will boost quality higher education and vocational education and training that is linked to the needs of firms and focused on strategic sectors, and enhance the skills and competencies for employability and life-long learning. The introduction of education and training priorities, including higher education in the Navarre S3 is very positive and shows that the region has given a key role to the education mission of universities in the achievement of the ambitious objectives set by the strategy. From the university side, the UPNA has gone through an important re-organisation of the nature and range of the education it offers that shows the relevance given by the university and engagement from the education mission to the S3. These new provisions are based on careful considerations of the alignment with Navarra's S3 priority areas and the response to regional societal demands, and as such have been included in the 2016-2019 Strategic Plan.

In North East Romania the system consists of seven public and four private HEIs, and each tends to be specialised in few scientific disciplines. Overall they complement each other relatively well in terms of subject matter, however the HESS project has highlighted the need for improved inter-institutional coordination for cooperation in teaching, research and other activities supportive of innovation. For example, private sector engagement in course-design, while not uncommon, appears largely left to the initiatives of individual professors with no formal structure to facilitate such processes. An effort to coordinate and support these ad hoc personal initiatives, either within each HEI or across them, appears important to maximise and scale-up their impact.

Furthermore, the centralised nature of higher education policy (and public administration in general) in Romania limits the flexibility for HEIs to adapt their activities, such as new academic courses or distance learning, to regional demands. The situation in Navarre is much different. HEIs enjoy high levels of autonomy from the central state and the public university is funded and administered by the regional government, providing the conditions for an alignment of strategies. The Public University of Navarre (UPNA) is a relatively young institution, being founded in 1987 with an explicitly regional mission. In fact 85% of the students are from Navarre and the range of education on offer is designed

together with the regional government. In contrast, the Private University of Navarre (UNAV) which is slightly larger is more connected internationally, both in terms of research networks and students, of which only 38% come from the region. It is a leading research institution in a number of disciplines, especially medicine and the bio-economy. Although it is not embedded in the region like the public university, UNAV makes a crucial contribution to its economy, directly due to its presence, but also in terms of new firm creation, industry collaboration and internationalisation. In fact, there is a potential for very fruitful cooperation between the two universities in Navarre because of their different but complementarity profiles. The system as a whole could become very powerful in adapting international knowledge to the local context. Nurturing a system of governance to promote cooperation between the universities and a joint dialogue with industry could enhance this process.

The launch of Aditech Corporation has addressed the existing rivalries between some of the research centres and university research groups. Aditech has brought under one umbrella six technology centres, three research centres, industry associations and the two universities of Navarre. It aims to create a new ecosystem that brings together new forms of establishing research centre-university-business collaborations in the value chain, especially focused on the implementation and application of innovative products and services. The increased integration of universities in the new Aditech ecosystem, whose initial aim was to bring together research and technology centres, could introduce additional structuring of the research capacities, enhance applied research and transfer of knowledge from universities.

4.2.3 The role of HEIs in place based policies

The ability of HEIs to engage in place-based policies clearly depends on different facets of the regional context and its policy competences. In this respect the two pilot case studies could not differ more.

Regarding sub-national governance, the region of North East Romania has no administrative status and is constituted as a NUTS2 territorial unit and as a framework for the implementation of regional development policies and use of Structural Funds. It has a Regional Development Agency (RDA) governed by a Regional Development Council (RDC), but its formal responsibilities remain very limited. The RDA has pro-actively developed an S3 for North East Romania but has limited influence on its policy mix. There is an ESIF regional operational programme but it is managed centrally by the national government. Furthermore, beyond the RDA there

are few place-based institutions such as clusters and business associations that can generate bottom up ideas for collaboration between the universities and enterprises.

Despite the context, the HESS project revealed avenues for embedding HEIs in place-based policy. HEIs are also actively involved in the governance of S3. In particular, academics are part of the Regional Innovation Consortium, the partnership structure coordinating the governance of the S3. The Consortium provides feedback on the structure and mix of policies in the strategy, potentially proposing updates or revisions and identifying relevant sources of funding. The consortium has an Advisory Commission to identify funding possibilities for the S3 project portfolio and to provide information on the implemented projects. Furthermore, the governance structure also includes an Academic Task Force, comprising the academic representatives of the Regional Innovation Consortium, which has an evaluation and advisory role.

In contrast, Navarre retains policy competences in most of the areas in its S3 policy mix. The Government of Navarre has been continuously defining and implementing successive regional innovation policies, addressing the reinforcement of the regional scientific and technological research infrastructure and resources as well as the stimulation of the innovation capabilities and performance of the business sector. The objective is to integrate regional innovation into the European Research Area and global networks. Support for innovation activities are carried out by means of financing R&D projects for companies and research organizations. Collaborative projects, either at a national or international level, are particularly encouraged.

The Navarre Government as well as the research and innovation stakeholders of the region have acknowledged the importance of involving universities in the S3. The Rector of the UPNA is a member of the S3 steering committee and both universities are involved at the highest level of governance, where the final decisions are made. However, staff at faculty level who may be more closely involved in projects linked to S3 are much less familiar with the regional strategy and its objectives. They spoke about a lack of clarity on how the S3 process will evolve after the definition of the S3 priority areas and the way the project prioritisation and decision making process will be set up.

The HESS case study has helped to identify certain limiting factors that hinder the stronger involvement of universities in the S3. The national regulation of the structure and governance of universities does not

provide the flexibility needed for the recruitment of university professors with different profiles and contract types. The S3 processes require more flexibility in terms of the possibility of professors to devote time outside teaching and research activities. This type of engagement with regional actors and S3 processes is carried out on top of their official activities and is very much based on the individual motivation and engagement of professors than in a systematic and regulated manner. Moreover, these processes require different researchers' profiles to the general academic professor profile, which is interested in working in multi-stakeholder collaborative projects, applied research and closer to the policymaking cycle. A potential way of overcoming these obstacles are hybrid organisations that are under the umbrella of university governance but can develop partnerships with outside organisations in a flexible manner and can hire personnel outside the university regulatory requirements.

4.2.4 Broader understanding of innovation and research

In North East Romania HEIs reported a strong shared recognition of the university's role as a boundary spanner and of the value of engagement with the public sector and with society at large. While HEIs and their staff show awareness of the importance of being present in different organisations (including NGOs, civic society etc.) in their field of interest, these activities are pursued on an ad hoc, individual basis. University staff members are voluntarily involved in different decision making committees at local and county level. HEIs showed awareness of the importance of being present in different organizations (including NGOs, civil society etc.) in their field of interest. However, academics engaging with the society do so because they are personally motivated, rather than because there is institutional or sectoral encouragement. In terms of actionable proposals, the study indicates a need for capacity-building process to improve engagement, as well as awareness-raising to recognise the effort of HEIs participating in activities with the territory.

HEIs in North East Romania stressed that S3 also puts new demands on the topics of research, demanding that more attention be paid to local socio-economic challenges (for instance, specific health issues in rural areas remote from cities). For this to succeed however there needs to be more intra-regional and interdisciplinary collaboration among HEIs. This is nevertheless extremely challenging, as local universities do not have a tradition of collaboration, nor do funding streams and evaluation frameworks encourage such approaches.

The Navarra case has also shown the importance of the societal recognition of the university activity for its own sake as a clear and distinct contribution to the region, and especially to individual teachers and researchers collaborating in projects of public interest. The stronger orientation of regional programmes/initiatives towards societal challenges would be welcomed by innovation actors as it is believed that this could become a catalyst for new forms of cooperation with the university

The cross-border collaborations with Aquitaine and Basque Country regions can boost the outward looking perspective of the Navarre S3, and contribute to better integrating the region into international value chains. The recent formal engagement of Navarra in the Euroregion EGTC governance envisions a new framework of potential collaborations that can have an important impact through the S3 process. Nevertheless, more awareness of existing cross-border collaboration opportunities should be raised by the Navarre government to foster this partially untapped potential.

4.3 Case study conclusions

4.3.1 North East Romania

The results from the fieldwork show that there is significant potential for universities in North East Romania to supply the human capital needed to increase innovation and implement the region's S3. The universities provide high quality education and attract students to its main cities. There are positive examples of engagement with business, whether through student placements or co-design of courses. Yet a lack of structured cooperation at an institutional level limits their impact. There is openness among the staff to contribute to entrepreneurial education, lifelong learning and professional training, outside the traditional course structure and student profile. Finally, increased capacity at regional level for tracking graduates and understanding the labour market seems to be essential for progress. It is critical that the RDA and the other actors governing S3 are able to capitalise on the willingness of local HEIs and find ways to implement the lines of activities identified through the HESS project.

It also seems essential to allow universities to participate more in international networks, and to build the capacities for knowledge absorption. This could be done by centring research efforts on local challenges (societal, techno-economic, environmental or health-related) and fostering collaboration among regional research actors.

The very limited development of technology transfer in the region places local HEIs in a difficult position. On the one hand they are important regional research actors, on the other they have had limited incentives, capacity and (intermittent) policy support to engage in technology transfer.

While the HESS fieldwork was extremely fruitful and identified relevant avenues for policy decisions, its most important outcome is the definition of a strategic vision for regional development among HEIs and with the RDA. HEIs have perceived themselves not only as providers of human capital, but also as critical actors for regional development.

This is an achievement not to be underestimated and it is especially relevant for the EU's peripheral regions. Indeed, it suggests that the concept of smart specialisation and stakeholders' collaboration is appealing and gathers commitment also in areas that have little tradition of dialogue and cooperation in innovation, where universities are strongly anchored to traditional models.

4.3.2 Navarre

The two main universities of the region, UPNA and UNAV, are complementary and can contribute differently to regional development based on their main strengths. UPNA is a more regionally oriented university with strong connections to the territory as well as interregional collaborations. UNAV is well rooted in Navarre but displays a clear international talent attraction and research university vocation. The HESS case study has shown that a more sustained and systematic institutional collaboration between both universities could considerably strengthen their contribution to the S3. The strategies of the universities themselves should be carefully considered in the implementation of the S3 and in the reflection of the different type of contributions they can make.

The case study has raised the need to establish more links and collaborations between higher and vocational education, as they can both complement each other in their contributions to the S3. The regional government has given strategic importance to the plan for the range and types of vocational education and training on offer that has been shaped in collaboration with different education, social and economic actors of the region. The plan was informed in particular by the stated demand from employers and the perspective of students. There is a clear opportunity to fully exploit the Vocational Education and Training provided by national accredited centres of reference in energy (CENIFER) and health (ESTNA),

which are very close to the needs of the region and especially focused in the education and training of students to ensure their future employability.

While there are genuine efforts to align the teaching and other activities of the universities with regional priorities and employer demands, there could be more anticipation and mapping of future needs in terms of education, innovative educational models and promotion of entrepreneurship. The universities are also asked to develop more 'transversal' skills in graduates as well as deep but narrow technical competencies, which are sought by regional employers.

The industrial PhD or traction programmes that promote collaboration between companies, technology centres and research institutes have been welcomed as important instruments put in place by the government that will contribute to the S3 priority areas. The fact that the instruments have been jointly defined in cooperation with research and innovation actors helps to make them suitable to address the challenges faced. Nevertheless, additional efforts by the actors to shape the specific activities, projects and initiatives that will be promoted under the S3 education and training cross-cutting factor would be beneficial to ensure the timely achievement of the proposed results in coordination with the activities launched in the six vertical priority axes.

5. Policy lessons and next steps

The first phase of the HESS project has simultaneously shown the potential of HEIs to contribute to smart specialisation in Europe's regions, while identifying major obstacles to the engagement of the HE sector with innovation and regional development.

On the one hand, policy makers perceive HEIs as central to smart specialisation, in particular for the development and retention of human capital. The S3 Platform survey showed that higher education is seen as particularly important for S3 implementation by less developed regions. Furthermore, in the public consultation on smart specialisation conducted by DG Regional and Urban policy, respondents identified skills and education as the second most important element in S3 processes (European Commission 2017c, p37). These surveys also suggest HEIs have become more involved in innovation eco-systems at regional level, and the action research in Navarre and to a lesser extent in North East Romania shows that senior university managers have been closely involved in S3 governance structures. Yet at faculty and operational level, engagement with S3 is still patchy, sporadic and usually based on individual relationships rather than a comprehensive and corporate university strategy.

In fact, the HESS project has shown that the contribution of HEIs to S3 is limited by several factors tied to the multi-level nature of the EU and its Member States. While smart specialisation is an EU initiative, European level intervention is mostly restricted to the negotiation of ESIF OPs in the area of R&I. Yet, the aspiration for S3 to be economic modernisation strategies, as repeated in the latest Communication on Smart Specialisation (European Commission 2017b), requires a much broader set of policy tools which are beyond the remit of the European Commission. For instance HE systems, a competence of member states, rarely provide career incentives to engage with regional stakeholders, from business to the public sector and civil society. At the EU level it is only possible to issue recommendations through the European Semester process (for example Latvia has been encouraged to rationalise its HE sector and link it to S3 priorities). Furthermore, harnessing HE for regional needs is much more difficult in highly centralised Member States such as Romania than in those with more autonomy for HE such as Spain. The widening out of smart specialisation requires more integrated policy making from EU level down. This is illustrated by the very limited use of

the ESF for innovation, and yet investment in people rather than research has been identified by S3 policy makers and practitioners a priority, especially in less developed regions. The next generation of ESIF post 2020 should explore ways to better integrate the different ex-ante conditionalities and funds.

Nevertheless, despite these obstacles, the HESS project has started to highlight cases where HEIs can really make a difference to smart specialisation. This reservoir of European knowledge needs to be built and disseminated further, especially when it comes to the role of HEIs in developing and retaining talent in regions that are facing demographic challenges. Examples of how the ESF as well as ERDF have been used to strengthen this role are particularly needed. This will be a priority for the HESS project as it moves forward. Further analysis of ESIF programming and implementation together with Country Specific Recommendations of the European Semester can help to target regions and countries for action research. This in turn will help build a European Community of Practice that is committed to forwarding this agenda.

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